The optimal and decreasing growth rate of the Islamic banking industry

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Abstract

Purpose – The Indonesian Islamic banking industry is very promising, but there has been no analysis of the optimal and decreasing growth rate of the industry. Information regarding these is essential for policy makers, Islamic bankers and all related parties to guide the future development of the industry and sets up proper plans and strategies. The paper aims to explore the optimal and decreasing growth rates of the industry and in so doing contribute to the current literature on the Indonesian Islamic banking industry.

Design/methodology/approach – The paper first reports on the performance of the Indonesian Islamic banking industry, before explaining conditions where the Islamic banking industry is believed to be still immature. Third, in order to identify the optimal and decreasing growth rates, the paper estimates the future performance of the industry by using ARIMA models to identify periods where the growth rate is at optimal and decreasing points. Then, on the basis of a number of assumptions and statistical simulations, the analysis broadens to become qualitative in nature by determining the optimal numbers of Islamic banks to be established in the future.

Findings – The paper generates some important findings. First, the optimum growth rate of the market share (0.12 percent) is predicted to occur in December 2012; the market share in that month is estimated to be 5.75 percent. Second, although the market share keeps growing, the paper finds the rate of increase to be slow, and in October 2018, it becomes negative, at 0.004 percent. The estimated market share in that time is 11.63 percent. Finally, the optimal number of Islamic banks in December 2012 is shown to be 23 and in October 2018, 24.

Research limitations/implications – Qualitative information on the months of the optimal and decreasing growth rates and quantitative information on the optimal number of Islamic banks to be established are significant information for policy makers, Islamic bankers and other related parties. The information is likely to be important in relation to their efforts to develop the Islamic banking industry, to anticipate decreasing growth in the industry and to establish new Islamic banks. More generally, the paper helps the related parties to direct and guide the future development of the industry.

Originality/value – To the best of the authors’ knowledge, this is the first paper that attempts to establish optimal and decreasing growth rates in the Indonesian Islamic banking industry, or the optimal numbers of Islamic banks to be established in the future.

Keywords ARIMA, FDR, NPL

Paper type Research paper

JEL classification – G21, G28

The paper is purely the authors’ own research and opinion. It does not represent the views or policies of institutions where the author is working for.
1. Introduction
The remarkable growth of the Islamic banking industry in Indonesia is cause for optimism that the industry might play a dominant role in the economy sometime in the future. From 2004 to 2009, the annual growth of the industry reached 46.3 percent, while in 2010, it reached a 47 percent growth rate (Bank Indonesia, 2009, 2010). However, there is also reason for curiosity and caution among Islamic bankers, government, banking regulators, Islamic scholars, and the public, who are all probably eager to have qualitative information. Studies are needed to answer questions regarding when the optimal growth rate is achieved, when the industry may face a decreasing growth rate, quantitative information on what the negative number of growth rate is, and how many more Islamic banks are to be established in the near future.

The answers to those questions are essential to the immediate development of the current Islamic banking environment. Even the future plans and policies of banking regulators and market players may depend on such answers. Some examples are:

- the limit of the government and banking regulators’ efforts to develop the Islamic banking industry and reach its optimal growth;
- the actions and policies of the government, banking regulators, and all related parties to anticipate the expected decreasing growth rate of the industry; and
- the central bank policy to limit the establishment of new Islamic banks.

This paper attempts to conduct an empirical analysis to answer those important questions. First, it identifies conditions when the Indonesian Islamic banking industry faces optimal and decreasing growth rates. Second, to find qualitative information on the estimated periods of the optimal and decreasing growth rate, the paper uses an econometrics model – namely the autoregressive integrated moving average (ARIMA) model – including information on the future growth rate of the Islamic banking industry. Finally, with some assumptions and statistical simulations, it counts on the optimal numbers of new Islamic banks to be established in the future.

The organization of the paper starts with a description of the Indonesian Islamic banking industry to give some initial ideas on the latest position of the industry. It continues with the related literatures on estimating the growth of Indonesian Islamic banking industry followed by literature reviews on the ARIMA model. Then, it constructs the ARIMA models and produces essential outputs with regard to the future performance of the industry. Finally, the paper analyzes the outputs of the models, which are indeed the answers to the questions posed earlier. Furthermore, it stresses some vocal points to be considered by policy makers, Islamic bankers, and all related parties in determining the future policies and plans to develop the Islamic banking industry in Indonesia.

2. Indonesian Islamic banking industry
After the establishment of the first Islamic bank namely Bank Muamalat Indonesia (BMI) in 1991/1992, the Indonesian Islamic banking industry has shown its robust performance at least based on various banking indicators. For example, the industry has healthy financial intermediary function and prudential banking operations. The financing to deposit ratio (FDR) fluctuated around 110.71 percent on average from December 2000 to September 2010.
It reveals that the industry focuses entirely on direct financing to the real sector and plays an important role in improving performance of the small and medium enterprises (SME) as most of its financing (65.83 percent) go to this sector. Furthermore, the non-performing financing (NPF) stands between 2 and 5 percent of the total financings. Other measures, like total assets, financing and deposits grow annually for more than 40-60 percent on average (Bank Indonesia, 2000-2010).

Based on data of September 2010, the total assets have reached Rp83.45 trillion with total financing of Rp60.97 trillion, very close with the total deposits of Rp63.91 trillion. At the closing of this period, there were ten Islamic commercial banks (BUS) followed by 23 Islamic banking windows/unit (UUS) and 146 Islamic rural banks (BPRS) integrating 1,388 offices around the country (Table I).

Nonetheless, despite such an outstanding performance, there is a need to know the optimal and decreasing growth rate of the Islamic banking industry as mentioned previously. Knowing when the industry stands on its maturity level and when it decreases as represented by a set of questions above is very important to be elaborated and answered. The following parts will look at the conditions leading to the conclusion that the Islamic banking industry is not yet optimal followed by relevant studies to assess the growth of the industry for the econometrics exercises.

3. Conditions leading to the optimal and decreasing growth rate
There are at least three main conditions leading to the conviction that the Islamic banking industry is not yet optimal. These are:

1. so far, depositors of Islamic banks are only 8 million or only 3.8 percent of the total Moslem population (208 million) in the country (Bank Indonesia, 2000-2010);
2. almost all of the Islamic banks’ deposits belong to the public (Bank Indonesia, 2010), that is, the government allocates only minimal funds to the Islamic banking industry; and
3. up to December 2010, there are only 11 Islamic banks compared to 122 conventional banks.

More Islamic banks should be established to serve the public.

<table>
<thead>
<tr>
<th>Banking indicators</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
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<td>3</td>
<td>3</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(unit)</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>8</td>
<td>15</td>
<td>19</td>
<td>20</td>
<td>25</td>
<td>27</td>
<td>25</td>
<td>23</td>
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<tr>
<td>Islamic rural banks (unit)</td>
<td>79</td>
<td>81</td>
<td>83</td>
<td>84</td>
<td>88</td>
<td>92</td>
<td>105</td>
<td>114</td>
<td>131</td>
<td>139</td>
<td>146</td>
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<td>Total offices (unit)</td>
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<td>337</td>
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<td>567</td>
<td>683</td>
<td>951</td>
<td>998</td>
<td>1,388</td>
</tr>
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<td>Total asset (trillion Rp)</td>
<td>1.79</td>
<td>2.72</td>
<td>4.05</td>
<td>7.86</td>
<td>15.33</td>
<td>20.88</td>
<td>26.72</td>
<td>36.53</td>
<td>49.55</td>
<td>66.09</td>
<td>83.45</td>
</tr>
<tr>
<td>Total financing (trillion Rp)</td>
<td>1.27</td>
<td>2.05</td>
<td>3.28</td>
<td>5.53</td>
<td>11.49</td>
<td>15.23</td>
<td>19.53</td>
<td>27.94</td>
<td>38.19</td>
<td>46.88</td>
<td>60.97</td>
</tr>
<tr>
<td>Total deposit (trillion Rp)</td>
<td>1.03</td>
<td>1.81</td>
<td>2.92</td>
<td>5.72</td>
<td>11.86</td>
<td>15.58</td>
<td>20.67</td>
<td>25.65</td>
<td>36.85</td>
<td>52.27</td>
<td>63.91</td>
</tr>
</tbody>
</table>

Source: aBank Indonesia, up to September 2010

Table I. Selected Islamic banking performance indicators
As such, when the Islamic banking industry can serve at least 50 percent of the total Moslem population and when the government can allocate most of its funds to Islamic banks, then the number of Islamic banks will be more or less equal to that of the conventional banks, and the market share of Islamic banks will be significant enough to influence the economic policy, and therefore the Islamic banking industry would be assumed to have reached its optimal level of growth. After that, the industry might not maintain its optimal position or it may face a decreasing period. The next parts below will determine such optimal and non-optimal periods.

4. Literature reviews

4.1 Papers analyzing growth and development of the Islamic banking industry

Various papers analyze the growth and development of the Indonesian Islamic banking industry. The examples are Siregar (2002), Hamzah (2008), Suseno (2008) and Utami (2008). In his paper, Siregar (2002) addresses the issue of developing the Indonesian Islamic banking industry to support the economy. In particular, in order to speed up the development of the industry, he suggests that good cooperation among stakeholders, fair treatment, gradual and sustainable growth of the industry, and Islamic-values-oriented banking policies are required.

Further, he stresses the variability of Islamic banking products, the availability of human resources, the ability of Islamic banks to attract new investments, the development of infrastructures, and the proper regulation as focal points to determine the prospect of this industry. However, he neither analyzes nor assesses the future growth of the Islamic banking industry.

In his paper, Hamzah (2008) explains that the growth of Islamic banking depends on basic market mechanisms, namely the fulfillment of demand and supply of Islamic banking. He argues that the depositors of Islamic banks are not only interested in depositing money in the Islamic-based financial institutions but also are very irrational. Further, he states that human resources, product development, the number of Islamic banks, and banking regulations are critical variables that determine the development and future growth of the industry. Unfortunately, he does not conduct a proper analysis of the fulfillment of demand and supply.

Besides these two authors, Suseno (2008) indicates that the current growth of the Indonesian Islamic banking industry shows long-term and sustainable growth. He focuses on the efficiency of the industry to identify the soundness of such a prospective growth. Then, he analyzes the efficiency of the industry with the data envelope analysis (DEA) approach rather than exercises the long-term growth of the Islamic banking industry.

Finally, Utami (2008) studies factors determining the financial performance of the Islamic banks. She conducted analysis on:

- the relationship between the characteristics of the banking indicators and the bank’s financial performance;
- the influence of macroeconomic indicators; and
- the structure of the financial indicators in Islamic banks, in order to understand the influence of these variables on the performance of Islamic banking in Indonesia.

Unfortunately, she does not estimate the future development of the industry.
Considering the contributions and the limitations of these four papers, this paper assesses not only the historical and current performance of the Islamic banking industry but also estimates its prospective future condition. Later, the paper contributes to the current literature on the periods where the industry would reach its optimal and decreasing growth rate. Furthermore, it gives the optimal numbers of new Islamic banks to be maintained in the near future.

4.2 Autoregressive integrated moving average

The ARIMA model[1] is used to exercise the growth of market share of both the Islamic and conventional banking industry and to generate the estimated numbers of such market share. Historically, ARIMA was first developed by Box and Jenkins in 1976 and unlike the structural model which composes of some independent variables, ARIMA employs autoregressive (AR), and moving average (MA) in an integrated order term. AR(\(p\)) is actually describing a dependent variable (\(Y_t\)) based on its past (lag) value (of order \(p\)) or the same as dynamic model. AR is also commonly said as the one uses lag value of the residual of the regression.

On other hand, MA(\(q\)) is explaining a dependent variable (\(Y_t\)) based on past values of the error terms (\(\varepsilon_t\)) which are the moving average of past error terms of order \(q\) added into mean values of \(Y_t\). MA is also commonly said as the one occupies lag value of forecast error to improve current forecast. The general equation of ARIMA is:

\[
Y_t = \beta_0 + \theta_1 Y_{t-1} + \theta_2 Y_{t-2} + \ldots + \theta_p Y_{t-p} + \varepsilon_t + \Phi_1 \varepsilon_{t-1} + \Phi_2 \varepsilon_{t-2} + \ldots + \Phi_q \varepsilon_{t-q}
\]  

(1)

The process of modeling with the ARIMA approach follows four steps (Firdaus, 2006, p. 19):

1. identification of the variables;
2. estimation of the model;
3. model evaluation; and
4. model forecasting.

In the identification step, a series is investigated whether it has a seasonal pattern or not; stationary or non-stationary and; pattern of auto correlation function (ACF) and partial auto correlation function (PACF) such that:

\[
Z_t = \mu + \theta_1 Z_{t-1} + \theta_2 Z_{t-2} + \ldots + \theta_p Z_{t-p} + \varepsilon_t - \Phi_1 \varepsilon_{t-1} - \Phi_2 \varepsilon_{t-2} - \ldots - \Phi_q \varepsilon_{t-q}
\]  

(2)

From equation (2) \(Z_t\) is said to be stationary if the following conditions are met:

- constant mean for all investigation period or \(E(Z_t) = \mu\) for all \(t\);
- constant variance or \(\text{Var}(Z_t) = E[(Z_t - \mu)^2] = \sigma^2\) for all \(t\); and
- constant covariance or \(\text{Cov}(Z_t, Z_{t-k}) = E[(Z_t - \mu)(Z_{t-k} - \mu)] = \gamma_k\) for all \(t\).

Further, the unit root tests are carried out to check the stationarity of every variable which can be explained by taking a simple AR(1) process:

\[
Y_t = a_0 + a_1 Y_{t-1} + \varepsilon_t
\]  

(3)
where $Y_{t-1}$ is a lag of an independent variable which might contain a constant and trend; $a$ is a constant and; $\varepsilon$ is assumed to be white noise (Enders, 1995, p. 70). If $|a_1| \geq 1$, if $Y_t$ is a non-stationary series, it has a trend, does not have constant mean and; has time variance. Therefore, the stationary can be evaluated by testing whether an absolute value of $a_1$ is strictly less than one.

Two widely used tests are augmented Dickey-Fuller (ADF) and Phillips and Perron (PP).

Next, the estimation step will find out the most robust estimated model combining AR and MA or both of them. There are at least three patterns commonly found in ARIMA model:

1. a correlogram test which produces a zero value in all periods of the auto correlation function (ACF = 0) namely the white noise ACF function;
2. a correlogram test which shows a cut off ACF pattern (usually) between the first period of auto correlation function and the second or third one; and
3. a correlogram test with a decreasing pattern of the ACF from the beginning of the period until the end of a so-called dying down pattern.

When the ACF shows a dying down pattern and the PACF indicates a cut off pattern, a pure auto regressive (AR) model would be employed. When the ACF shows a cut off pattern while the PACF is dying down, a pure moving average (MA) model would be employed. Finally, when both the ACF and the PACF depict a dying down pattern, a combination of the AR and the MA is adopted. However, the model evaluation step conducts some diagnostic tests to check the accuracy of the estimated model and the actual one such as the residual test and coefficient of variables test. Finally, the forecasting step produces future data of every model under two assumptions, which are:

1. a linear forecasting; and
2. a selected model with the most efficient variables.

5. Construction of the ARIMA models and estimations

Before constructing the models, some assumptions are made in relation to the models. First of all, the ARIMA models utilize monthly data of the total assets of both Islamic banks and conventional banks from December 2000 to September 2010. The variable of total assets of Islamic banks is coded as IB while the one of the conventional banks is coded as CB. Second, after the construction of the ARIMA models, the estimated numbers of the total assets of Islamic banks and conventional banks are generated for the periods between October 2010 and December 2018.

Finally, the ARIMA models are run under the assumptions of the historical and current conditions of the banking industry. In particular:

- The growing market share of both Islamic and conventional banks is driven by organic factors such as the progressive growth of total deposits, total financing/assets, and total profits. Concerning that the Islamic banking industry has had a progressive development in the past two decades, the increasing of those organic factors cause the expansion of Islamic banking industry even faster than the conventional banking.
- The nonorganic factors that are the expansion of market share because of some new Islamic banks joining the industry, the conversion of the conventional banks
into Islamic banks or the spin-off of the Islamic banking unit (UUS) from its parent company, are not captured by the models.

- The dual banking system is still implemented and the government, public, and banking regulators support the development of the Islamic banking industry at the same level as present today.
- The economic and business conditions are always conducive to facilitate such a growing trend of the Islamic banking industry.

### 5.1 ARIMA models

#### A. Identification of variables

The identification of the variables IB and CB is conducted through checking:

- the mean, median, and standard deviation;
- the unit root (stationary test); and
- the correlogram.

The purposes of such tests are to ensure the validity of the data (no missing data, outliers, and so forth), to know the nature and diversification of the data, to identify the existence or nonexistence of a unit root, and to check any influence of lag variables toward the target variable. The total assets of Islamic banks and conventional banks are listed in Table II. The table reveals that the mean and median values of the total assets of Islamic banks are much below the ones from the conventional banks. This is because the market share of Islamic banks is still very small.

Nonetheless, the fluctuation of the Islamic banking assets is much lower than that of the conventional ones. Among other reasons, this is because the financing activities of Islamic banking have an increasing trend. Even in the cases of the Asian economic crisis of 1997-1998 and the global financial crisis of 2008-2009, the financing activities still went up while the credit activities of conventional banks were down. Table II implies that Islamic banks have the potential to keep growing in the years to come.

Following the statistical summaries, the stationary test finds that both total assets of Islamic and conventional banking indicate a non-stationary. Table III delivers the

<table>
<thead>
<tr>
<th>Variables²</th>
<th>Mean</th>
<th>Median</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Assets of Islamic Banks (IB)</td>
<td>24,947,393</td>
<td>18,343,467</td>
<td>22,229,625</td>
</tr>
<tr>
<td>Total Assets of Conventional Banks (CB)</td>
<td>1,591,076,000</td>
<td>1,424,185,688</td>
<td>527,006,020</td>
</tr>
</tbody>
</table>

Note: ²In million Rp

### Table II.
Statistical summaries of variables

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Augmented Dickey-Fuller</th>
<th>Phillips and Perron</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level</td>
<td>First difference</td>
</tr>
<tr>
<td>IB</td>
<td>8.6777</td>
<td>0.5984</td>
</tr>
<tr>
<td>CB</td>
<td>2.8965</td>
<td>−10.5614 *</td>
</tr>
</tbody>
</table>

Note: Statically significant at: *1 percent

### Table III.
Stationary test of the total assets
results of the unit root test based on the ADF and PP tests (118 frequencies of data) of both the IB and CB variables, including intercepts and 12 lags based on Schwarz info criterion.

The ADF and PP tests find that the CB is stationary in its first difference (1 percent statistical significance) or said to be integrated in order 1 based on the ADF and PP tests. Meanwhile, the IB is found to be non-stationary in both level and first difference based on the ADF test, but is stationary in its first difference (1 percent statistical significance) based on the PP test. Although IB is not identified as stationary based on the ADF test, both IB and CB are stationary in their first differences based on the PP test, and this fact confirms the next steps to use the first difference of variables IB and CB (Table IV).

After the stationary test, checking the pattern of both the AR and the MA is conducted with a correlogram test, in particular, to specify the patterns of the ACF and PACF of the IB and CB variables. The identified patterns determine the decision as to whether to model the variables with AR, MA, or a combination of both AR and MA. The correlogram test is given by Table IV. In fact, the computation on ACF and PACF finds that both ACF and PACF depict a dying-down pattern. Hence, the combination of autoregressive (AR) and moving average (MA) is employed in the ARIMA models.

**B. Estimation of ARIMA models.** Based on the correlogram test, IB and CB variables are modeled below with detailed information on the values of coefficients, $t$-statistics (in bracket), and $R^2$. Every equation has the robust series of past (lag) values of dependent variable ($Y_t$) or AR($p$) that explain the dependent variable and has fitted the regression requirements. IB is determined by autoregressive (AR) in lags 1, 2, 4, and 5 and moving average (MA) in lags 1-4. Meanwhile, CB is determined by autoregressive (AR) in lags 2, 6, and 7 and moving average (MA) in lags 1, 2, 3, and 7:

<table>
<thead>
<tr>
<th>Period</th>
<th>IB ACF</th>
<th>IB PACF</th>
<th>CB ACF</th>
<th>CB PACF</th>
<th>IB ACF</th>
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<th>CB PACF</th>
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<td>0.291</td>
<td>0.002</td>
<td>0.002</td>
<td>1</td>
<td>-0.007</td>
<td>0.011</td>
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<td>0.264</td>
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<td>0.014</td>
<td>2</td>
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<td>3</td>
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<td>0.006</td>
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<td>4</td>
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<td>-0.024</td>
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<td>16</td>
<td>0.081</td>
<td>0.005</td>
<td>-0.101</td>
</tr>
<tr>
<td>17</td>
<td>0.128</td>
<td>0.023</td>
<td>-0.059</td>
<td>-0.02</td>
<td>17</td>
<td>0.143</td>
<td>-0.062</td>
<td>-0.09</td>
</tr>
<tr>
<td>18</td>
<td>0.223</td>
<td>0.073</td>
<td>0.169</td>
<td>0.122</td>
<td>18</td>
<td>-0.066</td>
<td>0.177</td>
<td>0.018</td>
</tr>
</tbody>
</table>

Table IV. Correlogram of ACF and PACF of the total assets
\[
\Delta (IB_t) = \mu + \theta_1 IB_{t-1} + \theta_2 IB_{t-2} + \theta_3 IB_{t-4} + \theta_4 IB_{t-5} + \varepsilon_t + \phi_2 \varepsilon_{t-1} + \phi_3 \varepsilon_{t-2} \\
+ \phi_2 \varepsilon_{t-3} + \phi_3 \varepsilon_{t-4}
\]

(4)

19825  
-0.557  
-0.685  
-0.402  
-0.399  
-0.488  
0.284  
-0.878  
0.482  

\[-5.481\]  
\[-7.427\]  
\[-3.640\]  
\[-4.054\]  
\[-4.082\]  
\[4.614\]  
\[18.354\]  
\[3.960\]

\[R^2 = 0.595; \ AIC = 29.81:\]

\[
\Delta (CB_t) = \mu + \theta_1 CB_{t-2} + \theta_2 CB_{t-6} + \theta_3 CB_{t-7} + \varepsilon_t + \phi_2 \varepsilon_{t-1} + \phi_3 \varepsilon_{t-2} + \phi_2 \varepsilon_{t-3} \\
+ \phi_2 \varepsilon_{t-4}
\]

(5)

302  
-0.606  
0.327  
-0.276  
-0.117  
0.559  
-0.653  
0.274  

\[-4.030\]  
\[4.407\]  
\[-3.766\]  
\[-0.139\]  
\[2.786\]  
\[-3.036\]  
\[5.123\]

\[R^2 = 0.633; \ AIC = 23.24:\]

Next, the combination of the AR and MA in the models is used to produce the estimated numbers of the future position of market share (total assets) to know the future market share, the decreasing trend of the growth and the estimated numbers of Islamic banks. The accuracy of the IB model to predict the future market share of the Islamic banking industry is 59.5 percent. Meanwhile, the CB model has a higher degree of accuracy in predicting the future market share of the conventional banking industry, which is 63.3 percent.

C. Forecasting the ARIMA models. The two ARIMA models generate series of estimated values from October 2010 to December 2018. The decisions to choose these forecasting periods are based on three reasons. First, the extended period has shown the period where both the growth of the Islamic banking industry is optimal and the growth tends to decrease. Second, the accuracy of the ARIMA models is not very long. More than ten years ahead can lead to a bias estimation because of the dynamic progress of the Indonesian Islamic banking industry, especially if nonorganic factors such as new Islamic banks and Islamic banking units joining the industry are taken into account. Third, the main purpose of the paper is simply to find the optimal growth and the decreasing trend of the Islamic banking industry.

Figures 1 and 2 show the accuracy of ARIMA models to forecast series of the total assets of Islamic banks and conventional banks from their actual series. The forecast lines, which are the dotted lines in both figures, seem very robust to explain the actual lines, which are the smooth lines in both figures. With such a robust historical performance, the extension of the forecast lines is hoped to accurately predict the future market share and growth rate of the market share.

The forecast series shown in Figures 3 and 4 reveal that the monthly growth of the market share reaches its optimum growth rate (the highest difference between period $t$ and $t-1$) in December 2012. Such an optimum growth rate is 0.12 percent (between November 2012 and December 2012), where the market share of the Islamic banking industry in December 2012 is estimated to be 5.75 percent.

After the optimum growth rate in December 2012, although the market share keeps growing, it tends to grow very slowly until October 2018, when the Islamic banking industry faces a negative growth rate. Such a negative monthly growth rate (the lowest difference between period $t$ and $t-1$) occurs between September 2018 and October
2018 with the rate of $-0.004$ percent. The market share of the industry in that negative growth rate is estimated to be 11.63 percent. The important information from the ARIMA models above becomes the basis on which to estimate the ideal number of Islamic banks to be established in the future. Then, the information on the maximum numbers of Islamic banks may lead the policy maker to set appropriate polices to
manage the current management of Islamic banks and perhaps limit the establishment of new Islamic banks.

6. Estimation of the maximum numbers of Islamic banks
There are some assumptions to be made in order to determine how many Islamic banks are to be established in the future. First, the latest position of total assets in December
2010 is used to compute the difference between the future position of total assets and the latest position. Second, the total contribution of assets of some new Islamic banks is estimated from both:

1. the additional total assets when new Islamic banks are established; and
2. the growth of additional total assets of those new Islamic banks.

Third, the number of new Islamic banks in the future is computed by dividing the differences between the current and future position of total assets and total asset contribution of Islamic banks. Finally, with the latest numbers of Islamic banks in December 2010, the future numbers of Islamic banks are identified. Table V illustrates the estimation of the future number of Islamic banks during the times of the optimal and decreasing (negative) growth of Islamic banking market share, which are December 2012 and October 2018, respectively. In December 2012, the total assets of Islamic banking will be Rp153.05 trillion, meaning that there is an increase of Rp56.05 trillion from the latest position of total assets (December 2010). With the asset contribution of new Islamic banks of Rp4.56 trillion, there will be 12 new Islamic banks to be established by December 2012.

Meanwhile, in October 2018, the total assets of Islamic banks are grown to Rp399.59 trillion, which shows an increase of Rp302.59 trillion from December 2010. With an inflating asset contribution of new Islamic banks of Rp23.05 trillion, there can be 13 new Islamic banks to be established by October 2018 over the number of Islamic banks in December 2010. Hence, the total number of Islamic banks in October 2018 is 24 units.

However, it is realized that estimating the future number of new Islamic banks to be established should consider other factors such as economic conditions, changing of business environment, government regulations, and so forth. With its limitation (data and information), this paper only estimates the future number of Islamic banks based on the future growth of total assets, contribution of total assets from new Islamic banks, and the latest position of the available data (December 2010). Future revisions of this paper might consider other factors, such as those listed earlier.

7. Finding and strategic policy recommendations

The paper finds one important point that is the Islamic banking industry in Indonesia is very promising. Nevertheless, under the current conditions, it has optimal and

<table>
<thead>
<tr>
<th></th>
<th>December 2010</th>
<th>December 2012</th>
<th>October 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total asset (trillion)</td>
<td>97</td>
<td>153.05</td>
<td>399.59</td>
</tr>
<tr>
<td>Difference in total assets (trillion)</td>
<td></td>
<td>56.05</td>
<td>302.59</td>
</tr>
<tr>
<td>Total number of banks (unit)</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Contribution of Islamic banks in December 2012</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asset contribution of new Islamic banks (trillion)</td>
<td></td>
<td>4.56</td>
<td></td>
</tr>
<tr>
<td>Additional Islamic banks (unit)</td>
<td></td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Total number of Islamic banks (unit)</td>
<td></td>
<td>23</td>
<td></td>
</tr>
<tr>
<td><strong>Contribution of Islamic banks in October 2018</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asset contribution of new Islamic banks (trillion)</td>
<td></td>
<td>23.05</td>
<td></td>
</tr>
<tr>
<td>Additional Islamic banks (unit)</td>
<td></td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Total number of Islamic banks (unit)</td>
<td></td>
<td>24</td>
<td></td>
</tr>
<tr>
<td><strong>Table V.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimation of future</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>number of Islamic banks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of Islamic banks (unit)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
negative growth rates in certain periods that need to be anticipated by the policy makers, stakeholders and all related parties. The optimal one will occur in December 2012 while the non-optimal (negative growth rate) will occur in October 2018. As such, to reach the optimal growth rate of the industry, the regulators, bankers, and all related parties should conduct all efforts to boost the industry (Ismal, 2011b).

For example:

- the promotion of Islamic banks and public education on the operations of Islamic banks have to be intensified;
- the establishment of infrastructures such as a rating agency, Islamic financial markets, Islamic insurance, and so forth have to be done shortly;
- the linkage program between Islamic banks and conventional banks have to be initiated to strengthen the networks of the Islamic banking industry; and
- the product innovation and market development strategies have to be prepared by Islamic banks and banking regulators.

But, when the trend of growth rate goes down after reaching the optimal level, the policy makers are not recommended to boost the growth of the Islamic banking industry. Instead, they had better prepare appropriate rules and regulations to limit the establishment of new Islamic banks as calculated above. Moreover, with such numbers of optimal Islamic banks, they need to concentrate on informing the public regarding the contribution of the Islamic banking industry to the economy.

However, the qualitative findings and recommendations discussed previously are considered based on outputs of the ARIMA models, which have some limitations. Especially, outputs of the ARIMA model might differ if there are severe unexpected business environments influencing the development of the Islamic banking industry. For example, if:

- the Islamic banking industry would face a business downturn and Islamic banks would be rushed by their depositors, such as the rush that occurred in 16 conventional banks during the Asian economic crisis of 1997-1998;
- the economy would be under pressure or under instability conditions and therefore would deeply impact the performance of the Islamic banking industry; and
- there could be significant business frauds by business partners and suppliers of Islamic banks, and therefore the estimation of the future scenarios of the Islamic banking industry might be different.

Also, if there are some new ideas and regulations implemented by banking authorities, the government, Islamic scholars (National Sharia Board), and other related parties to further expand the Islamic banking industry and such ideas and regulations have never been applied before, the estimation of the future condition of the Islamic banking industry might be different. For example, if:

- there is an easier rule to establish new Islamic banks in the future;
- the government commits to allocate more of its funds to Islamic banks (Ismal, 2011a), hence the total assets of the Islamic banking industry would expand more progressively;
foreign investors could be more confident about investing funds in the Indonesian Islamic banks and even establish new Islamic foreign banks; and

the holding company of Islamic banking units (UUS) quickens the process of spin-off, resulting in more new Islamic banks.

However, as the ARIMA models estimate the future conditions of the Islamic banking industry based on historical and current conditions of the industry that have already occurred, outputs of the models need to be considered by all related parties. Then, besides considering other factors in determining the future number of new Islamic banks mentioned before, the future research should have longer time series data and updated information as the industry is very progressive and may face various improvements coming from the banking regulators, Islamic scholars, Islamic bankers, and the public in general.

8. Closing remarks

Indonesia has a promising Islamic banking industry. However, the models have found the optimal and negative growth rates, and it is essential that these be considered by policy makers, bankers, and all related parties. Most important, appropriate policies and actions have to be prepared to direct the industry to achieve its optimal contribution to the economy. For example, by knowing the optimal growth rate of Islamic banks, market players might set their own ideal business plans, and by knowing the decreasing trend of growth rate, market players and policy makers might concentrate on raising the performance of the industry, as it has reached its optimal level.

Note

1. Alternatively, one can consider GARCH model. However, as the available data in the paper is monthly data (GARCH uses high frequency data such as weekly, daily data), ARIMA is chosen.

References


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Optimal and decreasing growth rate

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