The Effect of Consumer Interest on Islamic Bank and Conventional Bank Mobile Banking: An Analysis Using Google Trends

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Abstract. This study aims to analyze the factors that can influence people's perceptions of intention to search for mobile banking information to support daily activities, as well as the influence of mobile banking on public interest or Depositor's Islamic banking and conventional banking. We use the Google Search Volume Index from one of the popular Islamic banking and conventional banking "Mobile banking" keywords in Google Trends to estimate the relationship between individual interest in Islamic banks and Convensional banks, and Islamic bank deposits and Conventional banks. This study shows that the keyword "mobile banking" coefficient has a non-significant correlation with Islamic bank deposits and conventional banks, which cannot be concluded. Although the number of deposits of Islamic banks and conventional banks is determined by many determinants. This investigation proves that the factors that have not been exploited to date, such as variables that cannot be quantified or not measurable (eg, popularity and curiosity), can be examined with the help of Google Trends.

1. Introduction
Mobile banking is a facility of banks in this modern era that follows developments in technology and communication, mobile banking is described as a channel to help customers communicate with banks through cellular devices, namely cellphones or personal digital assistants (PDAs). Today's information search is an indication of consumer interest or demand and is an important stage that influences the decisions of consumers or customers, the search for "mobile banking" in 2010 to 2017 has increased by 68% [1]. The role of this mobile banking requires detailed analysis from time to time.

Community Interest or Depositor's is an important account in terms of the liabilities of Islamic bank balance sheets and Conventional banks because it is the main funding source for the sustainability of Sharia bank operations and Conventional Banks. The Depositor's Sharia banking consists of Wadiah demand deposits, Wadiah savings accounts, mudharabah demand deposits, mudharabah deposits, and conventional depository deposits of bank deposits consisting of current
accounts, deposits or savings, deposits and loans. [2]. The role of the Depositor's requires detailed analysis from time to time.

Increased penetration of computers, smartphones, and the internet allows us to do instant searches to get accurate information instantly [**]. Google is one of the most popular search engines that comes with Google Trends. The availability of big data has enabled researchers to utilize Google Trends to estimate various business phenomena. Researchers have used many of these new estimation methods to examine various problems in many fields, including IT, business, health, economics, and communication [2]. This study analyzes the correlation between individual interests in Islamic banking and conventional banking in Indonesia. We use provincial level panel estimates to consider impacts in all provinces in Indonesia. In some previous studies, researchers used interest rates as explanatory variables. Therefore, this study still uses interest rates as one of the variables in estimating third party funds and uses Google's search request to explore the effects of public interest in Islamic banking on increasing total deposits of Islamic banks. This research involves one unique keyword related to Sharia banking and "mobile banking" Conventional banking to represent the public interest in mobile banking services in Indonesia.

Google Trends has never been used in a general econometric model despite the wide variety of online information available. In particular, it has not been used in social sciences, even for short-term investigations, even though this information is available in real-time. Choi and Varian [3] made use of Google search queries to conventional econometrics to overcome this problem and recommended the use of Google Trends data to estimate unemployment rates, consumer confidence, car agreements, and travel destinations. In an increasingly competitive environment, where customer loyalty decreases, online transactions such as mobile banking offer the potential for companies to gain competitive advantage [***], maintain and obtain customers. It also supports increasing customer satisfaction through cellular value services, cross selling and cost reduction (Shankar and Kumari, 2016; Tiwari et al., 2006; Vinayagamoorthy and Sankar, 2012; Juniper, 2014) [27]. According to Vinayagamoorthy and Sankar (2012), SMS and browsers are the most commonly used platforms.

This study offers two important contributions. The first is to show the use of Google Trends as a variable. The second contribution is to examine the relationship between Islamic banking and Conventional banks.

2. Research Method

Annual data for all provinces in Indonesia from the period 2010 to 2017 were used in this study. Table 1 presents statistical statistics of the main variables used. Islamic bank deposit data is obtained from Islamic Banking Statistics (SPS) OJK, financial services authority in Indonesia [1]. We use the BI-Rate [28] and 7-day (Reverse) Repo Rate [29] as a proxy for interest rates obtained from the website of Bank Indonesia, the portal of the Indonesian central bank.

We downloaded the Google Trends key variable from the Google Trends website. Google Trends presents real-time information from demand volumes with important volumes, which are search traffic for each time interval compared to the highest search traffic during the selected period. Table 1 shows that Google Trends data normalizes published traffic to the highest point, which is set to 100 for the related keywords. This normalization is very important because the number of users who are goggling in this search engine keeps increasing, the comparison using the number of searches is impractical. Normalization also makes it possible to compare between locations even though the population is different by country or province. Google Trends informs the fixed minimum and maximum points that are adapted based on time or country intervals. Properties that are standard deviations and shifts of averages according to the minimum point can be shown in Table I and II because the value follows a normal distribution. All variables must be downloaded simultaneously during data collection to make comparisons of direct variables and to produce relative values. Each variable is used together with the formula in this study (see Tables 1 and 2).
Table 1. Descriptive statistics of the main variables Islamic Bank

| Variables                | Mean  | Std. Dev | Min. | Max  |
|--------------------------|-------|----------|------|------|
| “Mobile Banking”         | 24.26 | 27.23    | 0.00 | 100  |
| BI-Rate (Percent)        | 6.25  | 1.23     | 4.25 | 7.75 |
| Depositors’ Funds (billion IDR) | 5,180.308 | 17,199.43 | 1.29 | 16,1917.5 |

Table 2. Descriptive statistics of the main variables Conventional Bank

| Variables                | Mean  | Std. Dev | Min. | Max  |
|--------------------------|-------|----------|------|------|
| “Mobile Banking”         | 24.11 | 27.23    | 0.00 | 100  |
| BI-Rate (Percent)        | 6.25  | 1.23     | 4.25 | 7.75 |
| Depositors’ Funds (billion IDR) | 9,373.56 | 32,788.53 | 1.62 | 26,8192.6 |

False regression can occur when we do analysis without using stationary time series variables. Although each variable is uncorrelated, false regression can show a strong relationship. We must evaluate whether the variable has the root unit panel. The following tests are used to ensure the variables in the panel estimation are free from no stationary time series. We used the Levin-Lin-Chu (LLC) test [30] and the Fisher-ADF test [31]. The LLC test assumes that there is a common root unit process, while Fisher-ADF tests individual root unit processes. The Fisher-ADF test is carried out through stationary p-value tests in a meta-analysis under critical assumptions about cross-sectional independence, so Maddala and Wu [31] define it as follows:

\[ P_{MW} = -2 \sum_{i=1}^{N} \log(p_i) \]  

(1)

It is customary to underline unobserved heterogeneity by using a fixed or random effect when we estimate a static Islamic bank deposit model with panel data analysis. The heterogeneity of panel data is considered in the following linear regression equation:

\[ y_{it} = \alpha + \beta x_{it} + u_t + e_{it} \]  

(2)

In a random effect model, we will consider UI as a random variable. In a fixed effect model, on the contrary, the error term ui from equation number two is the criterion we should expect. In the case of
the econometric model, the choice between the two models is suggested based on whether the cov assumption \((x_{it}, u_i) = 0\) is fulfilled. The term \(u_i\) error can be considered according to the normal distribution when the variables are purposively sampled from the random sampling method. The heterogeneity of panel data, represented by UI inference, is the main criterion when we choose a random effect model or a fixed effect. The null and alternative hypotheses below have been specified in the procedures we have described, known as the Hausman test [32]:

\[
\begin{align*}
(\dot{x}_{it}, u_i) &\neq 0 \\
(\dot{x}_{it}, u_i) &= 0, \quad H_1: \text{cov } \dot{\epsilon} \\
H_0: \text{cov } \dot{\epsilon}
\end{align*}
\] (3)

Using the Hausman test, we operate panel data estimates from unobserved heterogeneity. If the null hypothesis fails to be rejected, the random effect model is less efficient than the fixed effect model. We examine the relationship between Google Trends and Islamic bank deposits using provincial level panel data analysis. We developed two equations for regression of deposit panels in Islamic banks, as follows:

\[
\begin{align*}
\ln(DP_{i,t}) &= \alpha + \beta_1 \ln(BIRATE_{i,t}) + \beta_2 \ln(MBANKING_{i,t}) + \mu_i + e_{i,t} \\
\ln(DK_{i,t}) &= \alpha + \beta_1 \ln(BIRATE_{i,t}) + \beta_2 \ln(MBANKING_{i,t}) + \mu_i + e_{i,t}
\end{align*}
\] (4) (5)

Depositor’s \(i, t\) shows Depositors of Islamic Banks and Conventional Banks in the province in the period \(t\). BIRATE\(i, t\) shows interest rate projections Bi-Rate, \(t\) and MBANKING, \(t\) is a Google Trends request "mobile banking," \(\mu\) and \(e\) represents the error term.

3. Results and Discussion

Table 2 summarizes the results of the LLC test and Fisher-ADF test for each variable. This shows that all variables do not have a shared root unit or individual root unit. Both root unit tests confirm the stationary of all tested variables, and the regression model does not need to be estimated after the first difference (see Tables 3 and 4).

Table 3. Unit root test results for each variable Islamic Bank

| Variables                | Levin-Lin-Chu t | Fisher-ADF Chi Square |
|--------------------------|-----------------|-----------------------|
| BI-Rate                  | -4.65925***     | 111.169***            |
| Depositors’ Funds        | -13.0429***     | 87.1224***            |
| “Mobile banking”         | -6.41785***     | 56.2754***            |

* p < 0.1; **p <0.05; ***p <0.01

Table 4. Unit root test results for each variable Conventional Bank

| Variables                | Levin-Lin-Chu t | Fisher-ADF Chi Square |
|--------------------------|-----------------|-----------------------|
| BI-Rate                  | -4.65925***     | 111.169***            |
| Depositors’ Funds        | -48.7302***     | 400.630***            |
| “Mobile banking”         | -6.41785***     | 56.2754***            |

* p < 0.1; **p <0.05; ***p <0.01
As shown in Tables III and IV, all the variables involved in this study are stationary, so there is no need for non-stationary analysis such as co-integration tests. We evaluate if heterogeneity is explained as estimating random effects or estimating fixed effects in the next step using the Hausman test. The Hausman statistical value indicates that the null hypothesis is rejected. Thus, the random effect model is less suitable than the fixed effect model confirmed.

Therefore, see the Hausman test and the fixed redundant effect test (Chow test [33]) in Table III and Table IV, there is no specification error if we choose a fixed effect model for the panel estimation. The panel estimation results are shown in Table V and Table VI. In both keyword models, the interest rate variable shows statistical significance at the 0.01 level. This finding is consistent with previous studies as discussed in the literature review. However, the main focus of this research is to assess Google's keyword relationships with Islamic bank deposits, in particular, we pay more attention to Google Trends keywords than interest rates.

The keyword variable from "mobile banking" has a positive coefficient but has a high p value which indicates there is no relationship with Islamic bank deposits or Conventional banks. The popularity of using these keywords in search activities also shows the demand for information on Sharia banking services and products and Conventional banking (see Tables 5 and 6).

### Table 5. Fixed Effect Results of the “MBANKING” keyword Islamic Bank

| Ln(DPK)  | Coefficient | t-Statistic | P>|t|  |
|----------|-------------|-------------|------|
| Ln(BIRATE) | -136090.7 | -2.601609 | 0.0099*** |
| Ln(MBANKING) | -2.254326 | -0.094819 | 0.9245*** |
| CONSTANT  | 13747.68   | 3.800595   | 0.0002*** |

* p < 0.1; **p < 0.05; ***p <0.01

### Table 6. Fixed Effect Results of the “MBANKING” keyword Conventional Bank

| Ln(DPK)  | Coefficient | t-Statistic | P>|t|  |
|----------|-------------|-------------|------|
| Ln(BIRATE) | -813718.2 | -1.963974 | 0.0507*** |
| Ln(MBANKING) | -52.78412 | -0.247983 | 0.8044*** |
| CONSTANT  | 145863.6   | 5.092928   | 0.0000*** |

* p < 0.1; **p < 0.05; ***p <0.01

This finding supports information retrieval as one of the most important steps in consumer decision making [34] as well as the financial behavior models of Milner and Rosenstreich [35]. With the quantification of public interest in Islamic banking, it is possible to use it as a leading indicator to predict the growth of Islamic banking and conventional banking deposits, especially in countries that implement a dual banking system, Islamic banking deposits are difficult to predict.

### 4. Conclusion

A new approach that includes information taken from Google Trends as we propose is based on a review of the models considered in public interest literature for Islamic bank and Conventional bank deposits. We develop other models by adjusting the current observation model for Islamic bank deposits and Conventional banks. We use interest rates and panel estimates of Islamic banking demand in the suggested model to measure consumer interest individually. The disposition of this model must be done to confirm and reveal the correlation between Islamic bank deposits and Conventional banks and the questions chosen and also to understand the extent to which these questions can affect the makers of deposit policies of Islamic banks and Conventional banks later.
References

[1] Otoritas Jasa Keuangan, Statistik Perbankan Syariah - April 2018. [online] Available: https://www.ojk.go.id/id/kanal/syariah/data-dan-statistik/statistik-perbankan-syariah/Pages/Statistik-Perbankan-Syariah---April-2018.aspx.

[2] Jun S P, Yoo H S, and Choi S 2017 Ten years of research change using Google Trends: From the perspective of big data utilizations and applications. Technol. Forecast. Soc. Change. 0–1.

[3] Choi H and Varian H 2012 Predicting the Present with Google Trends. Economic Record. 88 2-9.

[4] Smith P 2016 Google’s MIDAS touch: Predicting UK unemployment with internet search data. J. Forecast. 35 263-284.

[5] Suhartanto D, Helmi Ali M, Tan K H, Sjahroeddin F, and Kusdibyo L 2019 Loyalty toward online food delivery service: the role of e-service quality and food quality Journal of Foodservice Business Research. 22 81-97.

[6] Gunn III J F, Lester D 2013 Using Google searches on the internet to monitor suicidal behavior. J. Affect. Disord. 148 411-412.

[7] Adebola Solarin S, Hammoudeh S, and Shahbaz M 2018 Influence of Economic Factors on Disaggregated Islamic Banking Deposits: Evidence with Structural Breaks in Malaysia. J. Int. Financ. Mark. Institutions Money.

[8] Aysan A F, Disli M, Duygun M, and Ozturk H 2015 Religiosity versus rationality: Depositor behavior in Islamic and conventional banks. J. Comp. Econ.

[9] Mushtaq S and Siddiqui D A 2016 Effect of interest rate on economic performance: evidence from Islamic and non-Islamic economies. Financial Innovation. 2.

[10] Suhartanto D and Leo G 2018 Small business entrepreneur resistance of ICT adoption: a lesson from Indonesia, International Journal of Business and Globalisation. 21 5-18.

[11] Kotler P and Keller K L 2015 Marketing Management Global Edition. 15th ed. Edinburgh Gate, England: Pearson Education Limited. 194-209.

[12] Askitas N, Zimmermann K F 2009 Google econometrics and unemployment forecasting Appl. Econ. Quart. 55 107-120.

[13] Meslier C, Risfandy T, and Tarazi A 2017 Dual market competition and deposit rate setting in Islamic and conventional banks. Econ. Model. 63 318–333.

[14] Hamza H 2016 Does investment deposit return in Islamic banks reflect PLS principle? Borsa Istanbul Rev.16 32–42.

[15] Ismal R 2011 Depositors’ withdrawal behavior in Islamic banking: case of Indonesia, Humanomics. 27 61–76.

[16] Mushtaq S and Siddiqui D A 2017 Effect of interest rate on bank deposits: Evidences from Islamic and non-Islamic economies. Future Business Journal. 3 1-8.

[17] Bank Sentral Republik Indonesia 2018- Monetary Policy Objectives, BI Rate. [online] Available: https://www.bi.go.id/en/moneter/bi-rate/data/Default.aspx.

[18] Bank Sentral Republik Indonesia 2018 - Monetary Policy Objectives, BI 7-day (Reverse) Repo Rate. [online] Available 2018: https://www.bi.go.id/en/moneter/bi-7day-RR/data/Contents/Default.

[19] Suhartanto D, Farhani N H, Muflih M, and Setiawan S 2018 Loyalty intention towards Islamic Bank: The role of religiosity, image, and trust. 12 137-151.

[20] Milner T and Rosenstreich D 2013 A review of consumer decision-making models and development of a new model for financial services. Journal of Financial Services Marketing. 18 106-120.