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THE NEXUS OF ISLAMIC FINANCE AND POVERTY

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Abstract

This paper analyzes the short and long-run asymmetrical relationship between Islamic financing and poverty. We apply Autoregressive Distributed Lag on Indonesia data during 2003 to 2017 and provide interesting result: *first*, Islamic financing significantly helps to reduce the poverty both in the short run and also in the long run. *Second*, the role of GDP per capita on poverty reduction is inconclusive. *Third*, the structural break in 2006 significantly affects the short run dynamics of poverty, while the impact of structural break in 2010 is mixed. *Fourth*, there is evident that Islamic financing respond to the poverty condition in Indonesia.

Keywords: Islamic financing, poverty, asymmetric cointegration, bound test, ARDL
JEL Classification Codes: C22, D90, E40, G20

I. *Introduction*

This paper investigates the short and the long-run relationship between the Islamic finance, the poverty and the growth. The issue is important for several reasons; *first*, in many countries

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the benefit of growth for the poor is undermined by increases in inequality. Clarke et al. (2002) opined that there is a negative relationship between financial development and income inequality rather than an inverted u-shaped relationship but Greenwood and Jovanovich, (1990) noted inverted-U shape relationship between financial development and income inequality.

Secondly, many studies confirmed the interrelationship between financial development and economic growth including Bruno et al. (1998), Dollar and Kraay (2002), Honohan (2004), Beck et al. (2007), Odhiambo (2009), Jalilian and Kirkpatrick (2005), Jeanneney and Kpodar (2005), Quartey (2005), Stiglitz (1998), Arestis and Caner (2005), and among others, are also empirical research on the causal relationship between financial development and poverty reduction. The result of these studies tends to be inconclusive and mixed. Furthermore there are remaining disputes on political and policy consequences of the findings on those literatures as emphasized by Kanbur (2001). This fact motivates us to write this paper.

Thirdly, despite the abundant empirical literatures on financial linkage to growth and poverty reduction, literatures focusing on the linkage between Islamic finance and poverty reduction are still limited. The importance to focus on Islamic financing is twofold; (i) the growing of Islamic finance in nowadays practice possibly divert from the fundamental goal of Islam. Mehmet Asutay, a professor in Islamic finance at Durham University, argues that the development of Islamic financial institutions have neglected Islamic social goals[1]; (ii) the world poverty is still dominated by Moslem populous countries (see Obaidullah and Khan, 2008).

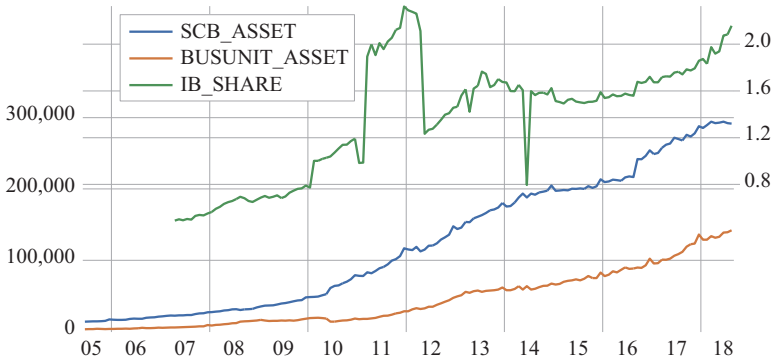
During the last decades, the socio-economic problems including income inequality remain the most challenging issue in Moslem countries, including Indonesia. A study by Askari and Rehman (2013) shows that during 1980 – 2011, almost all of 57 OIC member states shows a consistently underperformed trend in comparison to the world average in broad–based economic and social development. Using the United Nations Human Development Index (HDI) which comprises three: the Education Index (EI); the Health Index or Life Expectancy Index (LEI); and the Income or Wealth Index (II), the study finds that only the subset of the OIC, the six-GCC member countries – Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates – has outperformed the world average index, predominantly in terms of education, health and income levels. Nevertheless, the GCC's HDI index still remains below that of the OECD average during the same period. That poor socio-economic performance of most Moslem-majority countries has raised a long-standing debate on whether Islam as the "religion of practice" has relationships with socio-economic growth, or whether there are deeper problems, outside the Islamic values, contributing to lower education, poverty, poor health in the countries, although the Islamic economic principles have been introduced hundreds years ago.

This paper intentionally chooses the case of Indonesia, considering it has the largest Moslem population in the world. However, until 2016 the Islamic or Sharia financial inclusion in this country is still low even though the Islamic finance is relatively fast (OJK, 2018).

Coming from a low base, Indonesia's Islamic finance industry has shown rapid in recent years on the back of growing awareness of Islamic banking as well as government and monetary authority supports. Between the years 2010 and 2014, Islamic banking assets in this Southeast Asia's largest economy grew from IDR 100 trillion (approximately USD $8 billion) to IDR 279 trillion (USD $22 billion), or at a compound annual growth rate (CAGR) of 29.2

[1] https://www.thejakartapost.com/academia/2017/08/08/islamic-cooperatives-can-help-alleviate-poverty.html.

FIGURE 1. ISLAMIC BANKING ASSETS IN INDONESIA



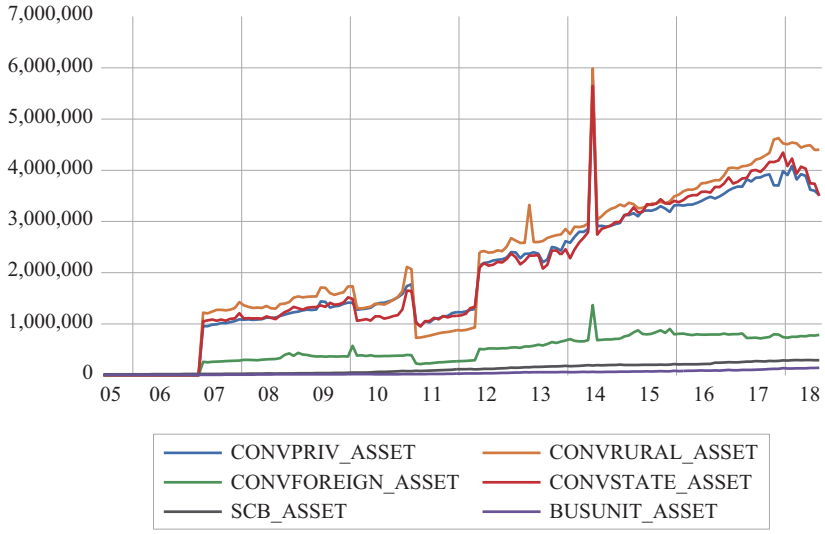
Notes: SCB is Sharia Commercial Bank and BUSUNIT is Sharia Business Unit. Series covers the period of July 2005–August 2018. The value is in current Billion Rupiah. The ib_share (RHS) represents the absolute fraction of these two Islamic institutions over the total conventional bank asset.
Source: Indonesia Financial Services Authority.

percent. This growth pace is considerably higher than growth posted in other Islamic banking markets. It is also interesting to note that Indonesia's conventional banking assets expanded at a much slower pace (with a CAGR of 16.9 percent over the same period).

An amount of USD $8 billion Sharia bank, created by merging existing Islamic units of state-controlled banks Bank Rakyat Indonesia (BRI), Bank Mandiri, and Bank Negara Indonesia (BNI), would reduce operating costs and make it possible to offer more competitive rates, while making integration between Indonesia's Islamic banks and the global financial system easier (for example by revising capital requirements in order to bring risk management at Indonesian Islamic banks in line with international standards). This mega Islamic bank would also quadruple Islamic banks' market share in Indonesia to 20 percent by 2018 according to the OJK. The three aforementioned banks together currently account for about 40 percent of Indonesia's Islamic banking assets. In 2015 the Islamic banking industry of Indonesia comprised 12 general Sharia banks, 22 Sharia business units of conventional banks and 163 Sharia people's credit banks (rural Islamic banks). As of 2012, the estimated total assets in Islamic banking in Indonesia reached US$1 to 1.5 trillion (World Bank estimates), with annual asset growth of 10 to 15 percent until 2010 and 8 percent per annum afterward. Recently, the Financial Services Authority (OJK) stated that Islamic finance industry assets had reached $32 million in the first quarter of 2017. Figure 1, 2, and 3 below present the share between the Islamic Commercial Bank and the Islamic Business Unit.

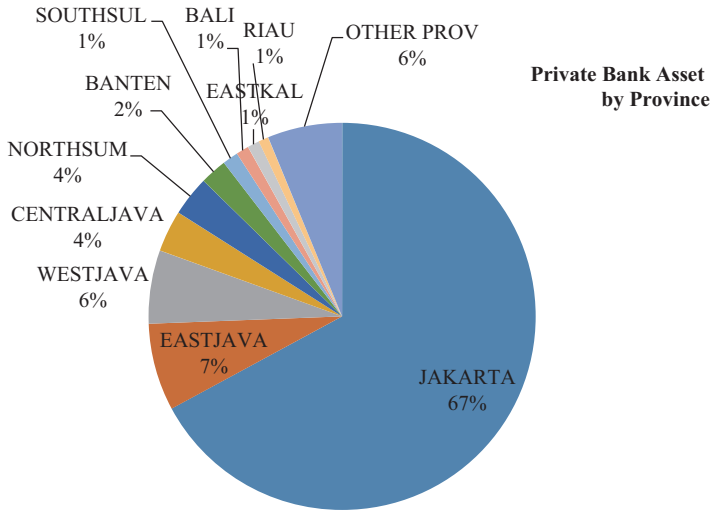
The rapid growth of Islamic finance presents an opportunity to address the social and economic gap including poverty. For the last of decades, Indonesia has been experiencing a reduction in the rate of poverty. Based on the latest data from Indonesia's Statistics Agency (BPS), Indonesia's absolute poverty rose to 27.77 million people in March 2017 from 27.76 million in September 2016. However, the country's relative poverty figure fell to 10.64 percent of the population in March 2017 from 10.70 percent in September 2016. This seeming paradox - rising absolute poverty but falling relative poverty - is caused by Indonesia's growing population. The Indonesian population now numbers about 261 million people. Suhariyanto,

FIGURE 2. CONVENTIONAL BANK ASSET VS. ISLAMIC BANKING ASSET IN INDONESIA



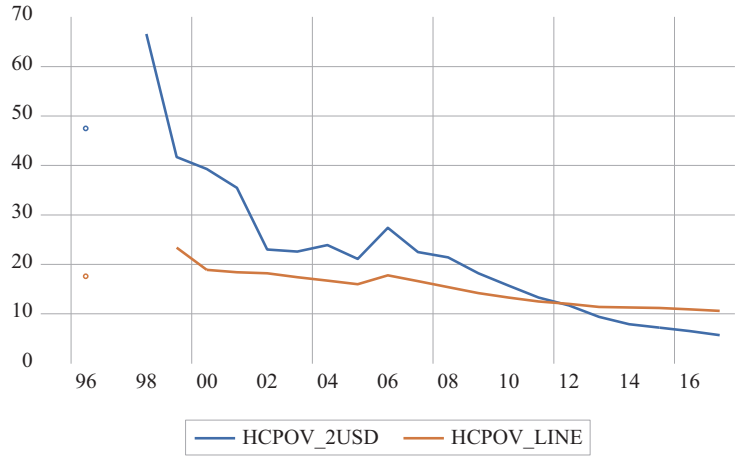
Notes: ConvPriv is conventional private banks; ConvRural is conventional rural banks; ConvForeign is conventional foreign banks; ConvState is conventional state banks. SCB is Sharia Commercial Bank and BUSUNIT is Sharia Business Unit. Series covers the period of July 2005–August 2018. The value is in current Billion Rupiah.
Source: Indonesia Financial Services Authority.

FIGURE 3. ASSET OF PRIVATE BANKS IN INDONESIA



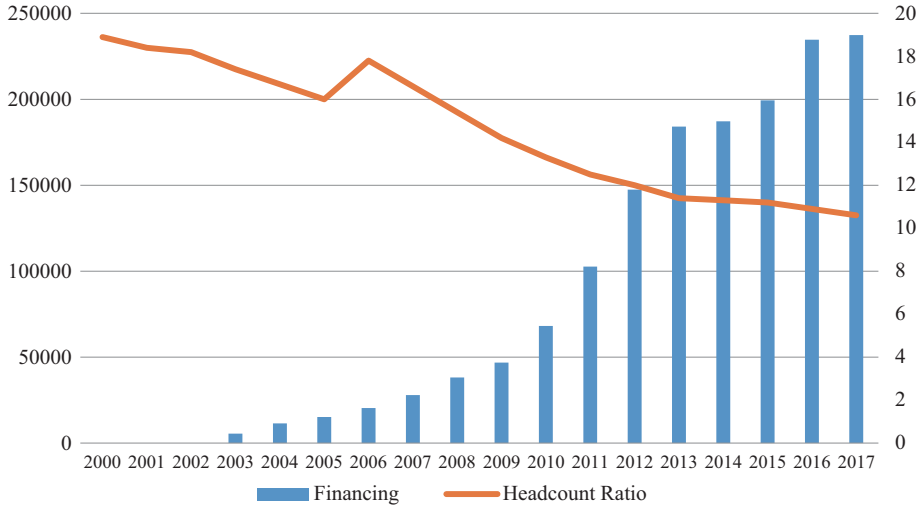
Notes: The graph shows the share of the largest ten provinces of private bank asset. The proportion is calculated from the average asset of the private banks during 2007–2018. There are 34 provinces in total but we include only the largest 10 (ten) and one rest category. Southsul is South Sulawesi, Eastkal is East Kalimantan,

FIGURE 4. HEADCOUNT POVERTY IN INDONESIA, 1995–2018



Source: World Bank, 2018.

FIGURE 5. ISLAMIC FINANCING AND HEADCOUNT POVERTY



Notes: Headcount ratio represents the poverty measured by the %age of population under the national poverty line. Islamic financing covers Sharia Commercial Bank and Sharia Business Unit in Billion Rupiahs.
Source: Indonesia Financial Services Authority.

Head of BPS, commented on the latest poverty data saying it basically indicates that poverty reduction in Indonesia stagnated over the past six months despite the decline in relative poverty.[2] There are many reasons for this stagnancy on poverty reduction. The question remains is whether this growth of Islamic finance outlined before really helps the poverty reduction in this largest Moslem country.

The novelty of this paper is to allow for asymmetry in potential causal relationship between Islamic finance and poverty reduction in Indonesia. In the light of the above inquiries, the present study contributes to fill the gap by testing two hypothesis; *first*, the Islamic finance and the economic growth reduce the poverty in Indonesia, and *second*, the Islamic finance respond to the poverty condition.

With these two hypotheses, we emphasize that the potential bi-directional causality between the Islamic finance and poverty is empirically observed. The Islamic financing responding to poverty condition is also part of the Moslem belief. Within this framework, this paper fall into empirical research, and to the best of our knowledge, testing whether Islamic financing respond to poverty is quite new within the vas literature on poverty.

To answer these hypothesis, *first* we apply unit root properties in the possible presence of structural break on the variables (see among others Clemente et al., 1998); *second*, after conforming no feedback effect from the endogenous variable, we apply the Auto Regressive Distributed Lag (ARDL) bounds testing approach to cointegration for the long run relationship between Islamic finance, economic growth, and poverty reduction. The use of this approach provides advantage since both the dependent and independent variables are related not only contemporaneously, but also across historical values. *Third*, we derive the Error Correction Model to identify the short run dynamics of these three variables. During the identification, model selection, estimation, and robustness check, we take into account the possibility of structural break on the series.

The paper provide several findings: *first*, Islamic financing significantly help to reduce the poverty both in the short run and also in the long run, where about 40 percent of the short run deviation is adjusted in one year. *Second*, the role of GDP per capita on poverty reduction is inconclusive in Indonesia. *Third*, the structural break in 2006 significantly affects the short run dynamics of poverty, while the impact of structural break in 2010 is mixed. *Fourth*, there is evident that Islamic financing respond to the poverty condition in Indonesia. However the magnitude and direction of the response is inconclusive.

Our estimation is robust across sample period, model variants both lag number and their order, structural break consideration, choice of poverty proxies, and also consistent between the short and the long run dynamics. Furthermore, they also pass the classical assumption including the weakly exogenous one.

This paper is structured as follows. Section II, presents a brief review of methodology including empirical model to estimate, methodological framework and data. Section III presents the results and analysis, while Section V draws conclusion and policy recommendations.

[2] https://www.indonesia-investments.com/news/todays-headlines/poverty-in-indonesia-absolute-poverty-up-relative-poverty-down/item7995

II. *Methodology*

To investigate the long- and short-run relationship between Islamic finance, economic growth and poverty in case of Indonesia, we use annual frequency data from the Statistics Indonesia (BPS) and the World Bank. Our data set spans the period 2000-2017.

One reliable measures for Islamic financing is Islamic domestic credit or financing to private sector such as *murabahah*, *mudharabah*, *qardh*, *ijarah* in working capital and investment scheme for Micro, Small and Medium Enterprises (MSMEs). The use of this proxy provides a more accurate measurement about the role of financial intermediaries in channeling funds to productive agents and possibly to the poor (Shahbaz, 2015). Financing to MSMEs provide more benefits to people in the area, as one of its characteristics is that MSMEs tend to be labor intensive rather than capital intensive. We expect the coefficient associated to financing to MSMEs to be negative and significant.

There are two categories of financial development, typically referred to as either the bank-based or the market-based measure of financial development. As the proxy for financial development, this paper use Islamic domestic credit channeled by Sharia Commercial Banks and Sharia Business Units. Previous studies used similar proxy include Clarke et al. (2002); Ang (2009); Shahbaz and Islam (2011); Baligh and Pirace (2013); and Naceur and Zhang (2016), who also utilize this proxy.

Since we observe the last 17 years data, a structural break may occur. We carefully take this into account during the stationarity test, estimation, and robustness check. There are two approaches on determining the break; exogenously and endogenously. We consider the use of these two approaches since some structural break in the past has been clearly identified in nature. [3]

The ARDL model to test for long run relationship between the variables also anticipates the possible presence of structural breaks. Should we find at least one cointegrating vector (i.e. the underlying equation), then we will re-parameterized the ARDL model of the cointegrating vector into ECM[4]. This will provide us the short-run dynamics (i.e. traditional ARDL) and long run relationship of the variables of a single model.

Then next focus variable is poverty. We measure the poverty using headcount ratio at national poverty lines and USD 2 spending per day per person[5] In addition to these two core

[3] Within endogenous break, see among others the pioneers Zivot and Andrews (1992). The more recent ones on this category includes Harvey, Leybourne and Taylor (2013). Marcus Nordstorm (2017) observe these two approaches (HLT and NP) and conclude that Harvey, Leybourne and Taylor test has superior size and power properties compared to the latter and also more accurate except for when the breaks are very large and the null is true.

[4] The case would be different when the trace or Maximal eigenvalue or the F-statistics (Wald test) from cointegration identification establishes that there are multiple long-run relations. On this case, the dependent variable shows a feedback effect, hence the weakly exogeneity assumption will not hold; this will lead us to multivariate procedure, where the alternative approach like Johansen and Juselius (1990) will be more appropriate. See the next section about the weak exogeneity test.

[5] Poverty headcount ratio is measured based on national poverty lines, which may vary across rural and urban areas, across different cost of living, or across differences in diets and consumption baskets. Poverty estimates at national poverty lines are computed from household survey data. National poverty lines reflect local perceptions of the level and composition of consumption or income needed to be non-poor. Almost all national poverty lines are inflation-adjusted, and anchored to the cost of a food bundle - based on the prevailing national diet of the poor - that provides adequate

variables, we also include one control variable in our models. The control variable is GDP per capita since it is highly correlated with the financial sector development; see among others Clarke et. al, (2002), Al-Zubi, Al-Rjoub and Abu Mhareb (2006), Eatzaz and Aisha (2009).

As explained before, the novelty of this paper is to allow for possible symmetrical causality between the role of Islamic finance in poverty reduction in Indonesia. Causality model from financing to poverty are widely available, for example in Shahbaz (2009 and Shahbaz and Islam (2011who investigated the impact of financial development and financial instability on poverty reduction by applying the autoregressive distributed lag model (ARDL) for long run relationship between the variables by controlling economic growth, inflation, agricultural growth, manufacturing and trade openness.

In contrast to these literatures, we also investigate possible causality from poverty to Islamic financing. The reason behind this is straightforward since *murabahah*, *mudharabah*, *qardh*, *ijarah, including shadaqah* and *waqf* in Islam are largely motivated to help people out of poverty.

We measure the poverty using headcount ratio at national poverty lines and USD 2 spending per day per person. For economic growth, we use the value of GDP per capita and its annual growth. The reason to use per capita is because poverty relates to person and not aggregate, though a more accurate measure is all fund allocated for public and potentially bring positive impact to the poor (Dollar and Kraay (2002)) On the other hand, any part of the GDP who benefit only the riches should be excluded.

We tested the unit root of all the variables both with exogenous and endogenous break approach as explained above. This is also part of our robustness strategy; combining the statistical model in endogenous break and also the importance of existing historical information to use in exogenous break approach. When they are all integrated at level or I(0), then the use of OLS will provide efficient and unbiased estimates. If they are all integrated at first difference or I(1), then we have to apply VECM. Should we find variables on the system, i.e. poverty, growth, and Islamic finance are integrated in different order, we will employ the ARDL approach to test for cointegration. Ignoring these rules will alter the predictive power of the models.

The first step in ARDL is to empirically investigate the existence of long run relationship between the variables, with the null hypotheses of 'no long run relationship between the variables'. The calculated F-statistic is then compared against the upper and lower critical value bound provided by Narayan (2005)[6], which correspond to the assumptions that the variables are I(0) and I(1) respectively. If the calculated F-statistics exceeds the upper critical bound (UCB), then the series are cointegrated; if it is below the lower critical bound (LCB), there is no cointegration. If the calculated F-statistics is between the UCB and the LCB, then decision about cointegration is inconclusive and knowledge of the cointegration rank of the forcing variables is required to judge any evidence of a long-run relationship.

The number of cointegrating equation (s) may depend on the presence of intercept and

nutrition for good health and normal activity, plus an allowance for nonfood spending. Source: https://www.indexmundi.com/facts/indicators/SI.POV.NAHC.

[6] Under non asymptotic condition, Narayan (2005) provides a set of critical values for small sample sizes, ranging from 30 to 80 observations. The computed critical values will depend on the number of regressor, the order of variable, the inclusion of intercept and trend, and the included observation. Cointegration statistically exist when the F statistic is larger than the upper bound.

trend, either on the level series or in cointegrating equation, or both. The choice of assumption may somewhat cumbersome. To clarify this, suppose we have a VAR (1) system of $\Delta y_t = AB' y_{t-1} + \delta + \varepsilon_t$ and we assume that all $y_t \sim I(1)$ with $0 < r < k$ cointegrating relation. There are two possibilities here, first is $E(y_t)$ will be constant over time and arise from cointegrating relationship $z_t = B' y_t + \delta_0$. With $E(z_t) = 0$, then $\Delta y_t = A z_{t-1} + \varepsilon_t$ will be:

$$\begin{aligned}\Delta y_t &= A z_{t-1} + \varepsilon_t = A(B' y_{t-1} + \delta_0) + \varepsilon_t = AB' y_{t-1} + A\delta_0 + \varepsilon_t \\ &= AB' y_{t-1} + \delta + \varepsilon_t\end{aligned}$$

$E(z_t) = 0$ implies $E(\Delta y_t) = 0$ and result $E(y_t) = E(y_{t-1}) = 0$, which mean the restricted intercept δ_0 do not permit any trend in y_t. This is why assuming restricted intercept for a system of variable with trend is not appropriate. The second possibility on $E(y_t)$ is to let it trend. This time δ can take any value and does not necessary $\delta = A\delta_0$. The consequence is $E(\Delta y_t) \neq 0$ and result $E(y_t) \neq E(y_{t-1})$, which allow the presence of trend in y_t.

From the two possibilities above we will test the following 5 variants: (i) no deterministic trend and the cointegrating equation does not have an intercept; (ii) no deterministic trend and the cointegrating equation has an intercept; (iii) a linear trend with the cointegrating equation having an intercept; (iv) the cointegrating equation has a linear trend; and (v) a quadratic trend with the cointegrating equation having a linear trend. This is necessary to ensure the robustness of our estimation.

Once the cointegration between the variables has been identified, the long run coefficients and the error correction term (ECT) can be estimated. The ARDL cointegration procedure allows cointegrating relationship to be estimated by OLS once the lag order is selected. The model can be specified as follows:

$$\begin{aligned}\Delta P_t = a_0 + \sum_{i=1}^{k} b_i \Delta P_{t-i} + \sum_{i=1}^{k} c_i \Delta Y_{t-i} + \sum_{i=1}^{k} d_i \Delta IF_{t-i} + \\ \delta_1 P_{t-1} + \delta_2 Y_{t-1} + \delta_3 IF_{t-1} + \mu_t\end{aligned} \tag{1}$$

where P_t is poverty, IF_t is Islamic finance, and Y_t is income per capita. Δ denotes first difference of and u_t is the residual term. The coefficients b_i, c_i, and d_i represent the short run effects while all δ_j (for $j = 1, ..., 3$) represents the long run effects. We expect to have $\delta_1 \neq 0$ and or $\delta_2 \neq 0$. To investigate the presence of cointegration with causality from poverty to Islamic financing, we will modify Equation 1 and set the IF_t to be endogenous.

The dynamic error correction model (ECM) is derived from the ARDL model through a simple linear transformation where the ECM integrates the short run dynamics with long run equilibrium, without losing the long run information. The causality in the earlier step will be tested and confirmed through the t-statistic of the ECM while the coefficient of the ECT from the ECM indicates the speed of adjustment of the dependent variable towards its long run equilibrium.

$$\Delta P_t = \beta_{10} + \sum_{i=1}^{k} \beta_{1i} \Delta IF_{t-i} + \sum_{i=1}^{k} \beta_{2i} \Delta Y_{t-i} + \sum_{i=1}^{k} \beta_{3i} \Delta P_{t-i} + \gamma_4 ECT_{t-1} + \mu_t \tag{2}$$

Equation (1) is widely recognized as unrestricted ECM, while Pesaran et al. (2001) named it conditional ECM. By letting ΔP_t and all difference variables to have zero coefficient; in this

case all $b_i = c_i = d_i = 0$, we directly obtain the long-run effects of δ_2/δ_1 for income and δ_3/δ_1 for Islamic financing. Technically, the long run coefficient are derived from Conditional Error Correction form, where the calculation of F-statistic and the t-statistic has taken into account the non-standard distribution of the statistic and the effect of cointegrating rank as nuisance parameter of the variable system. The F and t critical values should also been corrected for the non-asymptotic distribution due to the limited sample of only 17 years in our data[7].

In a standard triangular representation of a regression specification, the single cointegration from $(n + 1)$ dimensional time series which follow the vector process (y_t, X_t') is provided below; see (Hansen, 1992; Phillips and Hansen, 1990):

$$y_t = X_t'\beta + D_{1t}'\gamma_1 + \mu_{1t}$$

where D_{1t} is deterministic trend regressors and there are n stochastic repressors X_t.

III. *Result and Analysis*

1. Descriptive Statistics

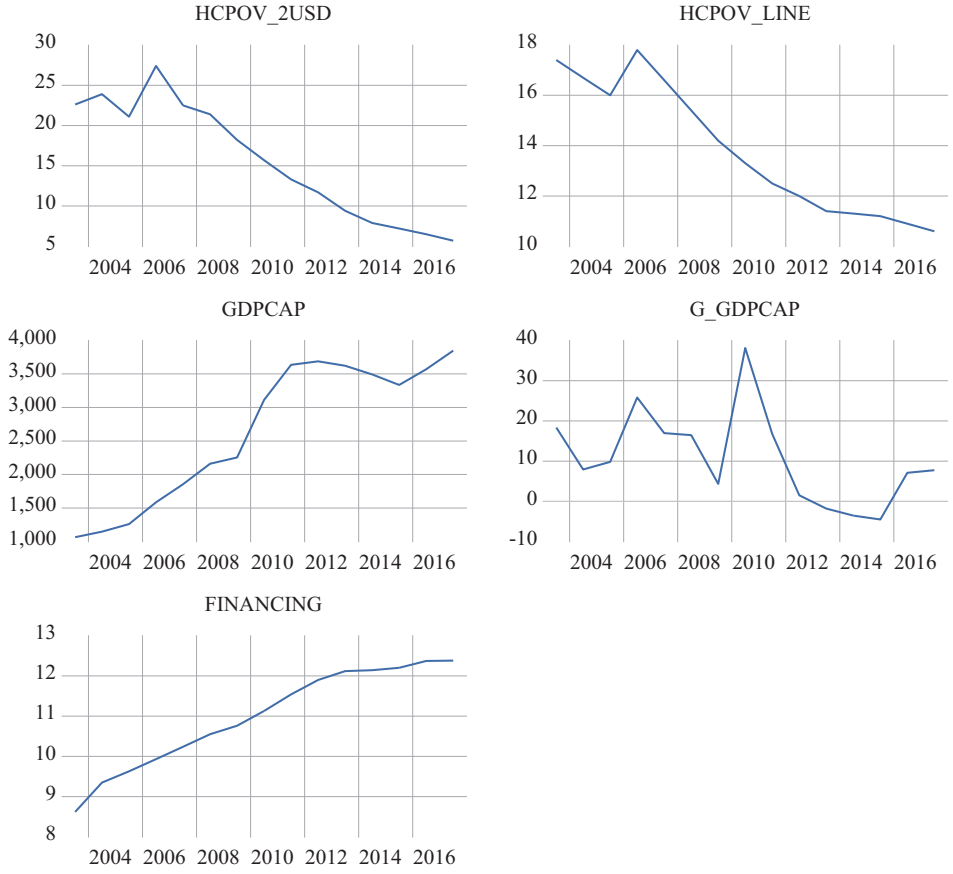
The poverty is measured in percent. The lowest rate of poverty was recorded is 10.6 percent in 2017 based on USD2 spending per day (per person) and the highest was 17.8 percent in 2006. During 2003 to 2017, the average poverty rate in Indonesia is 13.82 percent. When using the national poverty line, the average poverty in Indonesia is 15.63 percent. In general, the national poverty line set by corresponding country in this case Indonesia tend to be lower than the poverty measure set by the World Bank of USD2 spending per day per person. See Figure 6 to visualize the series.

Financing is the total fund distributed by Islamic banking, including Syariah unit owned by conventional bank. The series covers profit sharing based-financing (*Mudharabah*, *Musyarakah*, and other), loan to third party (*Murabahah*, *Qardh*, and *Istishna'*), leasing (*Ijarah*), and equity interest or capital participation (*Istithmar*). We use the natural logarithm of the Islamic financing value (in Billion Rupiah). The average value is IDR98,43 trillion. In 2017, the total market share of Islamic banking recorded only 5.78 percent of the total banking industry in Indonesia. The Islamic commercial banks dominate the distribution of Islamic financing, followed by the Islamic business unit. The total number of offices by 2017 is 2,610 with the total asset in value of IDR435.02 trillion. In 2017, the total Islamic financing is IDR234,64 trillion.

The second variable of interest is income and the proxy to use is GDP per capita. In average, the value of GDP per capita in this country is USD2,642 per annum. The lowest was recorded USD1,064.51 in 2003 and the highest is USD3,847 in 2017. A slowing occurred in 2011 to the lowest growth of 4 percent in 2015.

[7] We expect to run a cross section variation from panel data in the future since we believe the effect might be time varying.

FIGURE 6. THE CORE VARIABLES



Notes: This is the plot of poverty, Islamic financing, and GDP per capita in Indonesia. HCPOV_2USD is poverty rate based on USD2 spending per day, HCPOV_LINE is poverty rate based on national poverty line set by corresponding country; both are in percent. GDPCAP is Gross Domestic Product per capita (USD), while G_GDPCAP is growth of GDP per capita (percent). FINANCING is the value of credit distributed by Islamic banking, including Syariah Unit of conventional bank.

2. Identification

We use two proxies for poverty; (i) the headcount poverty based on USD 2 per day (HCPOV-2USD) and (ii) the headcount poverty based on national poverty line (HCPOV_LINE). Both differ significantly where the use of national poverty line is flatter and smoother. Prior 2012, the measure of poverty using poverty line is higher than when using USD 2 spending per day per capita.

We test the equality of means between these two poverty measures, and all the t-test, Satterthwaite-Welch t-test, Anova F-test, and the Welch F-test prove they have different mean.

TABLE 1. DESCRIPTIVE STATISTICS

Item	Poverty (percent)		GDP per Capita		Islamic Financing (percent)
	National poverty line	USD2 spending per day	Value (USD)	Growth (percent)	
Mean	15.63	13.82	2642.00	10.72	98439.54
Median	15.70	13.30	3113.48	7.90	68181.00
Maximum	27.40	17.80	3846.86	38.10	234643.3
Minimum	5.70	10.60	1064.51	-4.50	5530.00
Std. Dev.	7.29	2.61	1052.74	11.63	82650.40
Skewness	0.02	0.22	-0.32	0.73	0.32
Kurtosis	1.56	1.47	1.45	3.14	1.46
Jarque-Bera	1.30	1.60	1.76	1.34	1.728
Probability	0.52	0.45	0.41	0.51	0.42
Observations	15	15	15	15	15

Notes: The frequency is annual, covering period 2003-2017. Islamic financing, poverty and growth of GDP per capita is measured in, while the GDP per capita is in USD. Based on Jarque-Bera statistic, all variables are normally distributed.

TABLE 2. THE STRUCTURE OF ISLAMIC BANKING IN INDONESIA, 2017

Islamic Banking Industry	Number of Institutions	Number of Offices	Assets	Financing	Deposits
			Trillion Rupiah		
Islamic Commercial Banks	13	1,825	288.02	189.79	238.22
Islamic Business Units	21	344	136.15	95.91	96.49
Islamic Rural Banks	167	441	10.84	7.76	6.99
Total	201	2,610	435.02	291.18	341.71

Source: Syariah Banking Statistics, OJK (2018)

TABLE 3. TEST OF EQUALITY ACROSS POVERTY MEASURES

Test for Equality of Means Between Series
Date: 12/25/18 Time: 08:20
Sample: 1995 2017
Included observations: 23

Method	df	Value	Probability
t-test	39	2.263918	0.0292
Satterthwaite-Welch t-test*	22.09249	2.315717	0.0302
Anova F-test	(1, 39)	5.125323	0.0292
Welch F-test*	(1, 22.0925)	5.362546	0.0302

Note: *Test allows for unequal cell variances

Analysis of Variance

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	1	664.3411	664.3411
Within	39	5055.155	129.6194
Total	40	5719.496	142.9874

Category Statistics

Variable	Count	Mean	Std. Dev.	Std. Err. of Mean
HCPOVERTY_2DOLLAR	21	23.23810	15.53346	3.389680
HCPOVERTY_PLINE	20	15.18500	3.474611	0.776947
All	41	19.30976	11.95773	1.867484

TABLE 4. UNIT ROOT TEST ON POVERTY WITH STRUCTURAL BREAK

	National Poverty Line	USD2 spending per day	GDP per Capita	Growth of GDP per Capita	Islamic Financing
Observed Break	2006*	2006*	2010*	2010*	2010
Stationary	I(1)	I(1)	I(1)	I(0)	I(0)
Modified ADF test statistic	-15.71*	-11.85*	-4.90*	-4.47**	-5.27*
Y (-1)				11.35 3.81	0.05* 2.92
D(Y)(-1))	0.031* (0.06)	-0.157 (0.097)	-0.123 (0.22)	-9.15 3.72	
D(Y)(-1),2)			0.64* (0.19)		
D(Y)(-2),2)			0.31 (0.18)		
D(Y)(-3),2)			0.28 (0.15)		
C	-0.95* (0.11)	-1.24 (0.867)	175.12* (56.19)	38.16* 6.94	0.49* 0.40
INCPTBREAK	-0.87* (0.17)	-0.94 (0.915)	-23.04 (68.16)	0.13* 0.19	0.12* -0.11
BREAKDUM	3.17* (0.20)	8.04* (1.419)	859.99* (127.94)	0.23* 0.14	0.12 0.74
R-squared	0.962168	0.772940	0.883003	0.79	0.99
Adj. R-squared	0.947035	0.711015	0.795255	0.70	0.99
S.E. of reg	0.169446	1.352487	117.1220	6.34	0.09
SSR	0.287119	20.12144	109740.4	401.65	0.09
Log likelihood	8.385224	-23.48709	-88.01775	-45.94	15.68
F-statistic	63.58166	12.48179	10.06298	9.28	574.11
p (F-stat)	0.000000	0.000729	0.002310	0.00	0.00

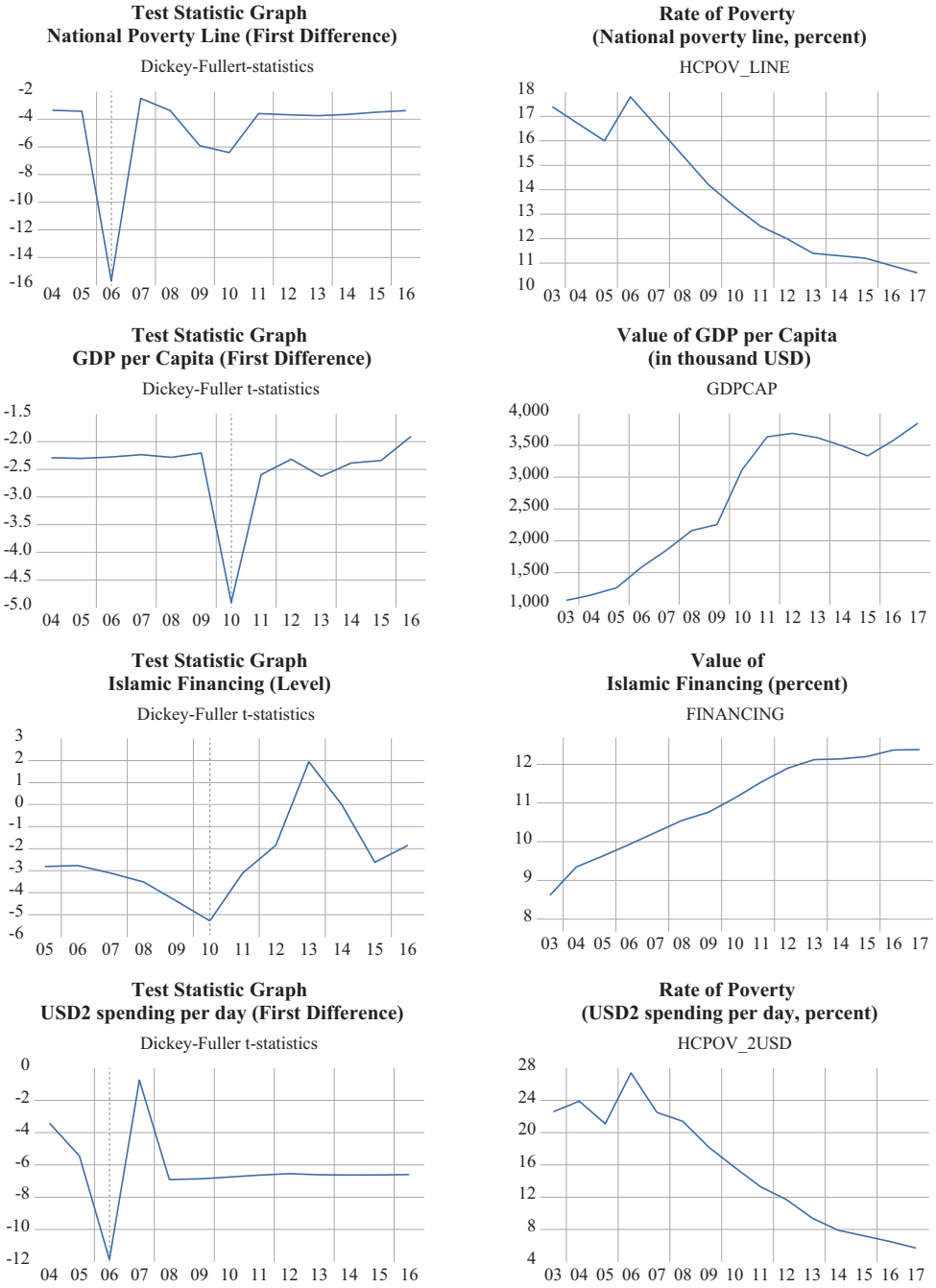
Notes: This is the result of unit root test with endogenous break. We found the poverty for national poverty line measure is stationer at level, while USD2 per day consumption measure is stationer at first difference[8]. The break dummy 2006 for both series is significant. The result is robust across the four method on Break Selection (Minimize Dickey-Fuller t-statistic, intercept break minimize t-statistic, intercept break maximize t-statistic, and intercept break maximize absolute t-statistic). It is also robust across two types of break (innovational and additive outlier).
For each chosen statistic (asymptotically distributed), the lag length to choose on these 5 estimations should be large enough to eliminate the effect of error correlation structure. We have six statistic variant and we report Schwarz information criteria on this table, with maxlag=3. The significance value is based on Vogelsang (1993) asymptotic one-sided p-values.
*) significant at p = 1 percent. **) significant at p = 5 percent.

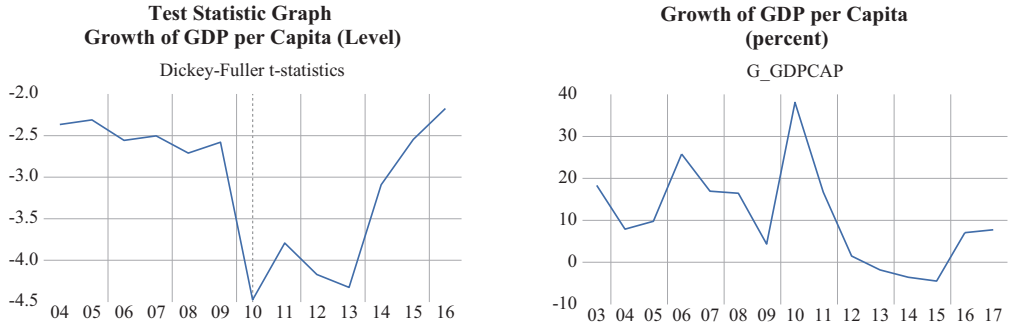
As explain before, the poverty with USD 2 per day has a mean of 23.23 percent with a standard deviation of 15.53. On the other hand, the mean for poverty with national poverty line has a mean of 15.18 percent with significantly lower standard deviation of 3.47. The fact that the two measure is not similar is the motivation to use them both as part of robustness check strategy on this paper.

Poverty based on national poverty line follows I(1) when we specify it to have intercept and trend (allowing break only in intercept). The same applies for poverty series based on USD 2 spending per day of I(1). The endogenous breakpoint test statistically find the break on in

[8] Although the dataset period is from 2000 to 2017, the data analysis is held between the year 2003 and 2017. This is due to use the first difference and two periods lag.

FIGURE 7. ENDOGENOUS BREAKPOINT TEST





Notes: The left column provide the visualization of the breakpoint test for all variables involving on this paper. To provide direct comparison, the right column provide real value of the variables. The result of statistical model of breakpoint reported on Table 4 (associated with the left column) is in accordance with the real value of the variables (right column). We found that the poverty and GDP has a break, while the Islamic financing does not.

2006 for poverty in Indonesia (see Table 4). For the control variable GDP per capita, the test revealed the presence of structural break in 2010 both for the value as well as its growth. The value of GDP per capita is stationary at I(1), while the growth of GDP per capita is I(0). This is logical since the transformation from value to growth will smooth the original series (see the comparison between the breakpoint test statistic graph and the actual series in Figure 7). The Islamic financing series follow I(0) without structural break during the observed period.

On identifying the structural break, we combine (i) the statistical model, (ii) historical information (for exogenous break test), and (iii) the nature of the series of interest, which relates to the choice of differencing and detrending. In summary the variables that stationary at level are growth of GDP per capita and Islamic financing, while poverty and value of GDP per capita follows I(1). Statistically we reveal significant break in two dates, 2006 and 2010.

The implementation of ARDL model on this situation is favorable. As pointed out by Nkoro and Uko (2016) to forestall effort in futility, they suggest the test for unit roots as we did above. This helps us to avoid wrongful application, estimation, and interpretation of ARDL cointegration technique.

The next step is to test the presence of cointegration, showing if our model empirically exhibits meaningful long run relationships.[9] We use the two identified breakpoints (2006 and 2010) along with other fixed regressor[10].

Our identification for cointegration is presented in Table 5 and Table 6. The result is robust across two identified breakpoints, two poverty measures, two measures of GDP per capita (value and growth), and the alternative assumption on the presence of intercept and trend[11]. The latter is important to incorporate the nature of the series; for example the presence

[9] If it failed to establish the cointegration among underlying variables, it becomes imperative to continue to work with variables in differences instead.

[10] This is one way to internalize the structural break on our system estimation. A more elaborated method is feasible but beyond the scope of the current paper. We specify 3 types of dummy, the first is for identified structural break in 2006/2007 (DBREAK1), structural break in 2010 (DBREAK2), and any point where the structural break occur (DBREAK3).

[11] To emphasize why intercept and trend matter economically, the following simple sample should be clear: "Observing consumption without presuming the presence of intercept would be misled".

of trend on the series avoid the use of restricted intercepts assumption when identifying the cointegration.

The poverty will naturally not be constant but should decrease along with the economic development. Poverty fluctuation is possible in the short run, poverty itself is a fundamental series and will take some time to change. Within this framework, we expect the poverty to have a declining trend and reach a certain natural level in the long run.

On the other hand, the GDP should have intercept and trend. By nature, the Islamic financing should have an intercept and will grow overtime. Particularly in Moslem majority country like Indonesia, the obligation to support the poor by collecting and distributing fund is part of their fundamental believe. We raise two supporting argument for this: (1) a widespread perception that Islamic banks (hence Islamic financing) are bound to a higher moral standard, and (2) the raise of technological and communication. We may or may not find this nature empirically, and this is where the elaboration on this paper becomes important.

We apply the ARDL bound test for cointegration on two models, one with poverty as dependent variable, and two the Islamic financing as dependent. We do not test the model where GDP per capita as dependent since we treat it only as control variable. Furthermore, determinant of GDP involves many variables such as capital accumulation, labor, and others, and this is beyond the focus of this paper.

Table 5 provides our identification and firmly confirm the presence of cointegration among the poverty, the Islamic financing, and the GDP per capita in Indonesia, where poverty is dependent variable. We report 8 (eights) the best models, and all of them are stable without serial correlation in error and homoscedastic. On the table we provide Breusch-Pagan-Godfrey test with null hypothesis of no heteroskedasticity and the LM test with null hypothesis of no serial correlation. The Bound test for non-asymptotic distribution of the F statistics are also reported, where the smallest one is 4.12 in Model P2, but still larger than the upper critical value of 3.87 for $\alpha=5\%$. The rest of the model confirm the presence of cointegration.

On the other hand, Table 6 provide strong evident about the presence of cointegration when treating Islamic financing as endogenous on Indonesia. Nine models reported provide bound F-statistic larger than the upper bound critical value. This result answer the second hypothesis on this paper that Islamic financing response to poverty in Indonesia. We proceed to the estimation of ARDL and elaborate the magnitude and how significant the response on the next section.

3. Result and Discussion

Role of Financing and Income on Poverty

The result of error correction model is available in Table 5 and Table 6. This model represent the short run dynamics between poverty, Islamic financing, and GDP per capita. For the long run model, we estimate the conditional error correction model and derive the long run model in Table 7 and Table 8.

The speed of adjustment (*CointEq*) is ranging from 34 percent to 73 percent. Averagely it shows that about 40 percent of the short run deviation from the equilibrium relationship among poverty, Islamic financing, and income, is adjusted in one year. All the coefficient lies between -1 and 0 as expected, conforming all the models are convergent.

TABLE 5. SHORT RUN, ERROR CORRECTION MODEL (DEPENDENT = POVERTY)

Dependent	Poverty based on USD2 spending per day (HCPOV_2USD)				Poverty based on National Poverty Line (HCPOV_LINE)			
Selected order ARDL(p,q1,..,qk)	ARDL (2,2,0) Case 2	ARDL (2,2,2) Case 2	ARDL (1,2,2) Case 3	ARDL (1,0,1) Case 3	ARDL (3,0,0) Case 3	ARDL (3,0,1) Case 3	ARDL (1,0,0) Case 3	ARDL (3,0,0) Case 3
Model	P1	P2	P3	P4	P5	P6	P7	P8
C			38.23* (6.53)	35.77* (9.39)	11.35* (1.07)	12.79* (1.32)	8.43* (1.04)	1.78* (1.08)
D(HCPOV_2USD)								
D(HCPOV_2USD(-1))	-.310** (.14)	-.14** (.05)						
D(HCPOV_LINE(-1))					.13* (.04)	.19* (.05)		.13* (.04)
D(HCPOV_LINE(-2))					.07 (.04)	.15* (.06)		.06 (.05)
D(FINANCING)	.397 (3.34)	-2.77 (1.204)	-3.33 (1.69)					
D(FINANCING(-1))	-7.45* (2.48)	-3.88* (.88)	-4.34* (1.08)					
D(G_GDPCAP)		-.009 (.01)	.06** (.02)	-.15* (.06)		-.02* (.01)		
D(G_GDPCAP(-1))		-.036* (.011)	-.07* (.014)					
DBREAK1		6.80* (.58)	6.14* (.79)		2.56* (.12)	2.87* (.18)	2.41* (.15)	2.45* (.12)
DBREAK2	-4.13* (1.56)		-2.47 (1.10)			.75** (.32)	-.10 (.15)	.01 (.14)
DBREAK3				7.80* (2.03)				
CointEq(-1)*	-.73* (.14)	-.45* (.07)	-.52* (.08)	-.44* (.11)	-.36* (.03)	-.39* (.03)	-.34* (.03)	-.39* (.03)
R-squared	.83	.99	.98	.69	.98	.98	.96	.98
Adjusted R-squared	.75	.97	.97	.62	.97	.98	.96	.97
S.E. of regression	1.30	.45	.49	1.56	.12	.11	.15	.12
Sum squared resid	13.56	1.20	1.18	26.77	.14	.09	.23	.13
Log likelihood	(18.72)	(2.94)	(2.87)	(25.63)	13.97	17.17	9.94	14.15
Durbin-Watson stat	1.93	2.09	48.32	8.47	136.59	112.39	115.63	10.87
Cointegration Status	Cointeg rated	Cointeg rated	Cointeg rated	Cointeg rated	Cointeg rated	Cointeg rated	Cointeg rated	Cointeg rated
F-Bounds Test	4.30	4.12	7.17	4.37	33.95	25.80	2.57	29.05
Upper Critical Value, I(1)								
1%	3.35	3.35	4.14	4.14	4.14	4.14	4.14	4.14
5%	3.87	3.87	4.85	4.85	4.85	4.85	4.85	4.85
10%	4.38	4.38	5.52	5.52	5.52	5.52	5.52	5.52
Breusch-Godfrey Serial Correlation LM Test:								
F-statistic	1.53	5.65	1.66	.21	1.53	1.81	.80	.32
Prob. F(.)	F(2,3) .35	F(2,1) .29	F(2,1) .21	F(2,7) .81	F(2,6) .29	F(2,4) .28	F(2,7) .49	F(2,5) .74
Heteroskedasticity Test: Breusch-Pagan-Godfrey								
F-statistic	2.05	1.58	.89	1.63	1.19	1.14	.47	.59
Prob. F(.)	F(7,5)	F(9,3)	F(9,3)	F(5,9)	F(6,8)	F(8,6)	F(5,9)	F(7,7)

Notes: The dependent for the first four models use poverty based on USD 2 spending per capita per day, while Model 5 to Model 8 use national poverty line. These 8 (eight) models are the best from all possible ARDL model order. Case 2: Restricted Constant and No Trend; Case 3: Unrestricted Constant and No Trend. All models use HAC standard error and covariance, and we find it sensitive to the coefficient significance. The number in parenthesis is the standard error. Observation = 14 years, except for Model-F9 is 13 year. All models are free from serial correlation and heteroskedasticity issue. "Coint." indicates the presence of cointegration, while 'False' denotes no cointegration.

We report eight model variants with Poverty as dependent variable and deterministic regressor intercept, restricted trend, structural break 2006, and structural break 2010. The upper bound critical value is based on limited sample (non asymptotic) and correspond to the stationary order of dependent variable.

The data and estimated model is available on the publisher and is available upon request to ensure the replicability of our calculation.

*, **, and *** denotes significance of 1%, 5%, and 10%.

The structural break in 2006 significantly affect the short run dynamics of poverty, while the impact of structural break in 2010 is mixed. Empirically, the break in 2006 deviate poverty from its long run equilibrium by significant magnitude. The presence of the break in 2006 has increase the poverty by 2.41 percentage change (the lowest estimate in Model P8) to as much as 6.8 (highest estimate in Model P2). The effect of the break will fade away in the long run, this is why we do not see the dummy for structural break in the long run model (Table 7 and Table 8).

From ECM specification, we can infer causality based on the reactions of one variable to deviations from equilibrium of another variable. Islamic financing on the previous period significantly affect the current condition of poverty where 1 percentage change increase in Islamic financing is estimated to reduce the poverty by 3.88 percentage change (lowest estimate, Model P2) to the highest estimate of 7.45 percentage change of the poverty in Model P1.

These estimates shows that growth and Islamic finance have significant effects on the poverty reduction in Indonesia, which is in line with existing studies in Indonesia (see among others Uddin et et. al. (2012); Hanafi, Martawardaya, & Parewangi (2014); Pinkan (2018); Umar (2017); Nugraha, Fickry (2017); Iskandar & Possumah (2018). For another country case, see among others Rashid (2017); Dhrifi (2015), Bayar (2017); Nasreddine & Mensi (2019); Abd. Majid, M. Shabri & Dewi, Sovia & Aliasuddin, Aliasuddin & Kassim, Salina (2017); Hanesti, Elsi & Herianingrum, Sri & Sukmana, Raditya (2018); Dewi, Sovia & Abd. Majid, M. Shabri & Aliasuddin, Aliasuddin & Kassim, Salina (2018).

The next stage is to derive the long run model, the result is provided in Table 7. All models confirm the long run effect from Islamic financing to poverty rate in Indonesia. In the long run, if Islamic financing grow by 1 percent, then the poverty rate will decrease by .92 percent (the lowest estimate in Model LR-P7) to the highest estimate of 7.47 percent (Model LR-P1).

The results emphasize the role of authorities in this country to encourage the Islamic financial sector development as part of effective poverty alleviation. Sound financial sectors will promote better and more access to institutional credits and make it available to the people particularly those who are living in poverty. Based on our findings, the impact of the program to poverty reduction will be evident in the short and in the long run.

In the short run, poverty condition also respond to the GDP per capita last year. An

TABLE 6. SHORT RUN, ARDL ERROR CORRECTION MODEL (DEPENDENT = ISLAMIC FINANCING)

Dependent Variable: Islamic Financing									
Selected order ARDL($p,q_1,..,q_k$)	ARDL (1, 0, 2)	ARDL (1, 0, 1)	ARDL (1, 0, 0)	ARDL (1, 0, 0)	ARDL (1, 0, 1)	ARDL (1, 3, 3)	ARDL (1, 1, 2)	ARDL (2, 2, 2)	ARDL (1, 0, 0)
Case	Case 3	Case 3	Case 4	Case 4	Case 4	Case 4	Case 3	Case 4	Case 4
	F1	F2-6	F3-5	F4-5C	F5-5B	F6	F7	F8	F9
C	4.16* (.38)	4.86* (.84)	6.60* (1.14)	6.12* (1.02)	5.58* (.85)	1.41* (.21)	3.18* (.01)	8.1* (.98)	3.22* (.25)
D(HCPOV_2USD)						.13** (.03)			
D(HCPOV_2USD(-1))						.03 (.01)			
D(HCPOV_2USD(-2))						-.01 (.01)			
D(HCPOV_LINE)									-.10* (.03)
D(HCPOV_LINE(-1))								-.08* (.016)	
D(FINANCING(-1))								-.48* (.11)	
D(GDPCAP)	.0005* (.0001)							.001* (.0001)	.0002* (.0001)
D(GDPCAP(-1))	-.0003 (.0001)							-.0003* (.0001)	-.0003* (.0001)
D(G_GDPCAP)		-.002 (.003)			.002 (.002)	.010* (.002)	-.001 (.004)		
D(G_GDPCAP(-1))						-.008** (.002)	-.005** (.002)		
D(G_GDPCAP(-2))						-.003 (.002)			
DBREAK1			.06 (.1)		.148 (.104)	-1.12** (.29)			.31* (.10)
DBREAK2			-.17 (.11)	-.18 (.11)			.186 (.17)	-.31* (.07)	
DBREAK3	-.15* (.06)	.17 (.116)							
CointEq(-1)*	-.53* (.05)	-.29* (.05)	-.27* (.05)	-.25* (.045)	-.31* (.051)	.32* (.048)	-.23* (.044)	-.81* (.09)	-.79* (.06)
R-squared	.939	.808	.761	.757	.803	.962	.871	0.97	
Adjusted R-squared	.912	.75	.689	.712	.744	.901	.791	0.94	0.96
S.E. of regression	.055	.092	.103	.099	.094	.058	.085	0.03	0.94
Sum squared resid	.027	.085	.106	.108	.088	.017	.057	0.01	0.04
Log likelihood	23.8	15.8	14.3	14.1	15.6	27.1	18.6	31.75	0.01
F-statistic	34.6	13.9	1.6	17.0	13.5	15.8	1.8	36.31	27.82
Prob(F-statistic)	0.00	.001	.002	0	.001	.004	.002	0.00	44.5
Cointegration Status	Coint.	Coint.	Coint.	Coint.	Coint.	Coint.	Coint.	Coint	Coint.
F-Bounds Test	27.7	8.1	5.3	6.0	6.7	4.5	7.0	14.91	24.36
Upper Critical Value, I(0)									
10%	3.17	3.17	3.38	3.38	3.38	3.38	3.17	3.17	3.38
5%	3.79	3.79	3.88	3.88	3.88	3.88	3.79	3.79	3.88
1%	5.15	5.15	4.99	4.99	4.99	4.99	5.15	5.15	4.99
Breusch-Godfrey Serial Correlation LM Test:									
F-statistic	1.12	2.79	1.54	1.61	2.57	1.06	6.09	12.13	7.51
Prob.	F(2,5) .39	F(2,6) .13	F(2,5) .30	F(2,6) .27	F(2,5) .17	F(1,1) .49	F(2,4) .06	F2,2 .07	F(2,3) .06

Heteroskedasticity Test: Breusch-Pagan-Godfrey									
F-statistic	1.12	2.79	1.54	1.60	2.57	1.06	6.09	.43	4.03
Prob.	F(2,5)	F(2,6)	F(2,5)	F(2,6)	F(2,5)	F(1,1)	F(2,4)	F(8,4)	F(8,5)
	.39	.13	.30	.27	.17	.49	.06	.85	.07

Notes: We use prewhitening on standard error and covariance (HAC or White) to deal with the serial correlation issue. Case 3: Unrestricted Constant and No Trend, and Case 4: Restricted Trend. The number in parenthesis is the standard error. Observation = 14 years, except for Model-F9 is 13 year. All models are free from serial correlation and heteroskedasticity issue. Coint. denotes that the model statistically confirm the presence of cointegration. The data and estimated model is available on the publisher and is available upon request to ensure the replicabilty of our calculation.
*, **, and *** denotes significance of 1%, 5%, and 10%.

Table 7. Long Run Model (Dependent = Poverty)

Dependent	Poverty based on USD2 spending per day (HCPOV_2USD)				Poverty based on National Poverty Line (HCPOV_LINE)			
Model	LR-P1	LR-P2	LR-P3	LR-P4	LR-P5	LR-P6	LR-P7	LR-P8
FINANCING	-7.47*	-6.14*	-5.33*	-6.03*	-1.64*	-1.74*	-.92**	-1.23**
	(1.3)	(.89)	(.61)	(.07)	(.08)	(.07)	(.38)	(.39)
G_GDPCAP	.07	.11	.27	-.17*	-.01	-.04***		
	(.15)	(.13)	(.12)	(0)	(.01)	(.02)		
GDPCAP							-.0008***	-.0005
							(.0004)	(.0004)
C	98.57*	81.86*						
	(16.17)	(11.34)						

Notes: This table present the long run model of poverty as function of GDP per capita and Islamic financing, where these three variables are statistically cointegrated. Long run coefficient is derived from Conditional Error Correction Model, where the calculation of F-statistic and the t-statistic has taken account the non-standard distribution of the statistic and the effect of cointegrating rank as nuisance parameter of the system.
The data and estimated model is available on the publisher and is available upon request to ensure the replicability of our calculation.
*, **, and *** denotes significance of 1%, 5%, and 10%.

Table 8. Long Run Model of Islamic Financing Response to Poverty and Income

Dependent	Islamic Financing								
Model	LR-F1	LR-F2	LR-F3	LR-F4	LR-F5	LR-F6	LR-F7	LR-F8	LR-F9
HCPOV_LINE	.059	.005	-.362*	-.528	-.514	-.408		-.05	.036
	(.067)	(.099)	(.028)	(.336)	(.344)	(.236)		(.03)	(.01)
HCPOV_2USD							-.004**		
							(.001)		
GDPCAP	.001*	.001*						.001*	.0007*
	(.0002)	(.0002)						(.0001)	(.0001)
G_GDPCAP			.013*	.023	.027	.02	-.073		
			(.012)	(.022)	(.024)	(.016)	(.067)		
@TREND				-.099	-.102	-.015	.293*		.09*
				(.238)	(.25)	(.179)	(.017)		(.03)

Notes: This is the long run model of Islamic Financing response to poverty and GDP per capita, providing there is cointegration between these variables. Long run coefficient is derived from Conditional Error Correction Model. The result provided on this table is completely replicable; we provide the data and the model on the publisher or directly available from the author upon request.
*, **, and *** denotes significance of 1%, 5%, and 10%.

increase of one percentage growth in GDP per capita will lower the poverty by .036 percentage change (lowest estimate in model P2) to .07 percentage change (highest estimate in Model P3). The effect of GDP per capita on poverty alleviation is mixed where only 2 of the eight models support this hypothesis. The short run model also when the growth of GDP per capita increase by 1 percent, then the poverty will decrease by .02 percentage (lowest in Model P6) to as much as .15 percent (highest estimate in Model P5).

In the long run, only two models support the significant effect of GDP to poverty. The estimated coefficient shows that as GDP per capita grow by 1 percent, poverty rate will decrease by .04 percent (lowest estimate in Model LR-P6) to as much as .17 percent (Model LR-P4). Considering variation estimate across models, we conclude that the role of income per capita on poverty reduction is inconclusive in Indonesia.

Response of Islamic Financing to Poverty and Income

This paper interestingly reveal that the Islamic financing respond to the poverty in this Moslem majority country. See Table 6 for the short run estimates and Table 8 for the long run one. All estimated models conform the asymmetrical cointegration between Islamic financing and poverty with a control variable income per capita.

The short run Error Correction Models are all stable and convergent. The estimated speed of adjustment ranges from .23 (the lowest in Model F7) to the highest estimate of .53 (Model F1); all of them are highly significant at $\alpha = 1\%$. This indicates that about 23 percent (to 53 percent) of the deviation from equilibrium will be corrected in one year.

We estimated several models and report three and all of them confirm the significant short run response of Islamic financing to the poverty. In Model 6, when poverty increase, the Islamic financing will also increase contemporaneously in the short run. However, Model F8 and F9 shows negative coefficient, which is contrast to Model 6. In the long run model, we also find inconsistent estimates where only 3 out of 9 estimated models conforming a significant response of Islamic financing to the condition of poverty. With this results, we conclude that there is evident that Islamic financing respond to the poverty condition in Indonesia. However the magnitude and direction of the response is inconclusive. We need to emphasize this conclusion should be challenged in the future using a more comprehensive theoretical framework, richer dataset, and competing method including Vector Error Correction, simultaneous model, and nonlinear estimation.

Related to the control variable, Islamic financing positively affected by the income per capita. The sign of coefficient is as expected and significant and provide a support on the positive impact of GDP per capita to Islamic financing both contemporaneously and with a one lag. We also find similar finding in the long run model, where the positive impact of GDP per capita to Islamic financing is firmly supported with the confidence level $\alpha = 1\%$. Recalling we transform the Islamic financing to natural logarithm, then the estimated long run coefficient represent the growth impact due to the change of corresponding regressor. An increase of USD 100 of GDP per capita for instance, will lead to a 10 percent growth of Islamic financing. To articulate this empirical estimation, during the 17 years of observation, the average increase of GDP per capita is USD196.48. Suppose next year the GDP per capita will increase by that number, then the Islamic financing will grow by 19.64 percent. If that happen in 2017 the growth of Islamic financing will worth IDR 46,64 trillion.

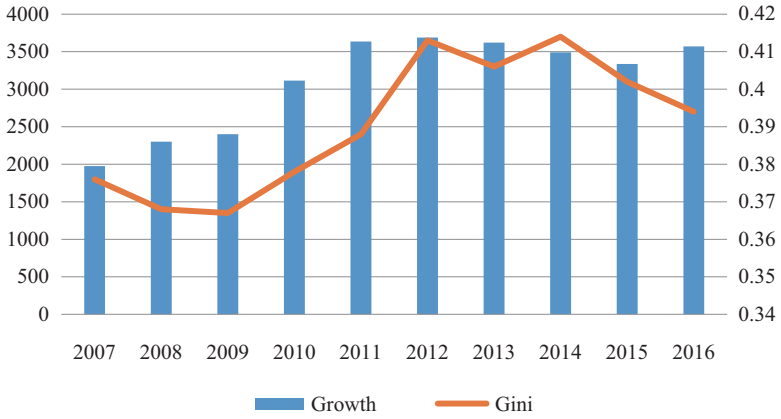
The positive association between output and Islamic financing is also consistent when

FIGURE 8. TOP 10 ISLAMIC MARKET IN THE WORLD

using the value of GDP per capita. The size of economy particularly the financial markets and institutions play a pivotal role in economic development and addressing the problem of poverty. This suggest the authority to ensure the availability of financing and other efforts required for a more inclusive financial sector. This will help the businesses sector to grow; particularly the micro and small enterprise where the poverty tends to concentrate.

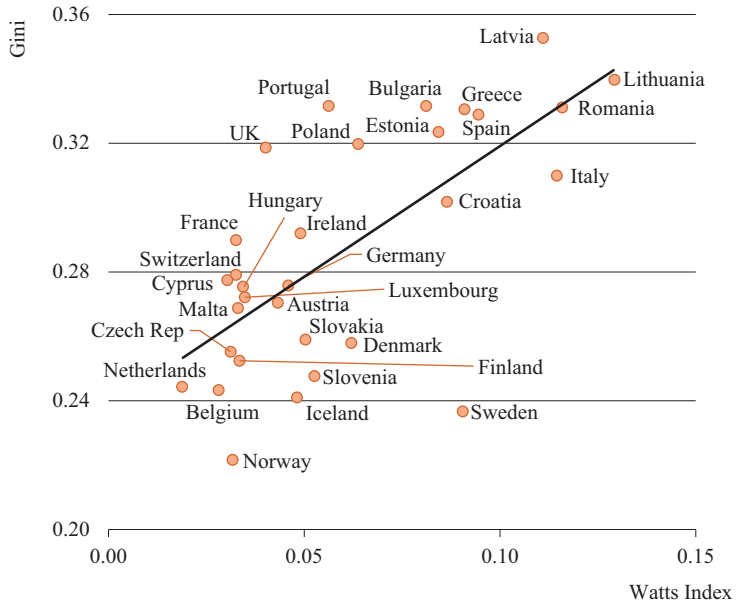
Related to the positive effect of GDP to financing, Indonesia is one of potential Islamic market. This is a nearest bridge for poverty alleviation since the financing may be directed to produce goods and services for domestic market. Just in Halal category, Indonesia always be the 10 largest expenditure market, particularly on consumer food, clothing, traveling, and pharmaceutical. It would be another story when the poor people can engage on productive activities on these sectors. Increasing the size of Islamic financing and turning the purpose from consumption to productive use will fundamentally solve the poverty problem.

FIGURE 9. GDP PER CAPITA AND GINI COEFFICIENT, INDONESIA



Source: BPS, 2018

FIGURE 10. NEXUS BETWEEN EQUALITY AND POVERTY, SELECTED COUNTRIES



Source: EU-SILC (2011) cross-sectional (rev. 5. June 2015).

Notes: Gini value of zero indicates perfect equality and one for perfect inequality. The Watts index is perceived as the absolute amount of social welfare loss due to poverty; higher indicates more severe poverty.
Source: EU-SILC in Paul Hufe and Andreas Peichl (2018).

Empowering is the key word on structural poverty, and financing is one of its effective tools. Another tool to empower is to let them participate on production, which also help to foster distribution of income in every level; from household, provincial, to national aggregate. De-Janvry and Sadoulet (1999), Bourguignon (2003), Lopez (2003) and Lombardo (2008) revealed that economic growth will reduce poverty in the event that a progressive income distribution. Indonesia has a high inequality of income distribution Gini coefficient with an average of 0.4 in the 2007-2017 period (BPS, 2018). This condition shows that the efforts to reduce poverty through increased economic growth would lead to the opposite outcome. Poverty will continue to increase, upon the high unequal distribution of income. Figure 9 shows that during the period of 2007-2012. In 2018, the Gini ratio in Indonesia was .389. Across continent, the income distribution in Indonesia is comparable to USA (.39), Lithuania (.38), or Turkey (.40).

The importance of income distribution are also emphasized by Paul, Kanbur, and Peichl (2018). They reconcile two prominent fairness principles (equality of opportunity and freedom from poverty), into a joint measure of unfair inequality. It is interesting that Paul, Kanbur, and Peichl argue that the average unfair inequality doubles when complementing the ideal of an equal opportunity society with poverty aversion. Though they underline that exclusive focus on top incomes may misguide fairness judgments.

Sirageldin (2000), Islam (2004), Bigsten and Shimeles (2005), revealed that poverty is a complex phenomenon resulting from the lack of growth and unequal distribution of income. The high number of unequal distribution of income has a major impact on poverty. Efforts to improve and lower the unequal distribution of income is a necessity to reduce poverty in Indonesia. Assessment of Ravallion (2001), Son and Kakwani (2003) and Bourguignon (2003) reveals that countries with high rate of inequality of income distribution medium and low, level regardless of the rate of economic growth, with more and more down the inequality distribution of income, resulted in the greater decrease poverty.

The significant relation between poverty, financing, and the GDP (hence equality), emphasize the important of Islamic financing, despite of its small value relative to the total industry. The presence of cointegration between financing to poverty in the long run is important proof that the poverty is a fundamental issue and should be dealt with a long term and comprehensive strategy, where the key point is empowerment of the poor.

Traditionally any monetized economy consist of real sector and financial sector. Within Islamic perspective there is a third sector namely religious or social sector, with largest target of Micro, Small, and Medium Enterprises (MSME), Mosque, and Islamic school. Financing will increase the access of the poor's and MSMEs to financial services and will help them to enhance their income and productive assets. Beside financing, another form of authority support would be providing appropriate infrastructure to promote microfinance amongst the financial institutions including financial cooperatives. Another possible avenue is to use funds from philanthropic activities (like sadaqah, waqf and qard hasan) as well as from Islamic banks' profits for social business. The Islamic banks' involvement in the social business can be as part of its corporate social responsibilities activities or as its own business investments. This is all in line with the religious and social sector in Islam, and emphasize the needs to elaborate the Islamic financing response to poverty in future research.

4. Notes and Caveats

We are aware of the presence of multiple cointegrating equations should be carefully and seriously taken into account since the underlying variable serving as dependent variable shows a feedback effect (multiple long run relationships) and will violate the weakly exogenous assumption when we estimate only single equation. The application of Johansen vector error correction model (not reported) did not alter the findings and conclusion derived on this paper.

On this paper, while we report 17 models while we actually estimated most of all possible model variants and found the identification of cointegration is sensitive to the inclusion of intercept and trend (ordinary and restricted). We argue the more restricted the model, the lower possibility to find cointegration on the system. Furthermore, they are also sensitive to the lag number. A more comprehensive work with larger dataset in the future is necessary to carry out the multiple cointegration in asymptotically distributed set of variables.

VI. *Conclusion*

This paper examines the presence of short and long-run theoretical relationship between Islamic finance, poverty, and economic growth in Indonesia for the period 2000 to 2017. We use ARDL approach to cointegration and confirm the presence of cointegration among poverty, Islamic financing, and the income per capita, both when setting poverty as dependent variable and when setting Islamic financing as dependent.

The empirical analysis provide several findings, *first*, Islamic financing significantly help to reduce the poverty both in the short run and also in the long run. *Second*, in the short run, about 40 percent of the short run deviation from the equilibrium relationship among poverty, Islamic financing, and income is adjusted in one year. *Third*, the role of GDP per capita on poverty reduction is inconclusive in Indonesia. *Four*, the structural break in 2006 significantly affect the short run dynamics of poverty, while the impact of structural break in 2010 is mixed. *Fifth*, there is evident that Islamic financing respond to the poverty condition in Indonesia. However the magnitude and direction of the response is inconclusive. We need to emphasize this conclusion should be challenged in the future using a more comprehensive theoretical framework, richer dataset, and competing method including Vector Error Correction, simultaneous model, and nonlinear estimation. Sixth, this paper conform the positive impact of GDP per capita to Islamic financing both in the short and in the long run.

The implication of these findings is straightforward, *first*, the religious or social sector can plays important role on Islamic financing, hence poverty reduction in Indonesia. *Second*, since poverty is a fundamental issue where the aggregate economic size (GDP) plays inconclusive role on poverty alleviation, then one can and should use a more direct and massive strategy. Since the concentration of the poor is Moslem society, we argue that the key point on dealing with poverty in Indonesia is empowerment of the poor by encouraging the religious or social motive of the people.

This paper provides important and pretty much different strategy from existing poverty alleviation approach. To empower the Moslem society, our estimated model confirm the importance of Islamic finance, where the authority can start to encourage Islamic financial sector. Sound economic sectors will promote better and more access to institutional credits

availability to society and economic sectors. With a significant long-run effect of Islamic finance on poverty reduction in the past, policymakers need to look into minimizing Islamic financial market imperfections and constraints, as well as to steer the development of the financial system in a pro-growth and anti-poor direction.

Regulators should consider reforming consumer loan regulation to make bank loans accessible to a larger part of the population and not only to the middle upper class. In order to give more access to finance, regulators should make banking development pro-poor. Regulation could bolster banks to channel more loans to micro, small, medium-sized enterprises to stimulate job creation. Moreover, there should be equal financial development across provinces to facilitate access to finance all over the regions. Furthermore, another tool to empower beside the financing is ensuring the participatory in productive activities. To many extend, this may be more important than the financing itself.

Despite the extensive work on this paper, it has limitation at least in two aspects, (i) the cross sectional variation of the data is limited since it only covers one country; (ii) since poverty is a complex process, the econometric models used in this study is limited to only have one endogenous variable. These open the room for more advance studies with broader dataset including the recent year's data and different variant of financial development proxies and dimensions could be explored. Also, using dynamic econometric models is greatly encouraged to deepen our understanding on the finance inequality linkage, and to understand the interaction effects between financial development and the other independent variables especially economic growth especially for Indonesia case. Further primary researches based on detailed survey data at the micro-level are also highly encouraged to draw more conclusions on financing access to the have-nots.

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