Examining an Islamic Financial Inclusivity and Its Impact on Fundamental Economic Variables in Indonesia
(An Approach of Static Panel Data Analysis)

Pengukuran Tingkat Inklusi Keuangan Syariah dan Dampakanya pada Variabel Fundamental Perekonomian di Indonesia
(Pendekatan Analisis Data Panel Statis)

Andre Pupung Darmawan (iD), *Angga Erlando (iD), Dwi Budi Santoso (iD)
Islamic Economics Study Programme, Faculty of Economics and Business, Universitas Airlangga, Surabaya, Indonesia
Department of Economics, Faculty of Economics and Business, Universitas Airlangga, Surabaya, Indonesia
Department of Economics, Faculty of Economics and Business, Universitas Brawijaya, Malang, Indonesia
andre.pupung.darmawan-2017@feb.unair.ac.id, angga.erlando@feb.unair.ac.id, dbudi@ub.ac.id

ABSTRACT

Previous studies mostly measured sharia financial inclusion using an index consisting of three dimensions: accessibility, availability, and usage. This research develops it by adding a digitalization dimension so that there are 4 dimensions in measuring sharia financial inclusion in Indonesia using an index. The first objective of this study is to visually illustrate the results of calculating the sharia financial inclusion index (in map form) in 33 provinces in Indonesia, using GeoDa software. Second, analyze the impact of sharia financial inclusion variables (the 4 form dimensions) that are calculated, on economic fundamental variables (growth, unemployment, poverty, and inequality) through a quantitative approach based on panel data analysis methods (FEM and REM). The secondary data used comes from the Financial Services Authority (OJK) and the Central Statistics Agency (BPS), in the 2015-2020 period. The results of this study indicate that sharia financial inclusion in Indonesia needs to be increased more evenly, so that it is not stagnant and centered in Java or provinces with a communal Muslim base (viewed from the results of index calculations) because the values are unequal between provinces. Meanwhile, the results of panel data analysis techniques show that variables reflecting the 4 dimensions of sharia financial inclusion have an impact on fundamental economic variables.

Keywords: Sharia Financial Inclusion, Index, GeoDa, Panel data

ABSTRAK

Kajian sebelumnya banyak mengukur inklusi keuangan syariah dengan menggunakan indeks yang terdiri dari tiga dimensi: aksessibilitas, availabilitas, dan penggunaan. Penelitian ini mengembangkannya dengan menambah dimensi digitalisasi, sehingga terdapat 4 dimensi dalam mengukur inklusi keuangan syariah di Indonesia menggunakan indeks. Tujuan pertama penelitian ini menggambarkan visual hasil perhitungan indeks inklusi keuangan syariah (dalam bentuk peta) di 33 provinsi yang ada di Indonesia, dengan software GeoDa. Kedua, menganalisis pengaruh variabel inklusi keuangan syariah (4 dimensi pembentuknya) yang dihitung, terhadap variabel fundamental ekonomi (pertumbuhan, tingkat pengangguran, kemiskinan, dan ketimpangan) melalui pendekatan kuantitatif berbasis metode analisis data panel (FEM dan REM). Data yang digunakan bersumber dari Otoritas Jasa Keuangan (OJK) dan Badan Pusat Statistika (BPS), dalam periode 2015-2020. Hasil penelitian ini, menunjukkan bahwa bahwa inklusi keuangan syariah di Indonesia perlu ditingkatkan lebih merata, agar tidak stagnan terpusat di Java atau provinsi dengan basis muslim komunal, jika dilihat dari hasil perhitungan indeks yang nilainya timpang antar porvinsi. Sementara itu, hasil teknik analisis data panel menunjukkan bahwa variabel yang mencerminkan 4 dimensi inklusi keuangan syariah berdampak bagi variabel fundamental ekonomi.

Kata Kunci: Inklusi Keuangan Sharia, Indeks, Geoda, Data Panel.

I.   INTRODUCTION

The development of the times has led to the position of the financial sector in relation to economic development giving rise to many hypotheses. The first hypothesis is the "Supply-Leading Hypothesis" with the view that financial activity as a tool to increase productivity in a region. That is, if the financial sector develops, such as: domestic savings, capital accumulation, technological innovation, and income growth will affect economic development (Honohan, 2004). It is no wonder that development in the financial sector is expected to lead to "inclusive finance", which according to Kim et al. (2018) is "...ease of accessibility and availability of the formal financial services, such as bank deposits, credits, insurance, etc., for all participants in an economy." This can take the form of ease of accessibility and availability of formal financial services, such as bank deposits, credit, insurance, and the like, for economic actors, especially the lower middle class, in order to spur economic development that is also inclusive.

Much earlier, Schumpeter (1911), Gurley & Shaw (1955), and McKinnon (1973) supported the "Supply-Leading Hypothesis" as the role of the financial sector was considered important in driving economic growth. Given, the economy moves with the encouragement of easily accessible capital. According to Romer (1986), this condition is a form of the role of the financial sector that encourages endogenous growth through the positive impact of the level of capital accumulation, investment, and savings. Even in the future, other factors such as financial technology innovation can develop to promote growth (Romer, 1990; Aghion & Howitt, 1992).

The second hypothesis is the "Demand-Following Hypothesis", meaning that it is the real sector of the economy that determines the development of the financial sector. Robinson (1952) argued that when corporate profits grow well, it can encourage the development of the financial sphere in society. The financial sector is not considered to be the first cause of economic development, but rather a response to the demands of the real sector that can develop the financial sector itself. Lucas (1988) and Miller (1988) are of the same opinion, that financial markets contribute to economic development is a proposition that is debatable, so it needs to be discussed empirically. In addition, macroeconomic indicators that develop as part of economic development, for many (developing) countries are still the key for the financial sector to exist. This is because increased productivity will lead to increased income and capital accumulation (Singh & Kodan, 2011).

The arguments of the two hypotheses have their basis. There is another view as a third hypothesis that emerges as a form of probability of a two-way relationship in the real sector of the economy and the financial sector. Patrick (1966) called it the "stage of development" hypothesis of Bi-directional Causality. His idea was to combine the supply-leading and demand-following hypotheses. Given that there is a lot of debate on which part influences first, it would be natural for the development pattern of the financial sector and the real economy (macro context) to alternately influence each other (Fosu & Hampshire, 2013; Ananzeh, 2016).

This research tried to look at the financial fundamentals of the three hypotheses, more specifically on the development of the Islamic financial sector in Indonesia. The measurement is also more specific by presenting the results of the calculation of the development of the Islamic financial sector through the Islamic Financial Inclusion Index (IIKS). This is interesting to study considering that many countries develop the Islamic financial sector, especially countries that join the Organization of Islamic Cooperation (OIC) (Mohieldin et al., 2011). One of them is Indonesia with the largest number of Muslims in the world. Even countries with a non-Muslim base have developed Islamic financial systems in their countries. However, there have not been many studies on a more provincial scale such as this research. This was the first novelty in closing the empirical research gap of previous studies. Furthermore, studies on financial inclusiveness in Indonesia generally focus on the scope of the financial sector in aggregate (conventional and sharia), meaning that the specific scope of Islamic financial inclusion is still limited (Umar, 2017).

When looking at the scope of aggregate financial inclusion calculations, much is developed from the Sarma & Pais (2011) model by formulating the form of financial inclusion into three dimensions, including the accessibility dimension, the availability dimension, and the usage dimension in the banking financial sector. This contribution encouraged subsequent research to develop in different empirical cases. Therefore, this study offered a second novelty, namely the Islamic financial inclusion model by developing the Sarma & Pais (2011) model which considers the additional dimension of digital development in the case study of Islamic financial inclusion in the scope of provinces in Indonesia.

The consideration of adding the dimension of digital development is also based on the fact that cashless Islamic financial systems, mobile banking, and digital platforms are developing in Indonesia

The third novelty related to the development of analysis after calculating the Islamic financial inclusion index. The study of Islamic financial inclusion conducted by Mohieldin et al. (2011), Umar (2017), and Puspitasari et al. (2020) by modifying the Sarma & Pais (2011) model which only includes Islamic finance, has not been visualized and analyzed by linking it to the economic fundamentals of inequality and poverty. This is because the context of inclusive finance, coupled with the essence of "sharia" which is actually for the benefit of the people, is quite rational when associated with elements of equity such as inequality and poverty. This research tries to visualize the results of the calculation of Islamic financial inclusion with Geoda software (geographic information system map).

The fourth novelty provided an additional review of Islamic financial inclusion by linking it to fundamental aspects of the economy such as growth, inequality, and poverty. Given, many previous studies reviewed the impact of financial inclusion on the performance of economic development indicators, such as its effect on economic growth, investment, unemployment, poverty, inequality, community income, and others (Nkwede, 2015; Sethi & Acharya, 2018). This means that these researchers support the first hypothesis of the "Supply-Leading Hypothesis". This study has a perspective by paying great attention to the same thing, which is to see how the existence of the hypothesis. Although if you look at the condition of the financial sector amid public financial literacy that needs to be improved, the pattern of the financial sector is shaky when the economy is also shaky (contraction or recession), and the pattern of financial asset management that tends to be monotonous. All of these indicate how vulnerable and dependent the financial sector is on fundamental economic variables. However, the basis of how the "Supply Leading Hypothesis" became the focus of this study was not without ignoring this. That is, the context is to prove the role of the inclusive financial sector in the sharia sector in improving the economy in Indonesia.

II. LITERATURE REVIEW
Islamic Financial Inclusion

As the name implies, financial inclusion began to emerge after the concept of financial exclusion. Financial exclusion is the process of making it difficult for social groups and individuals to gain access to the formal financial system (Leyshon & Thrift 1995; Allen et al., 2012). Meanwhile, according to Sarma (2012), financial inclusion is a process that ensures easy access, availability, and benefits of the formal financial system for all economic actors. Meanwhile, according to Demirgüç et al. (2008), financial inclusion can be said to be a process to ensure access to financial products and services that are applied according to the needs of all people in general and economically vulnerable groups such as economically weak communities and low-income groups in particular, at affordable costs, in a fair and transparent manner carried out by institutional actors.

Sarma & Pais (2011) in their research stated that financial inclusion connects many people, especially the poor and vulnerable groups to the formal banking system with safe, easy, and affordable access to credit and other financial services. Meanwhile, according to Lakshmi & Visalakshmi (2013), financial inclusion is the process of receiving/providing financial services and products at affordable costs. Meanwhile, Bank Indonesia determines one way to measure financial inclusion using the Inclusive Financial Index (IKI) approach as an alternative to assessing an inclusive financial system using a multidimensional index based on various macroeconomic indicators, especially aspects of the affordability of banking services to the public.

Typically, OJK's measurement of financial inclusion is still limited to IKI combining both conventional and sharia. The dimensions of an inclusive financial system are access, usage, and quality of banking services. The approach taken to measure the access dimension (the first dimension) is to calculate the ability to use formal financial services. This is done to capture potential barriers and challenges in opening or using a bank account. For example, the cost or ease of physically reaching banking financial services (bank offices, cash withdrawal machines, and the like). Some journals use access dimension indicator measurements including: (1) number of bank offices per 100,000 adult population; (2) number of ATMs per 10,000 adult population; (3) number of bank offices per 1,000 km2; and (4) number of cash withdrawal machines per 1,000 km2. The second dimension is usage, which is one dimension to measure the ability of how the actual use of banking financial products and services. These include frequency of use, regularity pattern, and length of use. Generally, this second

dimension is measured by proxying the indicators: (1) the number of Third Party Fund (DPK) accounts consisting of deposits, current accounts, and savings per 1,000 adult population; and (2) the number of credit accounts per 1,000 adult population. Furthermore, the third dimension relates to quality which is measured to determine whether the availability of financial product and service attributes has met customer needs. In some literature, this dimension can also be proxied by the name of the availability dimension, because it is related to the availability of financial service products of a bank.

Conceptually, the model measures financial inclusion that focuses on the scope of Islamic finance, so the model formed is by adopting the IKI equation into the IIKS (Islamic Financial Inclusion Index). The method used begins with building the dimensions in, which are IKSI indicators (the same as IKI), only differentiated by shorter data on IIKS which is more focused on Islamic financial data in Indonesia.

$$d_i = w_i \frac{A_i - m_i}{M_i - m_i} \; ; i = 1,2,3,4 ....(1)$$

Description of d_i = the i dimension ($d1$ = accessibility, $d2$ = availability, $d3$ = usage), w_i = weight given to the i dimension, A_i = actual value of the i dimension, M_i = maximum value of the i dimension, and m_i = minimum value of the i dimension. The di value for i = 1, 2 or 3 will be in the interval between 0 and w_i. The higher the di value indicates the more successful a region or country is in achieving the i dimension. A country's financial inclusion achievement is indicated by the point $X = (d1,d2,d3)$. In the context of dimensions, point $O = (0,0,0)$ represents the worst value, while point $W = (w1,w2,w3)$ where $w1, w2,$ and $w3$ are the weights given to each dimension will represent the ideal and high achievement situation for all dimensions.
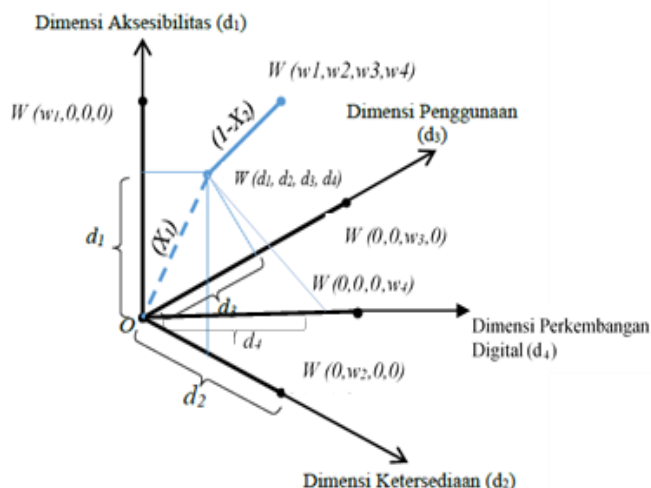

Figure 1. Visual Model of Islamic Financial Inclusion Index

This research attempted to add one dimension related to digital development as an external dimension which was assumed to also play a role in the development of Islamic financial inclusiveness that is occurring in Indonesia (d4=digital development dimension). This dimension was calculated by BPS in the form of Information and Communication Technology Development Index (IP-TIK) adopted from the International Telecommunication Union (ITU) under the name ICT Development Index (ICT DI). The components of the calculation are 11 indicators that make up IP-TIK which are divided into 3 sub-indexes, namely the access and infrastructure sub-index, the usage sub-index, and the expertise sub-index with an index scale of 1-10.

Calculation of the Islamic financial inclusion index is calculated based on the distance between the worst point and the achievement dimension (O-X or $X1$, see figure 1) as well as the distance between the ideal point of achievement and the achievement dimension (W-X or $X2$). This is done by the formula:

$$x_1 = \frac{\sqrt{d_1^2 + d_2^2 + d_3^2 + d_4^2}}{\sqrt{w_1^2 + w_2^2 + w_3^2 + w_4^2}} \; \text{dan} \; x_2 = 1 - \frac{\sqrt{(w_1-d_1)^2 + (w_2-d_2)^2 + (w_3-d_3)^2 + (w_4-d_4)^2}}{\sqrt{w_1^2 + w_2^2 + w_3^2 + w_4^2}} ....(2)$$

Adopting from research conducted by Sarma (2012), this research assumed that all dimensions used in the formation of the financial inclusion index are equally important, so $w_i = 1$ for all i value. In this case,

$W = (1,1,1,1)$ so that the Islamic Financial Inclusion Index (IIKS) equation:

$$IIKS = -\frac{1}{2}\left[\frac{\sqrt{d_1^2 + d_2^2 + d_3^2 + d_4^2}}{\sqrt{34}} + 1 - \left(\frac{\sqrt{(1-d_1)^2 + (2-d_2)^2 + (3-d_3)^2 + (4-d_4)^2}}{\sqrt{4}}\right)\right]$$
....(3)

The IIKS equation is obtained by averaging the values of X1 and X2 which indicate the position between the worst point and the most ideal point. According to Sarma (2012), the results of the inclusion index measurement are divided into three categories: (i) low if the index value is less than 0.3; (ii) medium if the index value is between 0.3 and 0.6 and; (iii) high if the index value is between 0.6 and 1. However, weighting research is in the form of an index value range of 0-10 (multiplied by 10).

The concept of good financial inclusion is due to the equal distribution of access to Islamic financial services. This will create goodness because people with low incomes need a helping hand from the upper middle income community. As in the Qur'an Surah Al Hasyr verse 7 which means " *And what Allah restored to His Messenger from the people of the towns – it is for Allah and for the Messenger and for [his] near relatives and orphans and the [stranded] traveler – so that it will not be a perpetual distribution among the rich from among you. And whatever the Messenger has given you – take; and what he has forbidden you – refrain from. And fear Allah; indeed, Allah is severe in penalty*." This verse explains that wealth does not only revolve among the rich, but those who are deficient in finances can benefit from a decentralized circulation of money. According to Masnita et al., (2020) which provided an opinion that assets that are squandered by rich people should be diverted to micro-financing without collateral, qardhul hasan financing or joint responsibility through group leaders or thaharah financing for low-income people. So that this can stimulate Islamic financial inclusion on an ongoing basis through collaboration with academics, practitioners, the Financial Services Authority (OJK), Islamic boarding school leaders, and community leaders through mentoring methods. In the sharia context, in the future it is hoped that the success of financial inclusion can be seen from how evenly the availability of access to financial services is for every (fair) community. According to Ka'abi (2020) the conceptual principles of economic justice written in the Koran are divided into 5: ownership, production, consumption, distribution, and the role of the state.

The Linkage of Islamic Financial Inclusion to the Economy and Previous Studies

Studies linking the impact of financial inclusion on the economy are quite common, for example the impact of the level of financial inclusion associated with economic growth, the open unemployment rate, the poverty rate, and the level of income inequality. Gupta et al., (2014) measured the Index for Financial Inclusion (IFI) in 28 states and 6 regions in India using the dimensions: penetration, availability, and usage of banking services, found empirically that the financial inclusion index and human development index as proxies social welfare in India has a positive correlation. Therefore, they stressed the priority of the Indian government's policies to achieve inclusive growth, human, and economic development.

Mehry et al., (2021) also tried to see the impact of financial inclusion in 35 developing countries on the unemployment rate. The finding is that an increasing level of financial inclusion will reduce unemployment. Other studies in the same context were also conducted by Alshyab et al., (2021) in the non-oil producing Arab countries, Amakor & Eneh (2021) in Nigeria, Erra & Venkatachalapathy (2018) in Indian States, found that increased financial inclusion is considered able to reduce the unemployment rate.

Meanwhile, Honohan (2008) used an econometric approach from a combination of survey-based and secondary data to estimate the proportion of households that can access formal financial services or services in 160 countries around the world. His research showed that the financial access index has a significant effect on reducing income inequality. The similar studies were also conducted by Luo & Li (2022) in China; Polloni-Silva et al., (2020) in Latin American countries; Omar & Inaba (2020) using panel data in developing countries in the world; and Park & Mercado (2018) with the same data pattern in developing Asian countries, concluded that the level of financial inclusion that is getting better and developing will reduce the level of income inequality.

Furthermore, when it is associated with poverty, Sanjaya & Nursechafia (2016) conducted research that aims to measure and analyze the level of financial inclusion and inclusive growth in Indonesia. The results found that financial inclusion is strongly influenced by the accessibility dimension, while the availability and usage dimensions only have a small proportion. The conclusion is that the poor community is quite limited in utilizing financial sector services. Similar research was also conducted

by Umar (2017) who found that financial inclusion in this case is specific to the scope of the Islamic financial index (formed from 3 dimensions) in Indonesia, indicating that higher Islamic financial inclusion will increase welfare.

Considering that there are conditions in Indonesia that are uneven in terms of the economic structure and development of the Islamic economy, as well as research related to Islamic financial inclusion on the economic sphere from previous studies, this research in general only consisted of two hypothetical focuses. First, that the level of Islamic financial inclusion in Indonesia only develops in certain regions in Indonesia (not evenly distributed) based on the results of the calculation of the Islamic financial inclusion index. Second, that the level of Islamic financial inclusion which in this study was developed through 4 indicator dimensions, has a good impact on the economy (increasing economic growth, reducing unemployment rates, reducing poverty, and reducing income inequality) or following the essential pattern "Supply Leading Hypothesis".

III. RESEARCH METHODS

This research used a quantitative approach with static panel data-based analysis techniques. This was done in addition to consideration of data limitations (2015-2020) in the form of time that is not long, such panel data also has a more static pattern (short time). The panel data analysis technique was formed to determine the level of influence of the independent variables/dimensions (D) of Islamic financial inclusion consisting of D1 (Accessibility), D2 (Availability), D3 (usage), D4 (Digital Development) on the dependent variable of constant 2010 GDP growth, open unemployment rate, poverty rate, and the level of inequality of the Gini index in 33 provinces in Indonesia for the 2015-2020 period partially or simultaneously.

Table 1. Secondary Data Used and Operational Definition of Variables

Block	Dimensions	Variable Indicators	Reference	Symbol	Source
Financial Inclusion	Accessibility Dimension (1)	This dimension measures the level of penetration of Islamic banking into the community	Sarma dan Pais (2011)	D1 (index)	OJK, BPS
	Availability Dimension (2)	It measures the level of service availability for use by the community		D2 (index)	OJK, BPS
	Usage Dimension (3)	This dimension measures the extent to which Islamic banking products and services can meet customer needs, namely Islamic financing needs.		D3 (index)	OJK, BPS
	Digital Development Dimension (4)	This dimension measures the digital development taking place in Indonesia	Bansal (2014)	D4 (index)	OJK, BPS
	Islamic Financial Inclusion Index	Sum of the four dimensions	Research Development of Sethi & Acharya, (2018)	IIKS (index)	OJK, BPS
Economic Development	Economic Growth (*GDP Constant*)	2010 constant economic growth		*Growth* (%)	OJK, BPS
	Open Unemployment Rate	Number of unemployed in the labor force	Alshyab, Sandri & Daradkah (2021)	*Unemployed* (%)	OJK, BPS
	Poverty Level	Number of poor people according to the data of Statistics Indonesia (BPS)	Honohan (2004)	*Pov* (%)	OJK, BPS
	Gini Index	Level of income inequality	Neaime & Gaysset (2018)	Gini (index)	OJK, BPS

Source: modified from Sarma & Pais (2011)

In estimating the Islamic financial inclusion index data and other data needs, the data used in the study were secondary data with operational definitions in Table 1. Data information on the Islamic banking financial sector and several fundamental economic indicators were used from 2015-2020 at the

provincial level. The time series data approach was adjusted to the limited data in the Islamic financial sector. Financial-related data in 33 provinces were taken from OJK (Financial Services Authority), and digital development data using IP-ICT data (Information and Communication Technology Development Index) was taken from BPS (Statistics Indonesia).

Referring to Sarma & Pais (2011), there are three dimensions in measuring the Islamic financial inclusion index, namely accessibility (D1), availability (D2), and usage (D3). Then as a development, this study used an additional dimension of digital development (D4). The measurement of the Islamic financial inclusion index was carried out by first determining the index for the dimensions of Islamic financial inclusion with the following equation:

$$d_t = w_i \frac{A_i - m_i}{M_i - m_i} \; ; i = 1,2,3,4 \; \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(4)$$

Description:
di = the-I dimension, $d1$= accessibility, $d2$= availability, $d3$=usage, $d4$= digitalisation
wi = the weight given to the i dimension, Ai = actual value of the i dimension, Mi = maximum value of the i dimension, and mi = minimum value of the i dimension.

Table 2. Sharia Financial Inclusion Index Dimension Calculation Formula

Variable	Variable Description	Formula
Accessibility D1 (index)	The accessibility dimension measures the level of penetration of Islamic banking to low-income communities.	$D1 = \dfrac{\text{Total third party funds}}{\text{Total Population}}$ x 1.000
Availability D2 (index)	This dimension measures the level of availability of Islamic banking/financial institution services for use by low-income communities.	$D2 = \dfrac{\text{Number of Branches, ATMs, and IFI}}{\text{Jumlah Populasi}}$ x 100
Usage D3 (index)	This dimension measures the extent to which Islamic banking products and services can meet customer needs, namely Islamic financing needs.	$D3 = \dfrac{\text{Total IFI Financing} *}{\text{Regional GRDP}}$ x 1.000
Digital Development D4 (index)	Digital development that occurs in each province through the calculation of the Information and Communication Technology Development Index	*D4= IP-TIK = 0,4 Access + 0,4 Use + 0,2 Skill*

Especially for dimension 4 (D4), the digital development aspect is a dimension that is seen more comprehensively (Siswa & Agustin, 2020). Because this development is still difficult if it is only seen from digital banking developments due to limited data. Therefore, adopting research conducted by Bansal (2014), it took a proxy for digital development in a broader aspect. This is the Information and Communication Technology Development Index (IP-ICT) published by BPS. The values Di = 1, 2, 3, and 4 each have a weight of 0.25 in forming the Islamic financial inclusion index (adjustment).

Table 3. Weighting for IP-ICT Indicators and Subindexes

Components	IndicatorWeighting	SubindexWeighting
Access and Infrastructure		
Fixed-line subscribers per 100 population	0,20	
Mobile phone subscribers per 100 inhabitants	0,20	
International internet bandwidth per user	0,20	0,40
Percentage of households with a computer	0,20	
Percentage of households with internet access	0,20	
Usage		
Percentage of individuals using the internet of Fixed broadband internet subscribers per 100 population	0,33	0,40
Active mobile broadband internet subscribers per 100 population	0,33	
Skill		
Average years of schooling	0,33	
Secondary gross enrollment rate	0,33	0,20
Tertiary gross enrollment rate	0,33	

Source: BPS (2020)

Empirical Model

After each dimension and index was found, the appropriate model was formed, namely the empirical panel data model as follows:

$$growth_{it} = \alpha + \beta_1 D1_{it} + \beta_2 D2_{it} + \beta_3 D3_{it} + \beta_4 D4_{it} + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (5)$$
$$unemploy_{it} = \alpha + \beta_1 D1_{it} + \beta_2 D2_{it} + \beta_3 D3_{it} + \beta_4 D4_{it} + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (6)$$
$$pov_{it} = \alpha + \beta_1 D1_{it} + \beta_2 D2_{it} + \beta_3 D3_{it} + \beta_4 D4_{it} + \varepsilon_{it} \dots\dots\dots\dots..\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (7)$$
$$gini_{it} = \alpha + \beta_1 D1_{it} + \beta_2 D2_{it} + \beta_3 D3_{it} + \beta_4 D4_{it} + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..\dots (9)$$

Information about variable notation/symbol can be seen in Table 1. As for $\varepsilon_{i,t}$ is the error term, $\beta1,\beta2...,\beta7$ are *the 1st, 2nd* to *7th* regression coefficients, *i*=1,2… 7 provinces in Indonesia, *t* is time, *dan* α is a constant.

IV. RESULTS AND DISCUSSION
IIKS Calculation Results and Panel Data Estimation Output
Based on the results of the calculation process carried out, the following can be seen the Sharia Financial Inclusion Index (IIKS) in all provinces in Indonesia in the 2015-2020 period as follows.

Table 4. Sharia Financial Inclusion Index Calculation Results for Each Province (2015-2020)

Province	IIKS 2015	IIKS 2016	IIKS 2017	IIKS 2018	IIKS 2019	IIKS 2020	Avarage IIKS
DKI Jakarta	3,06	2,41	2,27	2,31	2,34	2,29	2,45
DI Yogyakarta	1,87	1,68	1,72	1,82	1,87	1,71	1,78
Kepulauan Riau	1,80	1,54	1,60	1,65	1,70	1,59	1,64
East Kalimantan	1,70	1,56	1,59	1,64	1,65	1,59	1,62
Nanggroe Aceh Darussalam	1,16	1,43	1,71	1,75	1,82	1,72	1,60
Bali	1,59	1,45	1,54	1,60	1,60	1,52	1,55
Banten	1,48	1,29	1,46	1,54	1,56	1,42	1,46
West Java	1,43	1,22	1,43	1,49	1,55	1,38	1,42
South Sulawesi	1,42	1,26	1,44	1,46	1,48	1,32	1,40
South Kalimantan	1,40	1,22	1,37	1,42	1,44	1,30	1,36
West Sumatera	1,34	1,16	1,35	1,37	1,40	1,27	1,31
North Sulawesi	1,32	1,18	1,35	1,35	1,36	1,30	1,31
East Java	1,29	1,13	1,34	1,36	1,43	1,28	1,30
Bengkulu	1,38	1,10	1,31	1,34	1,42	1,25	1,30
Riau	1,27	1,14	1,34	1,38	1,40	1,27	1,30
Central Java	1,20	1,08	1,30	1,35	1,42	1,24	1,26
Jambi	1,29	1,07	1,25	1,32	1,37	1,21	1,25
Central Kalimantan	1,23	1,08	1,26	1,29	1,35	1,22	1,24
Bangka Belitung	1,21	1,07	1,24	1,28	1,36	1,20	1,23
Southeast Sulawesi	1,12	1,05	1,26	1,28	1,36	1,18	1,21
NTB	1,07	0,90	1,15	1,39	1,51	1,23	1,21
North Sumatra	1,18	0,99	1,22	1,30	1,36	1,18	1,20
South Sumatera	1,19	1,01	1,22	1,27	1,29	1,17	1,19
West Papua	1,12	0,97	1,24	1,30	1,33	1,18	1,19
Gorontalo	1,09	0,99	1,20	1,24	1,29	1,12	1,15
West Kalimantan	1,18	0,98	1,17	1,21	1,27	1,12	1,15
Maluku	1,05	0,98	1,19	1,20	1,21	1,12	1,12
Central Sulawesi	1,06	0,90	1,17	1,15	1,22	1,08	1,10
Lampung	1,03	0,89	1,10	1,18	1,26	1,06	1,09
North Maluku	1,02	0,86	1,13	1,14	1,17	1,04	1,06
West Sulawesi	0,87	0,77	1,03	1,06	1,12	0,96	0,97
NTT	0,82	0,68	0,96	0,94	1,03	0,89	0,89
Papua	0,75	0,62	0,89	0,84	0,84	0,78	0,79

Furthermore, to see the partial indices (D1, D2, D3, and D4) the following can be seen in Table 5. Table 5 shows implicitly that the development of Islamic financial inclusion in Indonesia still needs a lot of attention and is relatively unequal between each region. If visualized in the form of a geographic information system on each dimension and Islamic financial inclusion, the tendency of cluster groups will be seen as follows.

Table 5. Average Calculation Results of Islamic Financial Dimensions for Each Province (2015-2020 Average)

Province	IIKS	D1 Average	D2 Average	D3 Average	D4 Average
DKI Jakarta	2,45	0,25	0,18	0,11	1,90
DI Yogyakarta	1,78	0,02	0,08	0,05	1,62
Kepulauan Riau	1,64	0,01	0,08	0,02	1,52
East Kalimantan	1,62	0,01	0,06	0,01	1,52
Nanggroe Aceh Darussalam	1,60	0,08	0,21	0,21	1,07
Bali	1,55	0,00	0,02	0,01	1,50
Banten	1,46	0,01	0,05	0,02	1,36
West Java	1,42	0,01	0,04	0,04	1,32
South Sulawesi	1,40	0,02	0,13	0,03	1,20
South Kalimantan	1,36	0,01	0,05	0,04	1,24
West Sumatera	1,31	0,01	0,05	0,03	1,21
North Sulawesi	1,31	0,00	0,02	0,01	1,28
East Java	1,30	0,01	0,03	0,02	1,24
Bengkulu	1,30	0,00	0,06	0,05	1,17
Riau	1,30	0,01	0,05	0,00	1,22
Central Java	1,26	0,00	0,02	0,02	1,20
Jambi	1,25	0,00	0,05	0,03	1,15
Central Kalimantan	1,24	0,00	0,03	0,02	1,18
Bangka Belitung	1,23	0,00	0,04	0,01	1,16
Southeast Sulawesi	1,21	0,00	0,04	0,02	1,13
NTB	1,21	0,01	0,06	0,10	1,02
North Sumatra	1,20	0,00	0,03	0,02	1,13
South Sumatera	1,19	0,00	0,04	0,02	1,12
West Papua	1,19	0,00	0,02	0,27	1,15
Gorontalo	1,15	0,00	0,03	0,02	1,09
West Kalimantan	1,15	0,00	0,03	0,05	1,06
Maluku	1,12	0,00	0,01	0,00	1,10
Central Sulawesi	1,10	0,00	0,00	0,02	1,06
Lampung	1,09	0,00	0,03	0,02	1,03
North Maluku	1,06	0,00	0,04	0,02	0,98
West Sulawesi	0,97	0,00	0,01	0,01	0,94
NTT	0,89	0,00	0,77	0,00	0,89
Papua	0,79	0,00	0,01	0,00	0,77
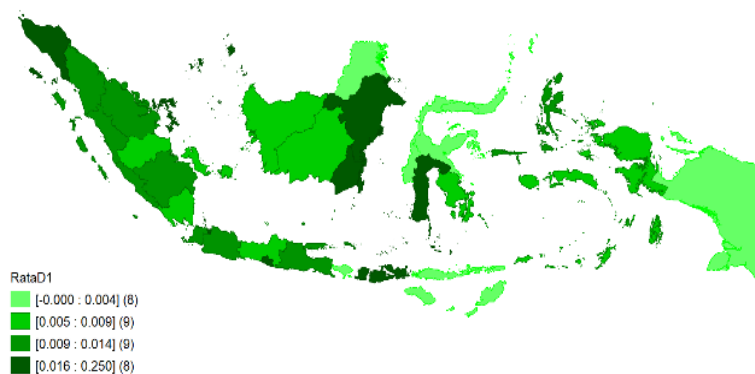
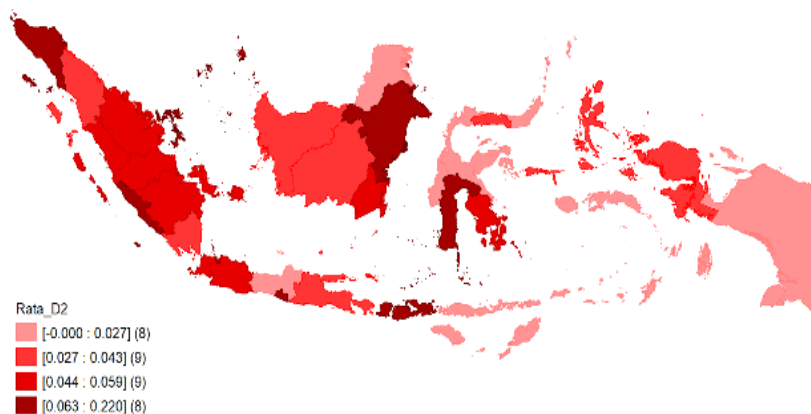**Figure 2.** Visualization of Average Islamic Financial Accessibility Dimension 2015-2020

Rata_D2
[-0.000 : 0.027] (8)
[0.027 : 0.043] (9)
[0.044 : 0.059] (9)
[0.063 : 0.220] (8)

Figure 3. Visualization of the Availability Dimension of Islamic Finance 2015-2020 Average

Rata_D3
[0.000 : 0.010] (8)
[0.012 : 0.024] (9)
[0.025 : 0.035] (9)
[0.044 : 0.216] (8)
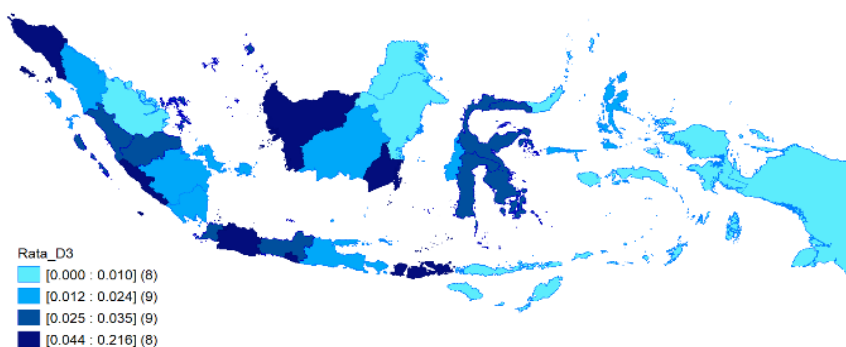
Figure 4. Visualization of Average Islamic Financial Usage Dimensions 2015-2020

Rata_D4
[0.010 : 1.062] (8)
[1.067 : 1.158] (9)
[1.167 : 1.242] (9)
[1.283 : 1.903] (8)
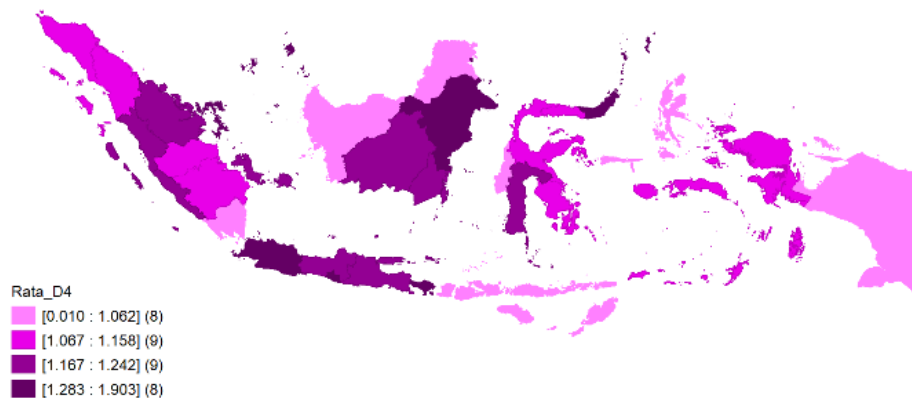
Figure 5. Visualization of Average Digitization Development Dimensions 2015-2020

IIKS
[0.010 : 1.129] (8)
[1.160 : 1.243] (9)
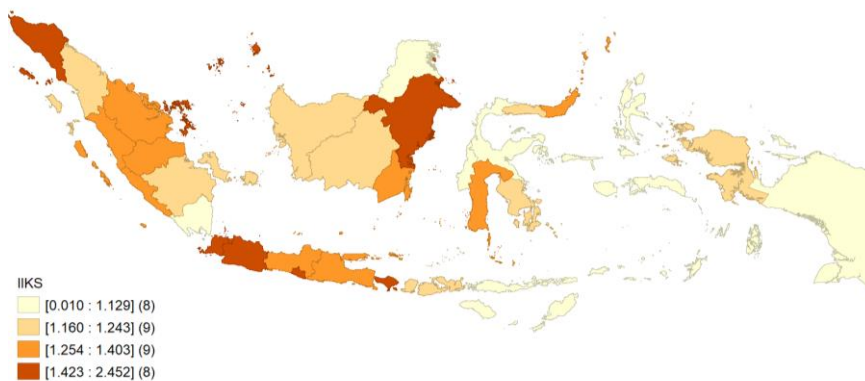[1.254 : 1.403] (9)
[1.423 : 2.452] (8)

Figure 6. Visualization of Islamic Finance Financial Inclusion Index

Furthermore, the following are the results of the panel data estimation. Table 6 is the development when the indexation of Islamic financial inclusion had been calculated and then used to review its impact on the economy (economic growth, unemployment, income inequality, and poverty). The output results were obtained based on the results of the best model selection test in the panel data best model selection procedure and passed the classical assumption test.

Table 6. Panel Data Model Estimation Results

Model	PLS VS FEM (Chow Test): Prob < α	FEM VS REM (Hausman Test): Prob > α	REM VS PLS Lagrangge Multiplier (LM) Test or crosssection–Breush Pagan: Prob > α
Model 1 (Growth)	0.002	0.000	-
Model 2 (Unemploy)	0.000	0.011	-
Model 3 (Pov)	0.000	0.071	0.011
Model 4 (Gini)	0.030	0.188	0.024

More specifically, the estimation results of each selected best model can be seen in the following table.

Table 7. Panel Data Model Estimation Results

Variable	Model Panel Data			
	Model 1 (Growth)	Model 2 (Unemploy)	Model 3 (Pov)	Model 4 (Gini)
	FEM	FEM	REM	FEM
Growth Coefficient (C)	3.092	-	-	-
Unemploy Coefficient (C)	-	6.291	-	-
Pov Coefficient (C)	-	-	10.886	-
Gini Coefficient (C)	-	-	-	0.348
D1 (Accessibility)	0.027 (0.056)*	-1.552 (0.138)	-0.022 (0.029)*	-0.148 (0.851)
D2 (Availability)	0.031 (0.000)***	-1.646 (0.012)**	-0.016 (0.012)**	0.006 (0.051)*
D3 (Usage)	0.043 (0.001)***	-1.043 (0.005)***	-0.013 (0.032)**	0.022 (0.000)**
D4 (Technology Development)	0.432 (0.007)***	-1.033 (0.009)***	-0.033 (0.027)**	-0.003 (0.000)***
R-squared	0.442	0.665	0.544	0.643
Prob(F-statistic)	0.000	0.000	0.000	0.000

Description: (***,**, and *) is the significance level (1%, 5%, and 10%)

Discussion

Java Island, especially DKI Jakarta province, dominates each dimension level. Meanwhile, the basis for the application of sharia principles in Nanggro Aceh Darussalam (NAD) also consistently has a fairly high level of dimensions when compared to other provinces. Provinces that are quite far behind include NTT, North Kalimantan, and North Sulawesi. This context implies that: first, the development of Islamic financial inclusion is still centered in provinces with sufficient money circulation, access, and infrastructure such as Java; second, in addition to the first factor, Islamic financial inclusion is also developing in areas with communal Muslim populations such as East Java (santri area), NAD which is famous for the application of sharia principles; third, the challenges of Islamic financial inclusion development are in areas that are building their existence (expansion) such as North Kalimantan and Gorontalo, as well as provinces with a non-Muslim base that are also quite communal such as NTT and North Sulawesi, Maluku, and West Papua. In fact, if we look at the development of Islamic financial inclusion in the world, it shows a high level of inclusion in countries with high non-Muslim populations such as in various European countries. Therefore, the context of financial literacy and its development is a challenge in the future. This finding strengthens the results of previous studies related to the level of Islamic financial inclusion in Indonesia which still needs to be improved (Umar, 2017; Lubis & Ramadhoni, 2019; Puspitasari et al., 2020).

Furthermore, the output results in Table 6 show that almost all financial inclusion dimension variables

play a role in the real sector economy. There are at least four signs of no significant influence with the dominance of variable D1 (accessibility dimension) and one variable D3 (usability dimension) in model 4 (inequality model). The accessibility dimension measures the level of penetration of Islamic banking to low-income communities that have not yet played a role in the real economy. This can be due to: first, because currently, it does not play a massive role like conventional institutions; second, because low-income people tend to have a low level of literacy so that the share of concentration is still in the scope of the upper middle class; third, the context of the role of Islamic banking in previous studies must be seen more specifically (micro perspective).

Meanwhile, the dependent variables of social problems, poverty, and inequality show that the role of financial inclusion is quite visible from the panel data estimation results. Except for variable D3 (usability dimension) shows a pattern that Islamic banking products and services can meet customer needs (Islamic financing needs) as a sign of significance and influence that can spur an increase in inequality. This finding shows the argument related to economic inequality, that Islamic banking is not yet inclusive. Namely, it is still limited to the upper middle class who utilize the facilities and services of the existence of Islamic banks, when compared to the lower middle class.

Furthermore, the impact of dimensions directly related to Islamic financial inclusion (D1, D2, and D3) generally plays a role in increasing economic growth (Anwar & Amri, 2017), access to education (Simatupang et al., 2020; Riswanto, Tanjung & Devi, 2021), infrastructure development spurred by the stretching of government spending (Fauzan, 2020), and reducing inequality and poverty (Dienillah & Anggraeni, 2016). This good finding is in line with many previous studies (in the context of conventional perspective financial studies) that support the Supply-Leading Hypothesis. However, since this index is a value that can be corrected and developed in the future, the context of the effect of its precision can be adjusted, the concern should be the level of significance and the sign of the coefficient.

V.   CONCLUSION

The conclusion of this study has answered the two objectives and hypotheses formed. First, the level of Islamic financial inclusion in Indonesia has only developed in certain regions in Indonesia, such as Java, and specifically is still limited to developing in areas with communal Muslim populations such as East Java (santri region) and NAD. In general, these areas are quite consistent in developing the Islamic financial system. However, the challenge of the development of Islamic financial inclusion must also be a concern because areas that are still building their existence (expansion areas) such as North Kalimantan and Gorontalo, as well as provinces with a fairly communal non-Muslim base such as NTT and North Sulawesi, Maluku, and West Papua, are stagnant and low. Therefore, the context of financial literacy and its development will be a challenge in the future.

Second, that the level of financial inclusion, which in this study is developed through 4 dimensions of indicators, generally has a good impact on the economy, including increasing economic growth, reducing unemployment, and reducing poverty. However, this study has not been able to show evidence that financial inclusion plays a role in reducing income inequality. The findings that the availability and usage dimensions have led to an increase in income inequality point to the challenge that there is potential for financial products and services to be enjoyed by the upper middle class. Meanwhile, in terms of usage, there are indications of unequal optimization of usage, because the upper middle class who have more financial assets experience the use of Islamic financial products.

This study does have some research novelty, starting from data processing techniques, how the model is developed for the context of the impact of Islamic financial inclusion which is quite comprehensive into the economic realm (economic growth, unemployment, inequality, and poverty), and this kind of study has not been done in Indonesia. Suggestions and inputs that can be taken into consideration for future researchers are: First, in terms of data access, it is hoped that in the future this kind of data can become public consumption and easily accessible, so that research development can be formed more focused, for example based on regional development clusters and the progressive context of Islamic financial inclusion conditions. Secondly, in terms of building dimensions and indicators, more comprehensive dimensions (additional dimensions) of other external dimensions can be considered.

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