The Application of Variance-based Structural Equation Modeling for Predicting the Intermediation Margin of Islamic Banking Industry

N S Kamila¹*, D Suhartanto²
¹Department of Finance and Sharia Banking, Politeknik Negeri Bandung, Bandung, Indonesia
² Department of Business Administration, Politeknik Negeri Bandung, Bandung, Indonesia

Email: ¹nadia.silmi.kps17@polban.ac.id, ²dwi.suhartanto@polban.ac.id

Abstract. The purpose of this paper is to predict the determinants of bank margins (bank-specific as well as macroeconomic condition) in Islamic banks by applying SEM-PLS. Data were collected through financial statements of 11 Islamic banks in Indonesia obtained in each website of bank, covering bank quarter observations for the period of 2013 to the second quarter of 2018. The results of this study indicate the specific factors of banks that have the greatest influence on NIM are liquidity variables. In contrast, macroeconomic factors (GDP and inflation) do not have a significant effect on Islamic bank NIMs, but specific bank and macroeconomic factors together affect Islamic bank NIMs. While the macroeconomic condition is not significant. In this study using the method of investigating the determinants of the margin of financial intermediation for Islamic banks operating in Indonesia by applying SEM-PLS. This finding improves our understanding on the usage of SEM-PLS to predict the margin intermediation of Islamic banks. This study provides a guidance and strategy for Islamic bank managers to manage their intermediation margin which can affect their customers interest to use Islamic banking services.

1. Introduction

The growth of Sharia banking in Indonesia has been quite rapid since legalized of the Banking Law about dual banking system. The number of Islamic banks in Indonesia has increased significantly as the number of Islamic banks currently reaches 13, this number changed significantly from 2009-2010 which only 5 banks. This condition shows that the developments of Islamic banking in Indonesia are quite significant, while also showing that Islamic banks have succeeded in showing their existence as financial institutions in the banking sector [1]. The existence of this Islamic bank brings Islamic banks to a very strategic position in bridging the needs in the real business sector. In the banking environment, financing is the main activity of banks to generating profits, because banks are intermediary institutions, namely intermediary institutions between surplus units and deficit units, where the source of bank funds comes from the public so banks have a moral obligation to redistribute public funds by financing to deficit society [2].

In Islamic principles, the intermediation of Islamic banking must be based on Islamic ethical principles[3]. One of them is the relationship of Islamic banks with depositors, if on a conventional bank system, the yield is a fixed interest rate, while in Islamic Banks, depositors are considered investors or partners because they can share profits generated. Thus, it can be said that Islamic banks implement a system of "profit and loss borne together". The most familiar services in Islamic banks are Mudharabah, both savings and deposits. In utilizing the money that has been deposited by the customer to the bank, the bank seeks profitable investments, but the bank does not guarantee a fixed
profit sharing such as interest sharing in conventional banks. This is because Islamic banks share profits according to the amount of profits earned and then distributed according to the promised percentage. Islamic banks are not permitted to generate profits only by pure financing activities without considering the real economy [4]. Pasaribu et al. all said that The high level of bank capital increases people's trust and trust about health bank. Stronger banks channel available funds in business activities and get a big profit, similarly with Pracoyo and Imani, according to him the ethics of a bank holds most of its assets. However, banks that have a smaller amount of liquid assets get a greater profit[5]. Islamic banks share the profits to customers and bear losses if the losses are caused by errors and violations of the contract provisions by the bank. Returns on investments in Islamic banks, especially Mudharabah contracts that are paid and received by Islamic banks are interrelated. For this reason, understanding the determinants of the margin of Islamic bank intermediation can be useful to find out why Islamic banks have higher margin costs compared to conventional banks [2].

The efficiency of financial intermediation has a major contribution to the growth of bank-based economies, given that the private sector relies heavily on bank loans for their business needs. The efficiency of Islamic bank intermediation can be measured by Net Intermediation Margin (NIM). NIM shows how the ability of bank management to carry out the main operational activities of the bank to generate net income[6]. Research on the determinants of the margin of intermediation for Islamic banks is very interesting because there are three reasons. First, margin intermediation can show the costs that will be borne by the customer if they use Islamic banking services. Second, the margin of intermediation can show the ability of bank management to manage its resources to benefit and streamline the performance of the financial system, as well as an indicator of the bank's profitability[7]. Third, unlike conventional banking, Islamic banks not only have the role to collect deposits and supply loans, but Islamic banks also operate as Mudhaceb. Therefore, it is important to know the determinants of bank intermediation because banks can be a major role in the process of economic development in Indonesia[8].

Most of studies on this topic focused on Europe, the United States, South America and countries in the MENA region, which mostly employ multiple regression as a method of analysis. However, research exploring the margin intermediation, especially in Islamic banks, by employing a more robust method of variance-based Structural Equation Modelling (SEM) is limited[9]. This paper begins with research conducted by Talbi and Bougafef with a discussion of bank and economic condition that affect the margin of conventional bank intermediation in the MENA region. As a country with the largest Muslim population, there is still limited research that examines the performance aspects of Islamic banks in the Indonesian Islamic banking system[10]. Therefore, this study tries to deepen the scope and fills the gap from the existing literature by exploring internal and external factors that explain the bank's performance as measured by NIM by using SEM-PLS [2].

The purpose of this study is to predict factors for determining bank margins by applying SEM-PLS. The method used is the financial intermediation margin proxied by Net Intermediation Margin (NIM). This method is applied because it is suitable for predicting the relationship between variables and small samples and has been reported as a strong method when data are not normally distributed, This study provides guidelines and strategies for sharia bank managers to manage their intermediary margins which can influence the interests of their customers to use sharia banking services.

2. Method

This research aims to investigate the determinants of the margin of financial intermediation for Islamic banks operating in Indonesia by applying SEM-PLS. This method is applied as it is a suitable for predicting the relationships between variables with small sample and has been reported as a robust method when the data does not normally distributed [11]. The financial intermediation margin is proxied by Net Intermediation Margin (NIM) which is explained by the division of income generated by investment minus financing and return projects that are distributed to depositors with productive assets. The sample in this study consisted of 11 Islamic banks operating in Indonesia, namely: Bank Muamalat, Bank Victoria Syariah, BRI Syariah, BJB Syariah, BNI Syariah, Bank Syariah Mandiri, Bank Mega Syariah, Panin Syariah Bank, Bank Bukopin Syariah, BCA Syariah, and Maybank.
Syariah, using the quarterly financial statements of each bank from 2013 until the second quarter of 2018. The inflation and GDP data were taken from data provided by BPS (Indonesian Central of Statistics). Following previous studies, researcher assumes that there is a linear relationship between the aforementioned explanatory variables and NIM. Thus, the model can be presented as follows:

\[
NIM_{it} = \alpha_i + \beta_1{\text{CAP}}_{it} + \beta_2{\text{GDP}}_{it} + \beta_3{\text{INF}}_{it} + \beta_4{\text{INEFF}}_{it} + \beta_5{\text{LIQ}}_{it} + \beta_6{\text{OEA}}_{it} + \varepsilon_{it}
\] (1)

Where NIM is Net Intermediation Margin, CAP is the ratio of equity to total assets, GDP is the growth of Indonesia's GDP, INF is Indonesia's inflation rate, INEFF is the level of efficiency, LIQ is the liquidity ratio, OEA is other earning assets, i to represent the bank, t for represents the period of year and ε for disturbances that may occur [12]. This study uses SEM-PLS to explain the causal relationships between variables, which are also used to measure the magnitude of the direct influence of each separate path in the structure/path diagram. SEM-PLS allows researchers to test the relationships between variables simultaneously and other influential relationships besides the variables being tested [13].

The descriptive statistics for the dependent variable and the coefficients are reported in Table 1 below. Overall, all Islamic banks in our database have comparable NIM, and the average changes are relatively small according to standard deviation. Maybank Syariah has the highest standard deviation of NIM (4.836), followed by Mega Syariah, BCAS, Panin Syariah and Victoria Syariah, by 1.862, 1.436, 1.214, and 1.047. Bukopin Syariah is the most homogenous banking system with the lowest deviation of 0.481.

| Muamalat | Victoria Syariah | BRIS | BJBS | BNIS | BSM | Mega Syariah | Panin Syariah | Bukopin Syariah | BCAS | Maybank Syariah |
|----------|-----------------|------|------|------|-----|--------------|---------------|----------------|------|----------------|
| Mean     | 3.693           | 3.286| 6.261| 5.732| 8.283| 6.502        | 8.370         | 4.005          | 3.136| 5.458          |
| Median   | 3.660           | 3.000| 6.300| 5.460| 8.200| 6.420        | 8.355         | 3.610          | 3.130| 4.850          |
| Max      | 4.970           | 6.490| 7.480| 8.340| 10.280| 7.350        | 11.660        | 6.490          | 4.080| 21.590         |
| Min      | 2.600           | 2.120| 5.160| 4.620| 7.190| 5.750        | 5.570         | 2.030          | 2.440| 4.000          |
| SD       | 0.756           | 1.047| 0.598| 0.904| 0.744| 0.459        | 1.862         | 1.214          | 0.481| 1.436          |

\[
\text{Mean of explanatory variables for Islamic Bank Indonesia}
\]

| CAP      | 7.279           | 13.810| 8.968| 12.703| 9.430| 7.914        | 13.900        | 16.516         | 10.406| 20.350         |
| INEFF    | 28.886          | 26.487| 36.285| 35.159| 42.389| 39.652        | 38.407        | 22.035         | 23.213| 27.478         |
| LIQ      | 1.615           | 0.299 | 1.223| 0.592 | 0.723| 1.771        | 1.049         | 0.195          | 0.819 | 0.169          |
| OEA      | 2.382           | 0.970 | 1.216| 1.492 | 0.949| 2.104        | 1.806         | 1.184          | 1.943 | 0.807          |
| GDP      | Rp2,989,292,327.31|
| INF      | 1.218           |      |      |      |      |              |              |                |      |                |

3. Result and Discussion
This study test the proposed model by using WrapPLS 6.0 and in Table 2 below show the result of this test have acceptable and ideally criteria with bank-specific factors have a significant effect on NIM, while macroeconomic factors have no significant effect.

| NIM | Criteria |
|-----|----------|
| CAP | 0.333*** | Significant 0.001|
| INEFF | 0.157** | Significant 0.05|
| LIQ | 0.489*** | Significant 0.001|
However, as figure 1 below, if the bank-specific factors and macroeconomic factors stand together, they can have an effect of 52.70% on the NIM, which means that 47.30% are affected by other factors outside the bank-specific factors and macroeconomic factors tested.

The capitalization coefficient (CAP) has a positive and statistically significant effect in path analysis testing means that capitalization coefficient has positive effect of 33.3% to NIM in Islamic bank in Indonesia. It shows that banks with large capital have lower external funding needs. Therefore, Islamic banks tend to reduce the profit sharing ratio for depositors because the risk of bankruptcy in Islamic banks is quite low. This result is in line with the findings of Hassan and Bashir who found that a high capital-to-asset ratio led to higher profit of Islamic banks[14]. The inefficiency ratio (INEFF) represented by the ratio of operating costs divided by gross income is found to have a positive effect of 15.7% to NIM, suggesting that Islamic banks in Indonesia tend to operate with high NIM in order to overcome their bad management quality. Of the four bank-specific variables, the liquidity ratio has the biggest positive effect on the NIM, which is equal to 48.9%, as Brock and Suarez indicate that, for some countries the higher reserve requirements of banks are to shift to their customers the increased
cost of intermediation[15]. OEA indicating diversification levels has a negative impact on the NIM of 9.4% [16]. The high value of this ratio implies that larger diversification of market-based activities. Therefore, bank margins will decrease as a result of high income diversification.

This is in line with the assessment of Hawtrey and Liang that traditional activities allow Islamic banks to operate with lower intermediation margins [17].

One important indicator to find out the economic conditions in a country is Gross Domestic Product (GDP). If the value of GDP increases, people's income will automatically increase so that the ability of the community to saving increases, so that the community will save its funds in Islamic banks and this will affect the profitability of Islamic banks[18]. However, in this study it was found that GDP did not significantly affect the NIM, indicating that people still trusted more conventional banks to save their funds compared to Islamic banks[19-20]. The results showed that inflation did not significantly effect to the NIM of Islamic banks. The reason that explains this condition is that even though high inflation reflects an increase in goods, the value of money circulation can be reduced due to the rising prices. But, these conditions do not affect the community in investing and saving funds in Islamic banks. This shows that the presence of inflation does not significantly reduce deposits or savings in Islamic banks.

4. Conclusion

The main purpose of this paper is to investigate internal and external bank that affect bank performance as measured by NIM by applying SEM-PLS. The results of this study show the bank-specific factor that has the greatest influence on the NIM is the liquidity variable. In contrast, the macroeconomic factors (GDP and Inflation) do not have a significant effect on the NIM of Islamic banks, however bank-specific and macroeconomic factors collectively affect on NIM of Islamic banks.

This phenomenon shows that Islamic banks should improve their service quality to streamline all funds owned and to increase public trust toward Islamic banks, other than that Islamic bank managers need to synergize their bank specific factors with macroeconomic conditions to enable their bank optimizing the NIM conditions. Although this paper reveals some important findings, this paper has limitations. Thus, a further research is suggested to add banks that have not been studied in this study and add factors that influence other NIMs, such as the BI Rate and overhead costs.

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