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ISLAMIC FINANCIAL DEVELOPMENT AND INCOME INEQUALITY IN INDONESIA

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Abstract: The objective of this paper is to analyze the short and long run relationship between Islamic financial development and income inequality in Indonesia over the period of 2000-2020. The study has employed the Auto Regressive Distributed Lag (ARDL) bound testing approach and the Error Correction Mechanism (ECM) to examine the existence of long-run and short-run relationship, while variance decomposition (VDC) technique is used to provide Granger causal relationship between the variables. The cointegration tests show that there is a long run relationship between Islamic financial development, economic growth, inflation and income inequality in Indonesia. However, Islamic financial development itself is found to be not statistically significant in influencing income inequality during the sample period for long-run. This study found a positive and statistically significant (10%) effect of Islamic financial development in explaining the changes in income inequality in the short run. In terms of policy, enhancing financial access is needed to ensure that financial development fully supports the reduction of income inequality in Indonesia.

Keywords: Islamic, financial development, income, inequality

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INTRODUCTION

Higher economic growth with equal income distribution is a great matter of concern for all developing economy. Especially, for developing countries who are trying to catch-up with economic growth such as Indonesia. It has been verified by numerous studies, in various countries that, for developing countries who are trying to attain high economic growth rate, there is always an increase of inequality on various grounds along with the growth of such economy (Chambers et al., 2007; Baliscan and Fuwa, 2003; Siyal et al., 2014).

Recognizing the problems associated with this increasing inequality, Indonesian's government has taken various measures to tackle the effect of the income inequality to mitigate negative consequences that might arise. President of Indonesia, Joko Widodo, has called to cut down further amidst the excellent performance of its macroeconomic indicators particularly, among peers. According to the Credit Suisse's Global Wealth Report 2016, Indonesia was named fourth, behind Russia, India, and Thailand, as the most unequal

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economy in the world.

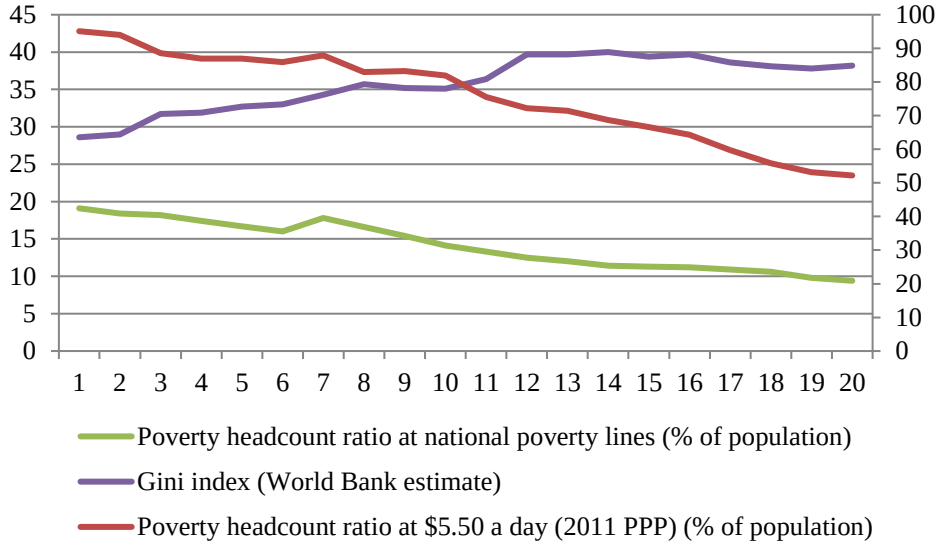

Figure 1. Indonesian Poverty & Inequality Statistics (2000-2019)
Source: World Bank (2021)

The number of Indonesians living below the poverty line has also decreased during the same period, from 19.1% (2007) to 9.4% (2019) (see Figure 1). However, the decrease in poverty is not at equal pace, over the entire region of Indonesia. The number of Indonesians living below the poverty rate in Maluku and Papua is still higher compared to other parts of the country. Economic activities and infrastructure in these regions are relatively less developed and significantly exposed to global commodity price. A look at the Gini ratio trend showed that, there has been a rapid rise in income inequality in Indonesia from the post-Suharto era. Thus, democracy and decentralization created an environment that allowed for rising inequality. In the 1990s, Indonesia's Gini ratio stood at an average rate of 0.30 but rose to an average rate of 33% in 2005 and remained stable at the rate of 39% in the years 2011-2015 before declining slightly to 38% in 2019.

Therefore, over the past decade, the growth of Indonesia's economy has indeed only been enjoyed by the rich who are about 20 percent of Indonesian society (World Bank, 2015). This implies that, 80 percent of the population (200 million people in absolute terms) are left behind. Based on this, the continuation of this situation could lead to an increase discontentment among this large group of Indonesians, hence jeopardizing social cohesion, which can result to social conflicts and disrupt the country's political and economic stability. A World Bank survey already showed that, most Indonesians consider their country's income distribution as "very unequal" or "not equal at all".

In tackling this income inequality, a prudential development of financial sector can be used as an important tool. The reason is that the contribution of financial development sector in the process of economic development through a well-developed financial systems and channeling of financial resources to the most productive uses, has long been recognized in previous literatures. This Financial development may affect income inequality in various channels. For example, it stimulates capitalization, which affects economic activity, thereby leading to economic growth. However, there are available theories which provide conflicting

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predictions about the effect of financial development on income inequality. Generally, there are two influential hypotheses: (i) the inequality-widening hypothesis, and (ii) the inequality narrowing hypothesis of financial development.

A further look of the low base Indonesia's Islamic financial sector, show that, the sector has witness rapid growth in recent years in terms of increasing awareness of Islamic banking and government support programs. Between years 2010 and 2014, Islamic banking assets in Southeast Asia's largest economy grew from IDR 100 trillion, approx. (USD $8 billion) to IDR 279 trillion, approx. (USD $22 billion), or at a compound annual growth rate (CAGR) of 29.2 percent. In which this growth is considerably higher than the ones posted in other Islamic banking markets. It is also interesting to note that, Indonesia's conventional banking assets expanded at a much low rate, with a CAGR of 16.9 percent over the same period.

This Indonesian government effort to turn the country into a major global hub of Islamic banking, deepen the country's financial markets, hence making the nation less vulnerable to the negative effects of global economic turmoil. In this context, Indonesian authorities stepped up their efforts to boost the Islamic banking industry, using the Indonesia's Financial Services Authority (OJK) to developed and launched a five-year roadmap in early 2015. This roadmap targets, is to triple the market share of Islamic banks to 15 percent by 2023 through various strategies, such as the reduction of fees on sharia-compliant banking products and the development of educational and training programs of the institutional framework and human resources of this industry. Also, their efforts involve intensifying coordination between the central government and the private sector, as well as strengthening and monitoring the Islamic banking industry through enhancing the legal certainty.

Recently, there has been increasing interest of researchers to analyze economic consequences of financial development on income inequality both at national and across all levels of the country. However, there still exist gap and little study of the relationship between financial development and income inequality in Islamic perspective. Whereas socio-economic problems, including income inequality, remain the most challenging issue faced by Muslim world, such as Indonesia in the last decades. A study by Askari and Rehman (2013) showed that, from the 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.

The poor socio-economic performance of the most Muslim-majority countries has raised a long-standing debate on whether Islam is a "religion of practice" and has a relationship with socio-economic growth, there are deeper problems outside the Islamic values, that are contributing to lower education, poverty, poor health in these countries. Although the Islamic economic principles have been introduced hundreds of years ago (Timmer and McClelland, 2004). These principles, which is also known as maqasid sharia attempt to answer one of two basic questions commonly faced by most developing countries, that is "What is the quality of development that Islam stands for?". According to Imam Al-Gazhali, the objective of Sharia (maqasid sharia) is to promote the wellbeing of all mankind, which lies in safeguarding their faith (din), their human self (nafs), their intellect ('aql), their posterity (nasl) and their wealth (mal) (Kasri and Ahmed, 2015). In other words, maqasid

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sharia is not only about achieving economic growth per se, but also achieving the real wellbeing of humankind (falah), as indicated by the rise in mental peace, and decline in crime and social tensions. All these objectives can only be achieved through the removal of poverty and the reduction of economic inequalities.

In the light of the above inquiries, the present study is intended to fill this gap. This paper will contribute to the existing literature in four folds: (1) the nexus between Islamic financial development and income inequality is investigated by using time series data, in the case of Indonesia. Previous studies conducted produced differing results and the various findings are discussed in Section 2 of this paper. Like the finance-growth nexus, it is possible that poverty and income inequality reduction exerts a positive effect on financial development, through an increase savings and demand for funds. An examination of this relationship will not only help to understand the role of financial involvement in sustainable development but also sets a framework for discussion of financial and distribution policies for the lower income group. Consequently, it is important to reveal the direction of causal relationship between finance and income inequality. This study therefore, aims to study the relationship between financial development and income inequality in Indonesia; (2) unit root properties of the variables have been examined by applying structural break unit root tests such as Clemente et al. (1998); (3) in doing so, this study will apply the structural break Auto Regressive Distributed Lag (ARDL) bounds testing approach in cointegration of the long run relationship between the variables and; (4) the Vector Error Correction Model (VECM) Granger Causality will also be apply to test the causal relation between the variables. The structured of this paper is as follows. In section 2, a brief review of previous literatures on the relationship between financial development and income inequality is presented. Modeling, methodological framework and data collection are presented in Section 3. While section 4 deals with results interpretation, and finally Section 5 draws the conclusion, policy recommendations and limitations.

LITERATURE REVIEW

Theoretical Frame of Financial Development and Income Inequality

The beneficial role of financial development in economic growth has been well documented. Literatures on finance-income inequality nexus has also been growing in recent years but specifically, study on Indonesia and Islamic perspectives is limited. When financial markets and institutions work well, they provide financing opportunities to all market participants. This provision can be mobilized for productive uses of business, education and to achieve one's aspiration, as well as to promote economic growth. There are two types of hypotheses advancing the finance-inequality nexus: (a) an inequality-widening hypothesis and (b) inequality- narrowing hypothesis.

Firstly, the finance-inequality widening hypothesis reveals that, financial development may benefit only the wealthy individuals when institutional quality is weak (Clarke et. al., 2006). This hypothesis suggests that financial development only benefits the rich due to their creditworthiness to the bank. On the other hand, the social and economic poor individuals, relatively lack creditworthiness and sufficient collateral at their disposal. They always find it difficult to access the financial services within the financial institutions. As a result, the poor are equipped only with primary education, and join the unskilled labor

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market with lower wages. Hence, the need for a positive association.

Secondly, the finance-inequality narrowing hypothesis was put forward by Galor and Zeira (1993), and Banerjee and Newman (1993). These authors proposed that, the presence of financial market imperfections deters the poor from borrowing adequately to invest in human and physical capital. This implied that, financial development helps alleviate income inequality. It is also assumed that individuals inherit different amount of wealth and those with larger wealth invest in education and take up skilled work. While those with lesser initial wealth must resort in borrowing for investment in human capital. In an underdeveloped financial market, borrowing costs are costly, and those who are unable to borrow will remain unskilled, which goes on from one generation to another. The expansion of an economy helps financial market to develops and support the growth with broader credit services, given the poor the opportunity to borrow for human capital investments and upgrade their earning potentials. Accordingly, income equality will start to reduce. This will conclude the linear hypothesis which states that, income inequality, negatively relates to the development of the financial sector.

The theoretical predictions on effects of financial development and income inequality are still unresolved. Different perspective on these basic ideas by Greenwood and Jovanovic (1990), present a theoretical model that has elements of both ideas of the linear relationships which are put together in a non-linear relationship. Their theory propounds that, at the early stage of economic development, only the rich can access and benefit from the financial system, thereby making the income difference between the rich and the poor widens, as a result of the expansion of the financial system and the rapid economic growth. Again, the theory states that, as the economic growth mature, the financial sector is more developed to provide wider financial access to the economy, including the poor. But once the economy reaches a stable and steady state, income inequality begins to develop. Hence the need of the non-linear hypothesis suggestion of an inverted U-shaped theory. As regards to the impact of income equality to the financial development, there could be a trade-off between reducing inequality with growing financial sector, because as income distribution improves, demand for financial services will increases, leading to growth in the financial industry.

Empirical Evidence

Our concern is to discuss the relationship between Islamic financial development and income inequality. There are various studies, that have highlighted different aspects of association of the financial development and income inequality. Clarke et al. (2006), tested both the linear and non-linear hypotheses to determine the relationship between finance and income inequality, through constructing a panel data set with 83 countries between the period of 1960 and 1995. Their results demonstrated that, inequality is lower in countries with better-developed financial markets, because their economy development will boost financial intermediaries. Their research rejected the finance-inequality widening hypothesis which stated that, financial development benefits only the rich and did not find any support for the inverted U-shaped hypothesis propounded by Greenwood and Jovanovic (1990). Many other studies that tested both the linear and non-linear finance-inequality hypothesis found similar results as Clarke et. al. (2006). Based on a Generalized Method of Moments (GMM) approach, Batuo et al. (2012) studied the same questions in the context of 22 African

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countries and concluded with similar results. Some researchers also revisited the conflicting theories by considering the experience of an individual country, using time-series data and their findings mostly show there is a linear and negative relationship, but do not provide support to the Greenwood-Jovanovic hypothesis of an inverted U-shaped relationship between finance and inequality. Amongst these researchers are Liang (2006)'s study on China, Ang (2010)'s on India, Shahbaz, and Islam (2011)'s on Pakistan, and Baligh and Piraee (2012)'s on Iran. Accordingly, this study only looks at the two contrasting perspectives of the linear hypothesis, but not at the non-linear hypothesis of Greenwood and Jovanovic (1990).

Most studies that investigate linear finance-inequality relationship, find support for the hypothesis they tested. Mookerjee and Kalipioni (2010) and Law et al (2014)'s findings support Galor and Ziera (1993), Newman and Banerjee (1993), by adopting the use of cross-sectional analysis hypothesis and dsicovered that financial development has a negative relation with inequality. Another finding by Arora (2012), and Hoi & Hoi (2013), using time-series analysis for specific countries also show support to the negative relationship between financial development and income distribution.

In contrast, other studies suggest that financial development may fail to reduce income inequality and poverty. Law and Tan (2009), examine the case of Malaysia over the period of 1980–2000 by adopting the autoregressive distributed lag (ARDL) approach to analyzed both private credit as a % of GDP (for proxy bank development) and stock market capitalization (for proxy capital market development), and find no significant evidence supporting the effect of financial development on income inequality. Their argument is that, in various additional public development programs, the government should focus on improving institutional quality, and the maintenance of low inflation to tackle income inequality. The limitation to their study is that it is possible that, the 21 years adopted small sample, which ended in 2000 may have failed to capture the true impact of financial development in Malaysia's inequality. Furthermore, the used of a broad dataset from 138 developed and developing countries between 1960 and 2008 by Jauch and Watzka (2012), finds that financial development in fact increases income inequality. Similarly, investigation made by Sehrawat and Giri (2015), also showed a widening-inequality results in the finance-inequality nexus in India for the period 1982 to 2012.

A study by Seven and Coskun (2016), find no support for both the linear and the non-linear relationship between financial development and income inequality. The used of dynamic panel data methods with dataset from 45 emerging countries for the period of 1987 to 2011 by Seven and Coskun (2016), assess the finance–inequality–poverty nexus by taking the separate and simultaneous impacts of banks and stock markets into account. Their mixed findings suggest that, while financial development promotes economic growth, but does not necessarily benefit the low-incomes earners in emerging countries. Their findings instead showed that, improvements in banking sector may increase income inequality in emerging economies. Their results also show that, bank development in comparison to stock market development has a greater and significant impact on income inequality and poverty. However, these researchers discovered a mixed but statistically insignificant results for the relationship between stock market development and inequality/poverty measures. Their argument is that, when the combined impact of banks and stock markets (the overall

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development in the financial sector) is tested, there will be no evidence of a statistically significant relation between financial development and inequality/poverty measures. Although recent papers have been attempting to include other dimensions of the financial development.

Rosemy and Masih (2017), employed the auto regressive distributed lag (ARDL) bound testing approach and the error correction mechanism, to examine the existence of long run relationship, using variance decomposition (VDC) technique to provide Granger causal relationship between the variables. Their fundings showed that, there is a long run relationship between financial development, economic growth, trade openness and income inequality in Malaysia. However, financial development was found not to be statistically significant in influencing income inequality during the sample period. But the VDC finds that, financial development can be a tool of the government to employ and reduce income inequality. Therefore, the current study also agrees with the above evidence, that trade openness helps reduce income inequality.

METHOD

This study examines Indonesia financial sector using the time-series data analysis between the period of 2000 and 2019. All data were sourced from the World Bank, Statistics institutions and Bank of Indonesia on the income inequality, financial development, and all other variables of this study. Generally, income inequality can be measured in various ways. This study will adopt the use of the Gini Coefficient (GC) to measure the income inequality. The GC is expressed in percentage, and ranges from 0 to 1. A Gini coefficient of zero expresses perfect equality, where all values are the same. For example, in a situation where everyone's income is the same. But a Gini coefficient of 1 (or 100%) expresses maximal inequality among values. For instance, in many people, where only one person has all the income or wealth, and all others have none, the Gini coefficient will invariably be one.

However, financial development measurement is a major problem in the empirical literatures, due to the varied selection of key variables. There are bank and market-based financial indicators to measure financial development. In this study, banking sector development will be use as a base model (Model 1). While the commonly used Islamic domestic credit (financing) by (Clarke et al, 2006; Ang, 2010; Shahbaz and Islam, 2011; Baligh and Piraee, 2012; Zhang and Naceur, 2019; and many other researchers) will be apply as a proxy for Islamic financial development. The Islamic domestic credit used in this study, however, is not only from the Sharia Commercial Banks but extended to Sharia Business Units. This is due to the indicator measurements of the role of financial institutions in channeling funds to finance users in bank-based type.

Looking at the variables of Islamic financial development and income inequality, this study includes two control variables in its models. The first control variable is GDP per capita, because it is highly correlated with financial sector development (Clarke et. al, 2006). While the second control variable included is inflation. Therefore, the general functional form of the model is given below as follows:

$$IE_t = f\,(Y_t, IF_t, INF_t)$$

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In this equation, IE_t is income inequality, Y_t is economic growth measured by GDP per capita (current US$), IF_t illustrates Islamic financial development (total of Islamic financing in billion IDR), and INF_t represents inflation measured by consumer prices (annual %). The current study converted all the series into logarithm for consistent and reliable results. The log-linear specification provides better results, because the conversion of the series into logarithm reduces the sharpness in time series data (Shahbaz, 2010). The empirical equation is modeled as follows:

$$lnIE_t = \theta_1 + \theta_2 \ln Y_t + \theta_3 \ln IF_t + \theta_4 \ln INF_t + \varepsilon_i$$

where, $lnIE_t$, $\ln Y_t$, $\ln IF_t$,and $\ln INF_t$ is natural log of income inequality proxies by Gini index (World Bank estimate), the natural log of economic growth, natural log of Islamic financial development, and natural log of inflation.

The current study aims to explore the long run relationship between income inequality, Islamic financial development, and other economic variables in Indonesia during the period of 2000 to 2020. Firstly, this study tested the unit root of all the variables using both the Augmented of Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. Afterwards, the Johansen and Juselius (1990) or the Engle Granger cointegration test was employed in the current research, to know if the series of each variable is integrated in the same order. The reason is that, if it is discovered that, the variables used in this study are not all integrated in the same order, therefore the ARDL approach will be employed to test the cointegration as Johansen method of testing the cointegration requires the variables to be integrated in the same order. Otherwise, the predictive power of the models tested in this study will be affected.

The ARDL approach which was developed by Pesaran & Shin (1999) and Pesaran et al. (2001), overcome these problems because ARDL can be applied irrespective of whether the variables are I (0) and/or I(1). More importantly, Johansen approach is not suitable for studying cointegration of small sample time series as in this study. On the other hand, ARDL provides robust results even in small samples (Pesaran and Shin, 1999), and this is advantageous because income inequality data is only available annually and the period available are also limited for many emerging economies like Indonesia. Another benefit of ARDL is that it allows the optimal lag lengths of the variables to differ, while the Johansen approach requires that all variables in the model have the same number of lags. For this study, AIC (Akaike Information Criterion) has been used to determine the optimal lag lengths of the ARDL model.

The use of Schwarz Bayesian Criterion (SBC), which provides smaller standard errors for some of the models tested under the ARDL of this study, it was still discovered that in some models, that SBC runs the models with ARDL (0,0,0,0), such that no ECM statistical output was produced. This is due to the SBC's method of choosing the minimum lag possible, making it possible to discover that AIC is more suitable for this study.

In the current study, the first step in ARDL is to investigate the existence of long run relationship between the variables. The calculated F-statistic is then compared against the upper and lower critical bound as provided by Pesaran et al. (2001), which correspond to

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the assumptions that the variables are I (0) and I (1) respectively. The assumption is that, if the calculated F-statistics exceeds the upper critical bound (UCB), then the series are cointegrated; and if it is below the lower critical bound (LCB), meaning there is no cointegration. But if the calculated F-statistics is between the UCB and the LCB, then the decision about cointegration is inconclusive and knowledge of the cointegration rank of the forcing variables is required to continue further.

The critical values of the F-statistic with different number of variables (k), was also examined to determine whether the ARDL model contains an intercept and/or trend, as available in Pesaran and Pesaran (1996), and Pesaran et al. (2001). This is because Their findings proposed two sets of critical values. Therefore, in this study the calculated F-statistic is then compared against the upper and lower critical bound provided by Pesaran et al. (2001), which corresponded with the assumptions that, the variables are I (0) and I (1) respectively. Pesaran's assumption is that, if the calculated F-statistics exceeds the upper critical bound (UCB), then the series are cointegrated; and if it is below the lower critical bound (LCB), it means that there is no cointegration. But if the calculated F-statistics is between the UCB and the LCB, then the decision about cointegration is inconclusive and knowledge of the cointegration rank of the forcing variables is required to continue further. Furthermore, in each application of their study, there is a band covering all the possible classifications of the variables into I (0) and I(1). But according to Narayan (2005), the existing critical values in Pesaran et al. (2001), cannot be applied for small sample sizes as they are based on large sample sizes. The ARDL cointegration test is tested on the following hypotheses:

H_0: $\delta 1 = \delta 2 = \delta 3 = \delta 4 = 0$ i.e., there is no long run relationship between the variables.
H_a: $\delta 1 \neq \delta 2 \neq \delta 3 \neq \delta 4 \neq 0$ i.e., there is cointegration or long run relationship between the variables.

Secondly, after establishing the cointegration between the variables of this study, the long run coefficients, and the error correction term (ECT) was estimated. The ARDL cointegration procedure allows cointegrating relationship to be estimated by OLS after the lag order was selected. And the model was specified as follows:

$$\Delta IE = a_0 + \sum_{i=1}^{k} b_i \, \Delta IE_{t-1} + \sum_{i=1}^{k} c_i \, \Delta Y_{t-1} + \sum_{i=1}^{k} d_i \, \Delta IF_{t-1} + \sum_{i=1}^{k} e_i \, \Delta INF + \delta_1 LIE_{t-1} + \delta_2 LY_{t-1} + \delta_2 LIF_{t-1} + \delta_2 LINF_{t-1} + \mu_t$$

where IE represents income inequality, IF is Islamic financial development, Y is income per capita, and INF is inflation. Δ denotes the first difference of the logged variables and u_t is the residual term. This equation is a standard VAR model, in which a linear combination of lagged-level variables is added as proxy for lagged error terms. The coefficients bi, ci, di and ei represent the short run effects while all δ_j (for j=1 … 4) represents the long run effects.

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, having long run equilibrium, without losing the long run information. The causality in the earlier step was tested and confirmed through the t-statistic of the ECM while the coefficient of the

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ECT from the ECM indicates the speed of adjustment of the dependent variable towards its long run equilibrium. The endogeneity or exogeneity of the variables in this study, is tested though the ECM, and the same equation is used with each proxy of the financial development as well as income inequality in turn being the dependent variable. Therefore, the ECM tests the following hypothesis:

H_0: The variable is Exogeneous

H_a: The variable is Endogenous

Finally, for the purposes of determining the relative degree of endogeneity or exogeneity of the variables, the generalized Variance Decomposition (VD) technique was applied. The VDC provides a decomposition of the variance of the forecast errors of the variables in the Vector Auto Regression (VAR) at different periods. The relative exogeneity or endogeneity of a variable can be determined by the proportion of the variance explained by its own past. The variable that is explained mostly by its own past is deemed to be the most exogenous of all.

RESULT AND DISCUSSION

Stationary tests are among the most important tests to estimate regression with reliable coefficients and used to avoid spurious regression results. In this study, two tests were applied in determining the stationarity properties of the variables. These tests are ADF, that is developed by Dickey and Fuller (1981) and PP, that is developed by Phillips and Perron (1988). The result of the null hypothesis of both tests reveals that, there is unit root in the series. Therefore, it can be concluded that all the variables have unit root, because the calculated statistics are not bigger than the critical values confirmed by probability values and the null hypothesis cannot be rejected.

Table 1. Results of the ADF and PP test

Level				
	ADF Test		PP Test	
Variables	t-statistic	Prob.*	t-statistic	Prob.*
IE	-1.253070	0.8684	-1.253070	0.8684
Y	-0.190959	0.9883	-0.271097	0.9855
IF	0.196125	0.9942	-1.467106	0.7946
IN	-4.942729	0.0042*	-4.942729	0.0042*
1st Difference				
IE	-4.773485	0.0069*	-5.040478	0.0042*
Y	-4.205949	0.0186**	-4.220790	0.0181**
IF	-3.947945	0.0418**	-3.947945	0.0418**
IN	-6.392679	0.0003*	-15.33763	0.0001*

* Significance at 1 % level, ** Significance at 5 % level, and *** Significance at 10 % level. # MacKinnon (1996) one-sided p values.

The results reported in Table 1 above, reveal that, the null hypothesis of the unit root problem is rejected at the first difference. This shows that most variables are found to be stationary at 1st difference with trend and intercept, implying that variables are integrated at I (1).

Again, after stationary tests among variables, then the variables were tested for cointegration by applying ARDL bound testing approach and the results for testing the Null, show that there is no long-run (LR) relationship among the variables. These are presented in Table 2.

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Table 2: Results of the ARDL cointegration test

Model	Estimation	F-statistic	Decision
1	$IE_t = f(Y_t, IF_t, IN_t)$	3.759**	Reject the Null Hypothesis
2	$Y_t = f(IE_t, IF_t, IN_t)$	8.909*	Reject the Null Hypothesis
3	$IF_t = f(IE_t, Y_t, IN_t)$	1.759	Accept the Null Hypothesis
4	$IN_t = f(IE_t, IF_t, Y_t)$	3.325***	Reject the Null Hypothesis
	Bound critical values significance generated	**Lower**	**Upper**
	10%	2.01	3.1
	5%	2.45	3.63
	2.5%	2.87	4.16
	1%	3.42	4.84
*Significance at 1%, ** Significance at 5%, *** Significance at 10%			

The results above reveal that, the calculated F-statistics exceeded the upper critical value in three out of four equations, tested at standard acceptable significance levels (1%, 5% and 10%). As a result, three cointegrating vectors were discovered, confirming cointegration relationship between the variables. This implies that, the long run relationship exists between (income inequality, economic growth, financial development, and inflation) in the case of Indonesia, judging from the presence of structural breaks.

Table 3: Long-Run ARDL Estimation Based on AIC (1)

Dependent Variable: Income Inequality (LnIE)				
Regressor Variable	Coefficient	Std. Error	t-Statistic	Prob.
Y	-0.058730	0.167156	-0.351348	0.7849
IF	0.279624	0.100772	2.774818	0.2202
INF	0.351228	0.072139	4.868784	0.1290
Dependent Variable: Economic Growth (LnY)				
Regressor Variable	Coefficient	Std. Error	t-Statistic	Prob.
IE	-23.71682	90.18252	-0.262987	0.8363
IF	6.397848	22.03795	0.290310	0.8201
INF	8.223258	29.81498	0.275810	0.8287
Dependent Variable: Inflation (LnINF)				
Regressor Variable	Coefficient	Std. Error	t-Statistic	Prob.
Y	0.174427	0.419862	0.415438	0.7493
IE	2.753391	0.537486	5.122723	0.1227
IF	-0.775801	0.156456	-4.958581	0.1267

After the evidence of cointegration between variables has been established, the long run coefficients of the models were estimated. Investigating of the relationship between Islamic financial development and income inequality was made, and the results of long-run relationship are reported. As shown in Table 3, there is not any significant long-run relationship between Islamic financial development and income inequality. Hence, we find no evidence to support the hypothesis that financial development increases or reduces income inequality in Indonesia. This finding is consistent with Law & Tan (2009), Rosemy and Masih (2017) findings of Malaysia using a short time series from 1980 to 2000. It seems that, there are other factors that have been contributing towards the decreasing income inequality level for more than 15 years back.

Again, after finding the long run impacts of Islamic financial development on income inequality, there comes the test of the short-run dynamics, using error correction method

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(ECM). Table 4 shows the results of the short run model.

Table 4: Short-Run Error Correction Model (ECM)

Dependent Variable: Income Inequality (LnIE)

Regressor Variable	Coefficient	Std. Error	t-Statistic	Prob.
D (IE (-1))	-0.320396	0.103365	-3.099668	0.1987
D(INF)	0.056876	0.008335	6.823559	0.0926***
D (INF (-1))	-0.014663	0.009306	-1.575743	0.3600
D(Y)	0.459430	0.063900	7.189840	0.0880***
D (Y (-1))	0.098409	0.040783	2.412987	0.2501
D(IF)	0.207022	0.050279	4.117476	0.1517
D (IF (-1))	0.401860	0.063187	6.359816	0.0993***
ECM (-1) *	-0.628512	0.081041	-7.755508	0.0816***

***** Significance at 1% ****** Significance at 5% ******* Significance at 10%

Dependent Variable: Economic Growth (LnY)

Regressor Variable	Coefficient	Std. Error	t-Statistic	Prob.
D (Y (-1))	-0.189997	0.089803	-2.115716	0.2811
D(IE)	1.950229	0.273682	7.125896	0.0888***
D (IE (-1))	0.569882	0.239678	2.377703	0.2534
D(INF)	-0.116671	0.020555	-5.676054	0.1110
D (INF (-1))	0.036462	0.017477	2.086296	0.2845
D(IF)	-0.360102	0.122250	-2.945626	0.2084
D (IF (-1))	-0.859798	0.066025	-13.02229	0.0488**
ECM (-1) *	0.056743	0.004753	11.93928	0.0532***

***** Significance at 1% ****** Significance at 5% ******* Significance at 10%

Dependent Variable: Islamic Financial Development (LnIF)

Regressor Variable	Coefficient	Std. Error	t-Statistic	Prob.
IF (-1) *	-0.618414	0.363475	-1.701394	0.3383
Y (-1)	0.285442	0.286104	0.997686	0.5007
IE (-1)	1.835953	1.695901	1.082583	0.4748
INF (-1)	-0.727004	0.531474	-1.367900	0.4019
D (IF (-1))	-1.208712	1.037255	-1.165298	0.4515
D(Y)	-1.162834	1.370036	-0.848762	0.5520
D (Y (-1))	-0.220875	0.430184	-0.513443	0.6980
D(IE)	2.837759	2.377949	1.193364	0.4440
D (IE (-1))	1.275104	0.807370	1.579330	0.3593
D(INF)	-0.181067	0.144991	-1.248815	0.4298
D (INF (-1))	0.064440	0.109834	0.586704	0.6622

***** Significance at 1% ****** Significance at 5% ******* Significance at 10%

Dependent Variable: Inflation (LnINF)

Regressor Variable	Coefficient	Std. Error	t-Statistic	Prob.
D (INF (-1))	0.335362	0.163209	2.054805	0.2883
D(IF)	-3.365085	0.773917	-4.348118	0.1439
D (IF (-1))	-6.428249	1.099256	-5.847815	0.1078
D(Y)	-7.001870	1.210609	-5.783760	0.1090
D (GDP (-1))	-1.453071	0.661763	-2.195757	0.2721
D(IE)	14.48920	2.110548	6.865134	0.0921***
D (IE (-1))	5.088348	1.635434	3.111314	0.1980
ECM (-1) *	-3.738469	0.512512	-7.294407	0.0867***

***** Significance at 1% ****** Significance at 5% ******* Significance at 10%

From the above table, the ECM confirms the short-run relationship indicated in the first step of the ARDL modelling. The results of this study ECM are shown in Table 4 for income inequality and financial development as the dependent variable respectively.

From the p-value (Prob.) of error correction (ECM (-1)) in Table 4, it is concluded that both income inequality and financial development (Islamic domestic credit) are

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endogenous. The lagged ECM terms for all two models have the expected negative sign and are significant at 10% level. In it, the error correction term implies that the deviation of the variables (represented by the error correction term) has a significant feedback effect on income inequality that bears the burden of short run adjustment to bring about the long run equilibrium. In term of Islamic Domestic Credit, the value of lagged error correction term is – 0. 628. This suggests that 62.8% of the change in income inequality were corrected each year, adjusting towards its long run equilibrium or approximately 13.14 years for income inequality to return to its long run equilibrium, that is if there is a shock to the system.

Although the Islamic domestic credit does not have significant effect in the long run-on income inequality (see Table 3) but found to be positive and statistically significant (10%) in the changes of income inequality in the short run. Similarly, inflation which does not have significant long-run relation with income inequality was found to have positive and statistically significant (10%) short-run effect in income inequality. Interestingly in Table 4, income inequality in the long run has a positive and significant effect on growth and inflation.

From the ECM, the endogeneity and exogeneity of a variable during the sample period was discovered. However, in policymakers what is more important is to recognize the relative degree of endogeneity and exogeneity of the variables of some forecasted period, so that policies can be targeted to the appropriate variable(s). This useful information can be derived from the output of VDC. This is because, VDC decomposes the variance of the forecast error of each variable into proportions attributed to shocks from each variable in the system.

The relative endogeneity and exogeneity of a variable can then be determined by the proportion of variance that is explained by its own past. The variable that is explained mostly by its own past variations, depends relatively less on other variables, and is deemed to be the most exogenous (most leading) amongst the variables.

Table 5. Variance Decomposition Proportions

Period	Variance Decomposition Proportions										
	IE(-1)	IE(-2)	Y	Y(-1)	Y(-2)	IF	IF(-1)	IF(-2)	INF	INF(-1)	INF(-2)
1	0.974	0.496	0.120	0.261	0.012	0.243	0.171	0.604	0.424	0.624	0.526
2	0.007	0.431	0.814	0.376	0.000	0.320	0.762	0.329	0.021	0.153	0.067
3	0.007	0.024	0.000	0.318	0.392	0.380	0.049	0.020	0.000	0.137	0.001
4	0.006	0.005	0.006	0.000	0.520	0.040	0.010	0.025	0.002	0.002	0.047
5	0.005	0.042	0.020	0.043	0.001	0.016	0.000	0.007	0.187	0.030	0.104
6	0.001	0.001	0.036	0.000	0.073	0.001	0.006	0.010	0.080	0.000	0.031
7	0.000	0.000	0.002	0.002	0.002	0.000	0.000	0.006	0.085	0.002	0.082
8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.191	0.005	0.077
9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.045	0.061
10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.001	0.004
11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Tables 5 above show the results of VDC for the base model used in this research. Those percentages highlighted in grey indicate the contribution of the variables explaining the

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forecast variance of income inequality. The VDC results imply that Islamic banking sector development in Indonesia has not been playing a bigger role to tackle higher income inequality at all levels. Whereas financial markets and institutions can play a pivotal role in economic development by bridging information asymmetries between borrowers and savers, thereby mobilizing savings, capital fund allocation, monitoring the use of funds and managing risks, which together support the economic growth process. This economic growth, which is due to financial development can be effective on income inequality.

One of the reasons to support this finding is that the market share of Shariah banking in Indonesia remarkably remains low, while nearly 90 percent of the population adheres to Islam. Also, in absolute terms, the country is Southeast Asia's largest economy, and contains more than 210 million Muslims. However, as of 2015, assets controlled by Islamic financial institutions in Indonesia only account for five percent of the nation's total banking assets. In making comparison with Malaysia, 'only' 61 percent of their population are Muslims, meaning that just over 30 million people are Muslim, and their Islamic financial institutions control 20 percent of the country's total banking assets. This is a remarkable contrast and shows both the underdeveloped nature of the Indonesians' Islamic finance industry, coupled with low awareness of Islamic banking. Meanwhile, in Saudi Arabia (which contains the world's largest Islamic finance industry) Islamic banks account for over half of the country's total banking assets. Therefore, these findings show that there is still ample room for growth in Indonesia Shariah compliance financial services industry. As a result of the forgoing, the Indonesian Government should continue to promote Islamic banking, because it has shown to benefit the economy. This can be done by setting a target ratio of Islamic banking assets to total banking assets, to be achieved in a certain year as was done in Malaysia.

CONCLUSION AND RECOMMENDATION

This research examines the presence of long-run theoretical relationship, between Islamic financial development, income inequality, economic growth and inflation in Indonesia for the period of 2000 to 2020. Adopting the use of the ARDL bound testing approach, two Islamic financial development indicators (Islamic domestic credit and Islamic stock market capitalization) were considered. The ADF and PP unit root tests were used to check the stationarity of the series and found that the variables included in this study are not in all the same order. This study finds that, income inequality was cointegrated with Islamic financial development, per capita GDP and inflation during the period under review. However, it is also found that no significant long run effect between Islamic financial development and income inequality and this supports earlier findings by Law & Tan (2009) and Rosemy & Masih (2017). Also, the current study finds that, income inequality is positively related to Islamic financial development, which shows that high income inequality is associated with higher Islamic financial development.

One of the motivations for the development of Islamic finance, is to have social justice via reducing income inequality. This could have been achieved amongst others, by broadening and deepening the process of financial system of Indonesia. In fact, Islamic and development finance is expected to have been able to assist in reducing poverty and inequality by including a larger proportion of the population into the financial system, and

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by providing an easy and transparent access to a diversified portfolio of services. Unfortunately, previous studies are not able to support this expectation. In the context of the findings of this research on finance-inequality relationship during the period studied, financial development is found to be endogenous and has no significant effect on inequality, effective redistribution, and economic policies in Indonesia, which could have been the more effective and direct approach to reduce income inequality in the past, because income inequality has been coming down. As a result, the Indonesian Government should continue to promote Islamic banking as it has shown to benefit the economy. In terms of policy implications, since there is no significant effect of financial development on income inequality in the past, policymakers need to investigate minimizing Islamic financial market imperfections and constraints, as well as to steer the development of the financial system in a pro-growth and pro poor direction.

Based on the VDC results, the policymakers should make the Islamic financial sector development as its focus economic policy that can influence the income inequality within the country. Efforts to increase the poor, small and medium enterprises (SMEs) access to financial services, to enhance income and productive assets need to be heightened. This could come in the form of providing appropriate infrastructure to promote microfinance, amongst the financial institutions, including financial cooperatives. Another possible avenue is to use funds from philanthropic activities, such as (*ṣadaqah*, *waqf* and *qarḍ al-hasan*), as well as from Islamic banks' profits for social business. The Islamic banks' involvement in the social business can be inform of its corporate social responsibilities' activities or as its own business investments.

Limitation

In this study, there was a limited time series data on Islamic banks, hence it was not directly used for analysis. Findings of no significant effect between the focus variables are alarming due to Islamic finance industry that has not been playing a bigger role in Indonesia financial system for the last 20 years, since the establishment of Bank Muamalat Indonesia in 1999. This is because, Islamic finance is supposed to aim for double objectives (enhancement of the economic and social conditions). In capping, inequality is a complex process and the econometric models used in this study may have its limitations. Therefore, more advance studies with broader dataset including the recent years data and different variant of financial development proxies and dimensions could be further explored. Also, using dynamic econometric models is greatly encouraged to deepen understanding on the finance inequality linkage, and the interaction effects between financial development and the other independent variables, especially economic growth for the case of Indonesia. Further primary research based on detailed survey data at the micro-level are highly encouraged to draw more conclusion on financing access to the have-nots.

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