Nexus between Financial Development and Income Inequality before Pandemic Covid-19: Does Financial Kuznets Curve Exist in Malaysia, Indonesia, Thailand and Philippines?

by Bayu Fianto

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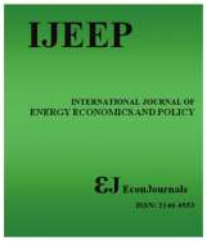

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Nexus between Financial Development and Income Inequality before Pandemic Covid-19: Does Financial Kuznets Curve Exist in Malaysia, Indonesia, Thailand and Philippines?

Abdul Rahim Ridzuan[1]*, Shahsuzan Zakaria[2], Bayu Arie Fianto[3], Nora Yusma Mohamed Yusoff[4], Nor Fatimah Che Sulaiman[5], Mohamad Idham Md Razak[1], Siswantini[6], Arsiyanti Lestari[7]

[1]Faculty of Business and Management, Universiti Teknologi MARA, Melaka Campus, Malaysia, [2]Faculty of Business and Management, Universiti Teknologi MARA, Shah Alam Campus, Malaysia, [3]Faculty of Economics and Business, Universitas Airlangga, Surabaya, Indonesia, [4]College of Energy Business and Economics, Universiti Tenaga Nasional, Malaysia, [5]School of Social and Economic development, Universiti Malaysia Terengganu, Malaysia, [6]Faculty of Economic and Communication, Bina Nusantara University, Alam Sutera Campus, Indonesia, [7]Faculty of Economic and Communication, Bina Nusantara University, Kemanggisan Campus, Indonesia. *Email: Rahim670@staf.uitm.edu.my

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ABSTRACT

This study offers new insights for policymakers to reduce income inequality, thus ensuring economic growth which greatly benefits the poor segment of population and directing financial sector to provide easy access to financial resources for lower income group at cheaper cost. Bound test was applied to examine the long-run and short-run relationships based on the sample period beginning from 1970 until 2016. The results confirm the existence of a long-run relationship between the variables. Financial development in Malaysia, Indonesia and Thailand had successfully reduced income inequality, however, a different effect was recorded in the Philippines where income distribution was worsened. Furthermore, economic growth brought positive effect to income distribution in Malaysia and Indonesia, but not for Thailand and the Philippines. Inflation, trade openness and foreign direct investment, provided mixed results for all countries. Among the policies recommendation for this paper are there should be more easy accessibility for entrepreneurs to reach the wide range of financial services including conventional and Islamic financial products, the expansion of capital market, as well as giving proper attention to the financial sector. Besides, granting the access to capital markets for low income groups or underprivileged individuals might be helpful to them either by developing entrepreneurial skill or involvement in productive activities and receive better salaries. This policy will give insight to the policymakers to strengthen their financial institutions, especially during the pandemic of Covid-19 .

Keywords: Financial Development, Income Inequality, ASEAN-4, Financial Kuznets Curve
JEL Classifications: G10, F62

1. INTRODUCTION

Income inequality which is captured by GINI coefficient is a persistent scenario that has become a fundamental economic issue globally. The world's economic phenomenon has been characterised by the level of income disparity, which may have contributed to the global economic uncertainty. The Association of South East Asian Nation (ASEAN) countries has undergone massive economics growth since its conception in 1967. However, ASEAN is cosnstantly looking at the issue of imbalanced income distribution. The first four countries that makes up as ASEAN-4 are Malaysia, Indonesia, Thailand and Philippines. Based on ASEAN Post (2018), Malaysia recorded a small per centage of people living under poverty line which is of 0.6% from its 31 million people. In addition, 34% of the country's indigenous people and 7% of children lives in poor condition, and seen in the urban low-cost

housing projects. Next, the richest 1% in Thailand own about 58% of the country's wealth while the top 10% is earning 35 times more than the bottom 10%. For Indonesia, the four richest men acquired more wealth compared to the poorest 100 million people, and about 50% of the country's wealth belongs to the top 1%. Lastly, the Philippines records their average annual family income of the top 10% is estimated at US$14,708 in 2015, nine times higher than the lowest 10% at US$1,609.

The trend of income inequality measured by GINI coefficient of ASEAN-4 countries is best seen at Figure 1. Overall, the trend of Gini coefficient for Malaysia is quite volatile starting from 1970 and it become more consistent from 2006 onward. The Gini recorded highest point of 0.52 in 1984 and the lowest point of 0.44 in 1970. Indonesia's estimated household income distribution is unique as compared to other ASEAN countries. There is a continuous short series of uptrend followed by a short series of a downtrend for the Ginis recorded from 1970 until 2002. Overall Thailand's estimated household income distribution showed a downward trend from 1970 until 2013. The decreasing trend of Gini coefficient reflects an improving trend in income distribution albeit marginally. Gini coefficient reached its lowest value in 2012 at 0.40 and then increased back to 0.42 points in 2013. Gini coefficient reflects an almost stagnant trend in the Philippines throughout 47 years of observation with the value maintained around 0.42 to 0.49. Although it showed a consistent trend, Philippines has the worst income distribution especially between the upper group and the lower income group among ASEAN-4 countries.

1.1. The Link Between Financial Development and Income Inequality

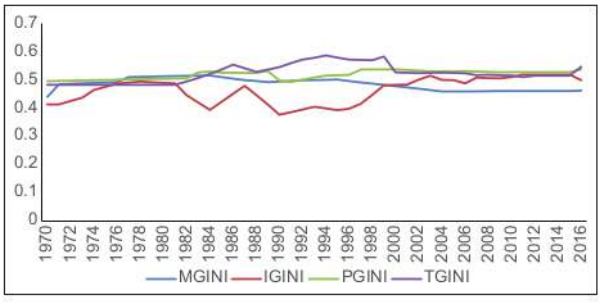
Based on previous empirical findings such as Chambers, Wu, and Yao (2007) and Siyal et al. (2014), revealed that inequality on various grounds increased with the economic growth in developing countries. Thus, sound macroeconomic indicators and policies could help the country to achieve high rates of economic growth. Tiwari et al. (2013) described that the development of the financial sector helps lead to an increase in economic growth, which consequently declines the income inequality trough two ways. First, the cheaper credit tends to make investment more attractive. Thus small entrepreneurs would like to expand their business to earn more profit. As a result, employment opportunities, output production, and welfares of the poor are move in the same direction with the increasing of financial development. Second, borrowing at a low cost will boost the increase of human capital quality because families can send their children to gain a higher level of education and health, which is a ladder to come out of the poverty trap.

Moreover, Gharleghi (2020) explained that financial development plays a vital role in degrading income inequality because financial services bring trough the society to be more productive such as developing a business. Additionally, Jung and Cha (2020), and Destek et al. (2020) classified the impact of financial development on income inequality into two perspectives. On the one hand, in a well-developed financial structure, income inequality narrowed. Because financial development also reflects the allocation of monetary resources in elevates, the quality standard of life includes trough education and productivity. Thus, society has more options for the occupational decision that can encourage an increase in income distribution, and as a result, decline the income inequality. Besides, Koh et al. (2019) described that well-developed financial sectors lead to an inequality-narrowing effect in the long-run through the easiness of firms to access capital, which an essential input to increase the companies' productivity and performance. Consequently, the advantages trickled down to society through the creation of jobs and which reduce unemployment.

On the other hand, at the recent development, a financial system will be a benefit for rich people because they can get financial access, which in turn triggers up them to earn much more wealthiness. Whereas, the financial accessibility for poor society is restricted. Consequently, this phenomenon will lead the higher economic growth but worsen income disparities. This explanation also supported by Gharleghi (2020) which stated that financial development might cause an increase in income inequality due to the higher financial services as well as returns to the well-to-do without significant impact on the empowerment financial status of the needy. Moreover, the tremendous growth of financial development might cause a widening gap in income distribution and become a serious concern among the country's leader. In details, higher level of economics growth may cause higher inflation and thus inflation could be one of the possible factors that influence the level of income distribution in this study. There are other various factors that have been identified in the previous studies that causes inequality in developing countries besides economics growth. For example, the rising of internationalization of economic activities and its impact on income distribution has been discussed heavily amongst economists. For the case of ASEAN countries, the increase in internationalization since its formation implies a growing economic openness among countries to trade (TO) and foreign direct investment (FDI).

Most previous studies focus on the effect of trade on income distribution and the findings are mix. Reuveny and Li (2003) find that TO is linked with more equitable income distribution within countries. Edwards (1997), on the other hand, postulates that

Figure 1: Trend of income distribution (Gini coefficient) in ASEAN-4 countries



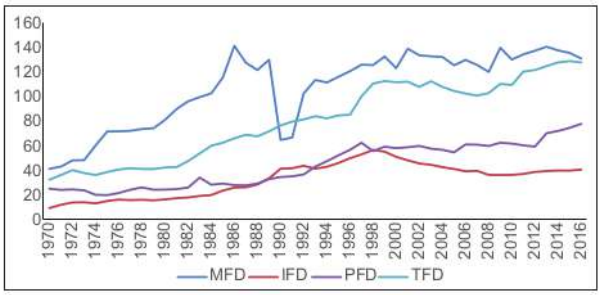
The value of Gini coefficient is range between 0 to 1. The gap of income is higher when the coefficient value is close to 1 and the income gap is lessen when its value is close to zero.
Source of data: Global Consumption and Income Project (2017)

there is no evidence connecting TO with an increase in inequality. Meanwhile, Dollar and Kraay (2002) ascertained that there is very little evidence of a significant relationship between the income share and TO. However, Spilimbergo et al. (1999) find that there is a positive relationship between TO and inequality. Kraay (2006) argue that TO has a significantly positive impact on income inequality. In summary, the development of financial system does not significantly affect the income inequality. Gharleghi (2020) also demonstrated that financial development does not significantly affect the reduction of income inequality in developing countries.

FDI, which is another channel of internationalization, has been remarkably going well in ASEAN-4 countries. Tsai (1995) for example, reports that there is a positive correlation between FDI and income inequality. In particular, he finds that FDI can give rise to a more unequal income distribution in less-developed countries. This finding is backup by Basu and Guariglia (2007), who observe that there is a positive relationship between FDI and income inequality. Gopinath and Chen (2003) concluded that FDI flows into developing countries can widen the skilled-unskilled wage gap. Choi (2006)., on the other hand, suggests that the Gini coefficient increases when the FDI intensity increases. These findings indicate that FDI flows will lead to labor-market segmentation in which skilled labor is paid a higher wage, and income inequality increases. In contrast to there being positive relationship, other scholars such as Milanovic (2005) argue that FDI has no impact on the income distribution.

As compared to FDI and TO, the roles of financial development and its impacts on income distribution for the case of ASEAN countries are rarely investigated. Based on previous findings, Batuo, Guidi, and Mlambo (2010), believed that the financial development has a significant impact on the distribution of income and income inequality. This could be the case when access to finance is limited to certain group of people based on their geographical area, income level and ability to provide collateral. Pamungkas et al. (2016) believed that only those countries that offer small-scale loans could reduce income inequality. They argued that with facilities offered by banking institutions, the issue of income inequality is difficult to resolve, except with the small-loan concept. The trend of financial sector development proxied by broad money as percentage of GDP can be observed in Figure 2. Based on this figure, we can concluded that there is a rise of financial deepening across ASEAN-4 countries as a results of rapid development, experienced by these countries.

Figure 2: Trend of financial sector development for ASEAN-4 countries



Source of data: World Development Indicators (2017)

For instance, in the case of Indonesia, income inequality was significantly reduced when small loan has been disbursed to the small- and medium-sized enterprises, even though the relationship was not clear-cut. However, the result differed when banks offered business loans to larger firms whereby the income inequality significantly increased. Ahmed and Masih (2017) also verified the discussion when they strongly suggested that efforts to increase the poor's and small & medium enterprises' (SMEs) access to financial services would significantly enhance their income level, thus reducing income inequality.

Recognising the financial development problems associated with increasing income inequality, this study investigates the impacts of financial development indicators and other selected mmacroeconomics indicators such as real income, inflation, FDI and TO towards income distribution of ASEAN-4 countries. The rising of income inequality cound hinder the ASEAN-4 countries from achieving ASEAN Vision 2025 that have been discussed among the ministrial level as its objectives are incurrent with Sustainable Development Goal (SDG). Moreover, according to the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) report, the Southeast Asian subregion has not been successful in its efforts to reduce inequalities, thus special attention need to be given on finding a possible macroeconomics solution that can reduce the income gap. The results of the analysis from this study could lead to some important implications especially for ASEAN-4 countries to have a proper management of financial development plan which might be helpful to reduce the income inequality without ignoring the efficiency of financial sectors.

This paper is structured as follow Section 2 presents a brief review of literature concerning the relationship between financial development and income inequality. Research methodology employed in this study is presented in Section 3. Section 4 deals with results interpretation and Section 5 provides the conclusion and important policy recommendations.

2. LITERATURE REVIEW

The relationship between economic growth and equal income distribution is one of the focal points for policymakers to devise long-term economic development-financial development policies for sustainable development. A review of past literature has shown that for a developing country which is trying to attain high economic growth rate, that inequality on various grounds increases with the growth of an economy (Chambers et al. 2007; Baliscan and Fuwa 2003; Siyal et al. 2014). Based on the extensive review, the study findings can be grouped into two strands. The first strand includes studies which found that financial development improves the income equality; the second strand groups the studies which found that financial development increases income inequality.

In the first kind of studies, Li, Lyn, and Zhou (1998) conducted a study on 40 developed and developing countries for the period

1947–1994 in which they discovered th financial development leads to less income inequality. Also, Jalilian and Kirkpatrick (2005) indicated that financial development takes a clear contribution to poverty reduction. In addition, Clarke, Xu, and Zou (2006) investigated the relationship between finance and income inequality for 83 developed and developi countries between 1960 and 1995. The results showed that, in the long run, inequality is reduced when financial development is positive. This finding is consistent with the work of Galor and Zeira (1993) Banerjee and Newman (1993). Furthermore, according to Beck, Demirgüç-Kunt, and Levine (2007), financial development disproportionately raises the income of poorest quintile and reduces income inequality. They also found that financial developm is strongly associated with poverty alleviation. Similarly, Deininger and Squire (1996), Dollar and Kraay (2001), White a Anderson (2001) and Ravallion (2001) explained that finance has a positive effect on poverty reduction. This is in line with the research outcome conducted by White and Anderson 1) and Ravallion (2001) where it was revealed that finance has a positi effect on poverty reduction. Also, Kappel (2010) stated that financial develop t can reduce both poverty and income inequality, however, the effect of financial development on poverty in particular is not or significant in itself, it is also evidently greater than the effect on income inequality. erjee and Newman (1993) underlined that countries with larger financial market imperfections such as information asymmetries and transaction costs that limit access to finance are more exposed to ome inequality. In the case of Malaysia, Law and Tan (2009) found that financial development has favorable impact on income distribution, nevertheless, inflation raises income inequality. Moreover, Kapingura (7) also demonstrated that financial development affectively reduces the level of inequality in South Africa both in the short- and long-run. Besides, according to Ridzuan et al. (2018), the deepening of financial development in Singapore also have improves the country's income gap within the society.

The second strand of the empirical literature indicates that financial development may increase income inequality or instance, Behrman, Birdsall, and Szekely (2001), and Beck et al. (2007) found that the drawbacks and shortcomings of financial development have cause oor individuals to be negatively affected by the circle of income inequality. This is due the fact that the underprivileged peopl ave no access to the benefit of financial development. Also, Wahid et al. (2011) found that financial development increased income inequality in Bangladesh. This is further supported by Arora (2012) who later claimed that overa come inequality is deteriorated with financial developments. Claessens and Perotti (2007) also stated that financial development y fail to reduce income inequality and poverty in the case of countries with historically high levels of inequality and distortion.

Another new branch of studies that receive increasing attention under this topic is the validation of Financial Kuznet rve also known as Greenwood–Jovanovich (GJ) hypothesis. Gre wood and Jovanovich (1990) argued that financial development initially increases income inequality, nevertheless, it declines income ine ity once financial sector matures. This seems to be holding the inverted U-shaped hypothesis between financial development and income inequality. There are various studies that h been conducted to investigate Financial Kuznets hypothesis between financial development and income inequality. For example, Li et al. (1998) examined the relationship between financial development and incon inequality in selected East Asian countries and confirmed the existence of U-shaped Kuznets Curve. In contrast, Re n et al. (2008), that also worked on a similar topic, rejected the inverted U-shaped relationship between financial development and income quality. More recent studies by Shahbaz and Islam (2011) also found U-shaped relationship between financial development and income inequality in Pakistan, however, it statistically insignificant. Moreover, in the context of India, rawat and Giri (2015) and Tiwari et al. (2013) also ascertained that financial development aggravates the income inequality in both long run and short run. Batuo, Guidi, and Mlambo (2012) explored the existence of Financial Kuznets curve hypothesis on African countries by employ dynamic panel estimation technique (GMM). They observed that financial development had a significant positive impact on income distribution, but failed to detect any evidence supporting the Financial Kuznets Curve hypothesis. Tan and Law (2012) investigated the dynamics of finance-inequality nexus using a body data from 35 countries. ed on the empirical testing, the authors found the presence of U-shaped relationship between financial deepening and incon distribution. This suggests that financial markets are inefficient to improve income distribution in these countries.

The mixed evidence of Financial Kuznets Curve and lack of empirical findings based on ASEAN countries, therefore, become the foundation of this research to investigate this hypothesis by focusing on four developing countries of ASEAN-4. The outcomes of this research could fill in the literature gap besides providing more evaluation on the performance of financial institutions as a potential driver for sustainable economic development. Based on the case studies of the four original members of ASEAN countries, this study can provide meaningful insights to other members of ASEAN.

3. METHODOLOGY

The formulation of th model used in this study is explained briefly in this section. All variables were transformed into log-linear form named as LN to translate the results into long-run elasticities. The construction of financial Kuznets cuve model is explain in more details to give more depth understanding on this theory to the reader.

3.1. The Financial Kuznets Curve

The financial Kuznets curve model can be explain by the following simplified equation as follows

$$y = a+bz+cz^2 \quad (1)$$

where y is a measure of income inequality (GINI), z is real per capita income (GDP), and a (constant), financial development, b (FD) and financial development square, c (FDSQ) are coefficients, with $b > 0$ and $c < 0$ in order for Eq. (1) to be consistent with the

inverse-U shaped of Kuznets curve relationship postulated by Kuznets (1955).

The KC turning point (x*) is obtained by maximizing Eq. (1) with respect to z, yielding

$$z^* = -b/2c \quad (2)$$

Based on Bradford et al. (2005), by differentiating Eq. (1) with respect to time and substituting Eq. (2), we obtain

$$\partial y/\partial t = (b+2cx)\ \partial z/\partial t = a(z - z^*)g \quad (3)$$

where $a \equiv 2c < 0$ and $g \equiv \partial z/\partial t$ is the (per capita) income growth rate.

The instantaneous change in economic inequality then depends on the per capita income growth rate g and on the distance of x from its turning point z*; moreover, assuming g>0 inequality increases when $z < z^*$ and decreases when $z > z^*$. By conditioning the turning point per capita income in Eq. (2) on the level of financial development (f), i.e.,

$$z^* = \lambda_0 + \lambda_1 f \quad (4)$$

and substituting Eq. (4) in Eq. (3), we have

$$\partial y/\partial t = \beta_0[z - (\lambda_0 + \lambda_1 f)]g \quad (5)$$

where λ_0 and λ_1 are parameters, with $\lambda_1 < 0$ indicating that a country with more developed financial markets reaches the KC turning point at a relatively lower income level than a country with a less developed financial markets.

Eq. (5) can be then integrated with respect to time, assuming y, g and f to be constant over time, to yield

$$y_t = \mu + \beta_0[z - (\lambda_0 + \lambda_1 f)]g_t \quad (6)$$

where t = 1,…, T and l is a constant of integration.

3.2. Model of Income Distribution

The model of income distribution introduced in this study is the modified version of the model adopted by previous researchers such as Shahbaz et al. (2014), Shahbaz et al. (2017) and Ridzuan et al. (2018). The common thing with regards to these three group of authors are that they are using the same method of analysis namely ARDL estimation. The ARDL bounds testing approach to cointegration is preferred due to its certain advantages. For example, the ARDL bounds testing is flexible regarding the order of integration of the variables whether variables are found to be stationary at I(1) or I(0) or I(1)/I(0). The Monte Carlo investigation shows that this approach is superior and provides consistent results for small sample (Pesaran and Shin, 1999). Moreover, a dynamic unrestricted error correction model (UECM) can be derived from the ARDL bounds testing through a simple linear transformation. Additionally, Narayan and Smyth (2006) also conducted similar research and utilized the ARDL approach. They explained that ARDL a suitable method for this type of current study since most macroeconomic variables reflect its past behavior, which should be seen as dynamic volatility and autoregressive process.

Considering the roles of economics growth, inflation, financial development, foreign direct investment and trade openness as highlighted in introduction section of this paper, the final version of the model is described as follows:

$$LNGINI_t = \delta_0 + \alpha_1 LNFD_t + \beta_2 LNFDSQ + \nu_3 LNGDP_t + \phi_4 LNFDI + \gamma_5 LNTO + \eta_6 LNINF + \mu_t \quad (7)$$

Where: -
LNGINI is Gini coefficient representing income distribution,
LNFD is a financial development proxied by broad money to GDP,
LNFDSQ is a financial development square,
LNGDP is economic output measured by real gross domestic product (constant 2010)
LNFDI is a foreign direct investment inflows as percentage of GDP
LNTO is a trade openness measured by sum of export and import over GDP
LNINF is inflation measured by consumer price index

Deepening financial development provides an opportunity for people of various backgrounds to borrow and invest. Income inequality is likely to increase if the access to financial markets borrowing is only granted to high income earners. To combat this problem, the middle and low income groups should be given easy access to credit markets to promote borrowings and investments in skills and human capital. Consequently, the income distribution will be improved. Hence, an estimate of θ_1 and θ_2 is expected to be either positive or negative. Note that given the standard definition of Gini, a positive estimate of α_1 and α_2 suggests a worsening effect of financial development and a negative estimate of θ_1 and θ_2 indicates improvement in income inequality due to financial development. Meanwhile, the presence of inverted U-shaped Financial Kuznets Curve only takes place when the expected sign for θ_1 is negative while θ_2 shows a positive sign. On the other hand, the U-shaped Financial Kuznets Curve occurs when θ_1 has a positive sign while θ_2 has a negative sign. The next important determinant of Gini is the level of economic growth rates denoted by LNGDP. Following the study done by Bahmani-Oskooee, Hegerty, and Wilmeth (2008), if economic growth rates improve income inequality, an estimate of θ_3 should be negative.

Next, the model includes foreign direct investment inflows (LNFDI). The expected sign for θ_4 could be negative, assuming FDI which creates the demand for unskilled workers; thus the host FDI nation would experience an enhancement in income inequality (Sylwester, 2005). To account for the impact of international trade on income distribution, the model includes a variable denoted by LNTO. Studies such as Bergh and Nilsson (2010) assumed that higher trade openness in labor abundant countries like ASEAN-4 countries will usually decrease the income inequality, thus the expected sign for θ_5 is negative. Lastly, inflation, LNIF is introduced in the model as a control variable. Higher inflation constraints the purchasing power of citizens, hence, the real income is reduced. Therefore, it is expected that θ_6 has a negative

relationship with income distribution.

The ARDL model based on Unrestricted Error Correction Model (UECM) is listed as below:

$$\Delta LNGINI_t = \beta_0 + \theta_0 LNFD_{t-1} + \theta_1 LNFDSQ_{t-1} + \theta_2 LNGDP_{t-1} + \theta_3 LNFDI_{t-1} + \theta_4 LNTO_{t-1} + \theta_5 LNINF_{t-1} + \sum_{i=1}^{p} \beta_i \Delta LNGINI_{t-i} + \sum_{i=0}^{q} \gamma_i \Delta LNFD_{t-i} + \sum_{i=0}^{r} \delta_i \Delta LNFDSQ_{t-i} + \sum_{i=0}^{s} \lambda_i \Delta LNGDP_{t-i} + \sum_{i=0}^{t} \vartheta_i \Delta LNFDI_{t-i} + \sum_{i=0}^{u} \zeta_i \Delta LNTO_{t-i} + \sum_{i=o}^{v} \psi_i \Delta LNINF_{t-i} + \upsilon_t \quad (8)$$

where Δ is the first difference operator and u_t is the white-noise disturbance term. Residuals for the UECM should be serially uncorrelated and the models should be stable. The computed statistic for this model is compare with critical bounds generated by Pesaran et al. (2001) to test whether cointegration exists or not. Pesaran et al. (2001) developed upper critical bound and lower critical bound. The null of no cointegration in the long run relationship is defined by: H_0: $\theta_0=\theta_1=\theta_2=\theta_3=\theta_4=\theta_5=0$ (there is no long-run relationship), is tested against the alternative of H_1: $\theta_0\neq\theta_1\neq\theta_2\neq\theta_3\neq\theta_4\neq\theta_5\neq 0$ (there is a long-run relationship exists). Using Pesaran et al. (2001) critical bounds, there is cointegration between the variables if computed F-statistic is more than upper critical bound. This study used an annual data starting from 1970 up to 2016 comprising 47 years, as a sample period. Summary of the data and its sources are shown in Table 1 below:

4. ANALYSIS

The analysis begins by detecting the stationary existence of each variable by using Augmented Dickey Fuller (ADF) test and Philipps Perron (PP) test which are display in Table 2. These tests are considered very important for time series analysis in order to determine the suitable cointegration analysis. Beginning with the level for intercept using Malaysia ADF unit root test, it was found that LNFD and LNFDI to be stationary at 10% and 1% significant level, while the rest of the variables were not significant at any level, I(0). However, most of the variables were found to be stationary at 1% significant level as the analysis proceeded with first difference, I(1) except for LNGINI and LNFDI. The procedure was repeated by testing the ADF but changing it to trend and intercept. The outcomes were almost similar to at level as well as at first difference, slight change was detected where LNFDI and LNINF were stationary at 1% and 10% significant level, while all other variables were found to be stationary at first difference except for LNFDI. Given that LNGINI was not stationary at both at level, I (0) as well as at first difference, I (1), there was a need to perform a more powerful unit root test, namely PP. The outcomes of LNGINI showed at first difference is now significant at 1% level for both intercept and trend and intercept. LNGINI was not the only stationary variable at first difference as the outcomes displayed that all other variables were also stationary at 1% significant level under PP unit root test. The mixed stationary variables found in Malaysia were also detected for the rest of ASEAN countries including Indonesia, Thailand, Philippines and Singapore. Most importantly, all variables were found to be stationary at first difference for these countries, thus, confirming that there were no single variables being stationary at I (2). The mixed stationarity of the variables either at I (0) or I (I) is predicted as the proposed model used several macroeconomics variables and it is also common for time series data. Thus, the best possible analysis that can be used in order to proceed with cointegration analysis is Autoregressive Distributed Lag (ARDL) estimation which permits the variables to be stationary only at I (0) and I (1) and not at I (2).

Table 1: Sources of data

Variables	Description	Sources
GINI	Gini coefficient	GCIP
FD	Broad money, M2 (% of GDP)	WDI
GDP	GDP per capita, (constant, 2010)	WDI
FDI	Foreign direct investment, net inflows (% of GDP)	WDI
TO	Trade (% of GDP)	WDI
INF	Consumer price index	WDI

WDI stands for World Development Indicators (2017), and GCIP stands for Global Consumption and Income Project (2017)

The outcomes of ARDL long-run cointegration for each ASEAN-4 country is displayed in Table 3. This procedure is an important stage that needs to be conducted before the outcomes of short- and long-run elasticities are discussed. To ensure that the long-run cointegration exists in each country, the F-statistic must be at least greater than the upper bound value of 10% significant level. All countries were found to prove the existence of long-run cointegration given that their F-statistic value exceeds 5% for the case of Philippines, and the remaining countries at 1% significant level.

To ensure that the model can provide accurate results, it is important that every single model is free from any diagnostic problems. Table 4 reveals the results of diagnostic checking for each ASEAN-4 countries. Four different types of diagnostic tests were tested, namely serial correlation, functional form, normality and heteroscedasticity tests. The null hypothesis of each test indicated the non-existence of all diagnostic problems while the alternative hypothesis indicated the existence of problems. Given the probability value of each test for each country is larger than 10% significant level, it failed to reject the null hypothesis, thus, confirming all models are free from any diagnostic problems.

The stability of the model was also tested by using Cumulative Sum of Recursive Residual (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) tests as part of the diagnostic checking. The model is considered stable if the plot (blue line) falls inside the critical bounds (dotted red line) of 5% significance level. All diagrams as revealed in Figure 3 show that they were plotted within the critical bounds, except for CUSUMSQ for Indonesia and Philippines. Despite the plot bypassing the critical bounds, it shows that the plot is moving back towards this area. Therefore, the model can still be considered as stable just like the rest of the models.

Table 2: Result of ADF and PP Unit Root Tests

Country			ADF unit root test		PP unit root test	
			Variable Intercept	Trend and intercept	Intercept	Trend and intercept
Malaysia	Level	LNGINI	−0.229 (1)	−2.073 (1)	−2.317 (4)	−5.792 (3)***
		LNFD	−2.659 (0)*	−2.874 (0)	−2.830 (5)*	−2.766 (3)
		LNFDSQ	−2.537 (0)	−2.874 (0)	−2.582 (4)	−2.803(2)
		LNGDP	−1.566 (0)	−2.065 (0)	−1.566 (0)	−2.131 (2)
		LNFDI	−5.755 (0)***	−5.717 (0)***	−5.757 (1)***	−5.718 (1)***
		LNTO	−1.891 (1)	−0.273 (1)	−1.433 (0)	0.168 (6)
		LNINF	−1.835 (9)	−3.489 (1)*	−4.186 (6)***	−2.508 (9)
	First difference	LNGINI	−12.388 (0)	−11.996 (0)***	−9.872 (4)***	−9.702 (4)***
		LNFD	−6.077 (1)***	−6.327 (1)***	−6.609 (3)***	−7.352 (6)***
		LNFDSQ	−6.679 (0)***	−6.311 (1)***	−6.737 (3)***	−7.504 (6)***
		LNGDP	−5.794 (0)***	−5.959 (0)***	−5.805 (1)***	−5.959 (0)***
		LNFDI	−2.162 (7)	−2.201 (7)	−25.564 (27)***	−25.2555 (27)***
		LNTO	−4.985 (0)***	−5.589 (0)***	−4.985 (1)***	−5.555 (6)***
		LNINF	−3.727 (8)***	−3.752 (8)**	−3.869 (0)***	−4.792 (1)***
Indonesia	Level	LNGINI	−1.732 (4)	−2.109 (4)	−1.781 (3)	−1.939 (3)
		LNFD	−1.591 (1)	−0.831 (1)	−2.825 (2)*	−1.285 (2)
		LNFDSQ	−1.476 (1)	−0.945 (1)	−2.240 (3)	−1.031 (3)
		LNGDP	−0.777 (0)	−2.577 (1)	−0.749 (1)	−2.229 (2)
		LNFDI	−2.664 (1)*	−2.636 (1)	−2.751 (2)*	−2.721 (2)
		LNTO	−3.434 (0)**	−3.029 (0)	−3.351 (2)**	−2.826 (2)
		LNINF	−2.508 (0)	−1.467 (0)	−2.286 (1)	−1.635 (1)
	First difference	LNGINI	−2.754 (3)*	−2.740 (3)	−3.753 (35)***	−3.505 (33)*
		LNFD	−4.884 (0)***	−5.024 (0)***	−4.882 (1)***	−5.024 (0)***
		LNFDSQ	−4.302 (0)***	−4.410 (0)***	−4.292 (10)***	−4.419 (1)***
		LNGDP	−5.016 (0)***	−4.975 (0)***	−4.984 (2)***	−4.943 (2)***
		LNFDI	−7.053 (0)***	−6.986 (0)***	−7.050 (2)***	−6.985 (2)***
		LNTO	−8.770 (0)***	−9.191 (0)***	−8.820 (1)***	−9.617 (3)***
		LNINF	−4.576 (0)***	−5.141 (0)***	−4.618 (1)***	−5.141 (0)***
Thailand	Level	LNGINI	−1.437 (0)	−1.387 (0)	−1.481 (1)	−1.502 (2)
		LNFD	−1.751 (0)	−1.139 (0)	−1.644 (1)	−1.139 (0)
		LNFDSQ	−1.416 (0)	−1.203 (0)	−1.416 (0)	−1.426 (1)
		LNGDP	−1.256 (1)	−1.661 (1)	−1.106 (3)	−1.249 (3)
		LNFDI	−2.650 (0)*	−3.267 (0)*	−2.527 (4)	−3.374 (3)*
		LNTO	−1.476 (0)	−1.423 (0)	−1.476 (0)	−1.399 (2)
		LNINF	−3.777 (1)***	−2.707 (1)	−5.183 (8)***	−1.333 (8)
	First difference	LNGINI	−5.479 (0)***	−5.395 (0)***	−5.479 (0)***	−5.395 (0)***
		LNFD	−5.046 (0)***	−5.073 (0)***	−5.041 (2)***	−5.072 (2)***
		LNFDSQ	−5.081 (0)***	−5.076 (0)***	−5.067 (1)***	−5.089 (2)***
		LNGDP	−4.012 (0)***	−4.125 (0)**	−4.012 (0)***	−4.125 (0)**
		LNFDI	−9.309 (0)***	−9.280 (0)***	−9.395 (1)***	−9.371 (1)***
		LNTO	−6.965 (0)***	−7.147 (0)***	−6.965 (1)***	−7.147 (0)***
		LNINF	−3.495 (0)**	−4.815 (0)***	−3.495 (0)**	−4.799 (3)***
Philippines	Level	LNGINI	−1.838 (0)	−2.602 (0)	−1.891 (1)	−2.602 (0)
		LNFD	−0.181 (0)	−2.540 (0)	−0.132 (3)	−2.540 (0)
		LNFDSQ	−0.031 (0)	−2.550 (0)	−0.005 (2)	−2.566 (1)
		LNGDP	0.343 (1)	−0.918 (1)	0.745 (3)	−0.439 (3)
		LNFDI	−3.106 (0)**	−3.885 (0)**	−2.966 (1)**	−3.885 (0)**
		LNTO	−1.376 (0)	−0.577 (0)	−1.409 (2)	−0.713 (2)
		LNINF	−4.558 (2)***	−0.551 (2)	−5.322 (8)***	−0.264 (12)
	First difference	LNGINI	−6.204 (0)***	−6.128 (0)***	−6.174 (4)***	−6.088 (4)***
		LNFD	−6.886 (0)***	−6.830 (0)***	−6.936 (4)***	−6.870 (4)***
		LNFDSQ	−6.959 (0)***	−6.930 (0)***	−6.965 (3)***	−6.935 (3)***
		LNGDP	−3.440 (0)**	−3.677 (1)**	−3.440 (0)**	−3.712 (1)**
		LNFDI	−9.364 (0)***	−9.279 (0)***	−13.373 (15)***	−13.090 (15)***
		LNTO	−5.402 (0)***	−5.603 (0)***	−5.371 (2)***	−5.603(1)***
		LNINF	−4.534 (0)***	−6.585 (1)***	−4.534 (0)***	−7.053 (19)***

1. ***,**,* represent 1%, 5% and 10% significant levels, respectively. 2. The optimal lag is selected using the Schwarz info criterion for ADF test and the bandwidth had been selected by using the Newey–West method for the PP test

The outcomes of both short-run and long-run elasticties are illustrated in Table 5. The attention is given only for lag 0 (grey area) for the outcomes of short -un elasticities for each variables. The results are explained according to each country's outcomes.

4.1. Malaysia

Based on the outcomes for Malaysia, it is found out that the financial sector development or financial deepening (LNFD) failed to influence the country's level of income distribution in the short run.

Table 3: Result of ARDL Cointegration

ASEAN-4	Maximum lag	Lag order (p,q,r,s,t,u,v)	F Statistic	Result
Malaysia	(4,4)	(1, 4, 4, 1, 3, 4, 4)	12.466***	Long run existed
Indonesia	(4,4)	(4, 4, 1, 2, 3, 3, 3)	8.218***	Long run existed
Thailand	(6,4)	(6, 4, 4, 2, 4, 4, 4)	15.465***	Long run existed
Philippines	(4,4)	(4, 4, 1, 4, 4, 4, 3)	4.375**	Long run existed
Critical Values for *F*-statistics#			Lower I(0)	Upper I(1)
1%			3.15	4.43
5%			2.45	3.61
10%			2.12	3.23

The critical values are obtained from Pesaran et al. (2001) based on case III: unrestricted intercept and no trend. *, **, and *** represent 10%, 5% and 1% level of significance, respectively

Table 4: Result of diagnostic checking

ASEAN-5	Serial correlation χ^2 (1) [p-value]	Functional form χ^2 (1) [p-value]	Normality χ^2 (2) [p-value]	Heteroscedasticity χ^2 (1) [p-value]
Malaysia	1.515 [0.256]	2.422 [0.141]	1.145 [0.564]	0.537 [0.922]
Indonesia	1.915 [0.186]	0.215 [0.821]	0.747 [0.688]	0.672 [0.821]
Thailand	4.301 [0.100]	0.000 [0.991]	2.269 [0.321]	0.709 [0.760]
Philippines	0.566 [0.584]	2.918 [0.115]	0.899 [0.637]	1.198 [0.383]

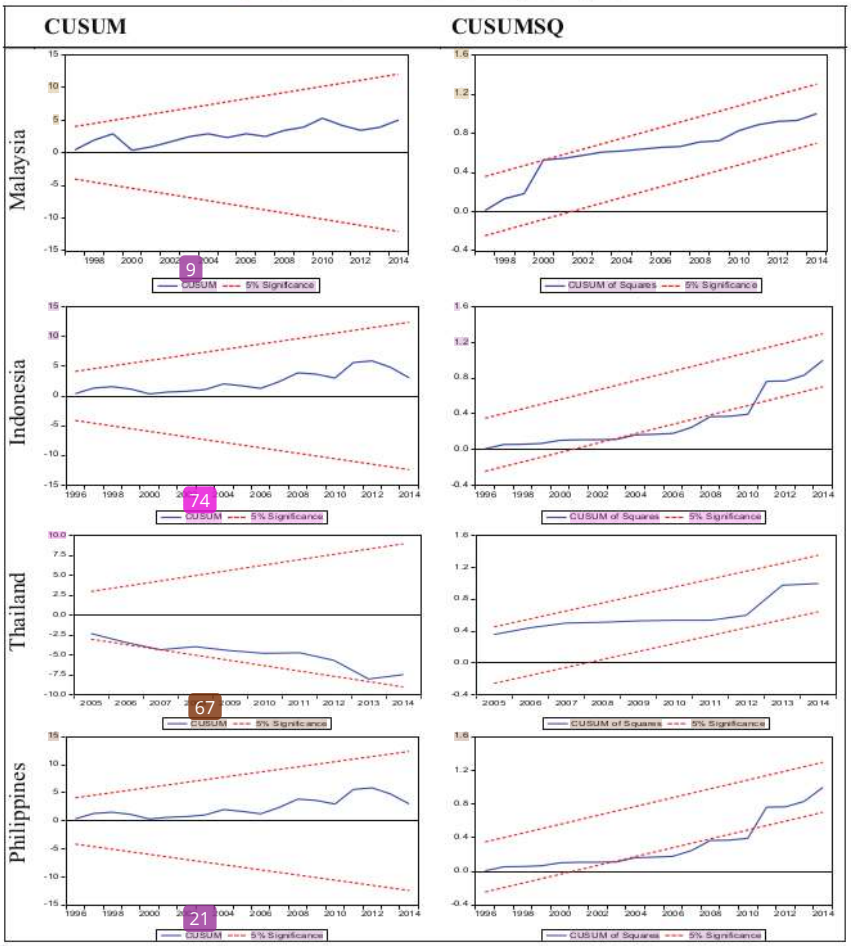
Note: The numbers in brackets [ ] are p-values.

Table 5: Estimation of short run and long run elasticities

Country/ARDL	Malaysia (1,4,4,1,3,4,4)	Indonesia (4,4,1,2,3,3,3)	Thailand (6,4,4,2,4,4,4)	Philippines (4,4,1,4,4,4,3)
Short run elasticities				
ΔLNGINI	-	-	-	-
$\Delta LNGINI_{-1}$	-	0.689***	0.251	0.458
$\Delta LNGINI_{-2}$	-	0.559***	−0.087	0.133
$\Delta LNGINI_{-3}$	-	−0.215	−0.602**	0.476
$\Delta LNGINI_{-4}$	-	-	0.291	-
$\Delta LNGINI_{-5}$	-	-	0.195	-
ΔLNFD	0.175	0.927	5.574***	−0.083
$\Delta LNFD_{-1}$	−0.056	0.226*	−5.003***	0.032
$\Delta LNFD_{-2}$	−0.627***	0.144	−0.718	−0.103*
$\Delta LNFD_{-3}$	0.625***	0.000	1.727*	0.078
ΔLNFDSQ	−0.019	−0.082	−0.637***	0.024
$\Delta LNFDSQ_{-1}$	0.008	-	0.525***	-
$\Delta LNFDSQ_{-2}$	0.068***	-	0.071	-
$\Delta LNFDSQ_{-3}$	−0.068***	-	−0.198*	-
ΔLNGDP	0.033*	0.112	−0.172	−0.595*
$\Delta LNGDP_{-1}$	-	0.112	−0.149	0.435
$\Delta LNGDP_{-2}$	-	-	-	-0.809***
$\Delta LNGDP_{-3}$	-	-	-	0.409*
ΔLNFDI	−0.001	−0.001	−0.004	−0.004
$\Delta LNFDI_{-1}$	-	−0.001	−0.009	0.028**
$\Delta LNFDI_{-2}$	0.001*	−0.039**	−0.020**	−0.005
$\Delta LNFDI_{-3}$	-	-	−0.015	0.029*
ΔLNTO	0.043***	−0.030	−0.073	0.111
$\Delta LNTO_{-1}$	0.018	−0.213***	0.190*	−0.049
$\Delta LNTO_{-2}$	−0.031**	−0.042	0.241**	0.179**
$\Delta LNTO_{-3}$	0.040***	-	−0.149**	−0.148**
ΔLNINF	0.104***	0.022	0.378**	−0.129
$\Delta LNINF_{-1}$	0.073	0.523**	0.633**	0.042
$\Delta LNINF_{-2}$	−0.138***	−0.808***	−0.182	−0.232**
$\Delta LNINF_{-3}$	0.080**	-	0.717***	-
Long run elasticities				
LNFD	3.659***	−6.702***	2.517***	−1.783*
LNFDSQ	−0.418***	0.984***	−0.243***	0.225*
LNGDP	−0.178***	−1.279***	0.2161**	−0.071
LNFDI	−0.015	0.112**	0.035	−0.07
LNTO	−0.112***	0.247	−0.438***	0.106*
LNINF	0.337***	0.502***	−0.130*	0.046
Constant	−8.005***	17.656***	−6.274***	2.885
ECT	−0.174***	−0.551***	−1.583***	−0.626*

Dependent variable is ΔLNGINI. *,**,*** indicates significant at 10%,5% and 1% significant level respectively. The ARDL estimation outcomes is generated using SIC

Figure 3: CUSUM and CUSUMSQ stability test



However, based on the long-run analysis, the deepening of financial development captured by both LNFD and LNFDSQ exhibited an inverted U shaped which validated existence of Financial Kuznets hypothesis. The improvement of income distribution due to the deepening of financial development is also supported by previous study done by Law and Tan (2009) and Ridzuan et al. (2019). Among the ASEAN-4 countries, Malaysia financial sector development have shown a huge progression as the country also have engaged in islamic banking and become pioneer in many islamic takaful product. Malaysia is positioning itself as the international provider and centre for Islamic fund and wealth management as a means of strengthening the current position as the global hub for Islamic finance (Securities Commission Malaysia, 2017). Thus, the strong and diversified fiancial product has helped to provide various jobs with decent income to the people. Based on the outcomes of economic growth (LNGDP), the results prevailed where it was recorded that the country's economic growth worsened the level of income distribution in the short run. Nevertheless, in the long run, the rapid economic growth experienced by this country redistributes income and makes the society more egalitarian. Statistically, 1% increase in LNGDP would worsen the income distribution by 0.03% in the short run, while it will be improved by 0.18% in the long run.

Next, it is found that foreign direct investment inflows (LNFDI) failed to statistically influenced the country's income distribution both in the short and long run. The expected sign for trade openness (LNTO) exhibits similar sign as LNGDP, where the deepening of trade liberalisation worsens the income distribution in the short run, while it improves the scenario only in the long run. Statistically, 1% increase in LNTO worsens the income distribution by 0.04%, while improves the condition by 0.11% in the long run. In addition, positive relationship is detected for inflation, LNINF of the country towards income distribution both in the short run as well as long run. Statistically, 1% increase in LNINF worsens the income distribution by 0.10% for short run and 0.34% for long-run elasticities.

4.2. Indonesia

Based on the lag 0 of the short-run elasticities, there were no single variables that significantly influenced Indonesia's income distribution. The outcomes based on different lag, however, showed mixed results. Thus, the focus of Indonesia elasticties will be entirely on long-run relationship. First, it was revealed that LNFD had a negative sign and was statistically significant at 1% level. This record indicated that the deepening of financial development could ease the national issue of greater income

inequality that has been overhelming the country since the past 20 years. The continous progress of the country's financial institutions has spread a benefit in the form of g ter wealth distribution to the local society. Besides, Indonesia has the largest Muslim population in the world and thus helped to facilitate and support the progre n of islamic financial product in the country. The LNFDSQ, on the other hand, displayed a positive and siginficant relationsh ith LNGINI, revealing that there was an existence of U shape of Financial Kuznets Curv this country; the maturing of financial institutions might not reduce the issue of greater income inequality in the future.The strict regulations improvised by the financial instituion have demotivated some people to borrow money to run their business, which influence the intake of n w worker into their operation. Besides LNFD, LNGDP was also found to have a significant and negative relationship with LNGINI in Indoensia. A 1% increase in economic growth improved the country's income distribution by 1.28%, which was considered as the largest among all indicators that influenced the country's income distribution. The remaining variables such as LNFDI and LNINF were found to have a positive sign and siginificant at 5% and 1% level. Technically, 1% increase in LNFDI and LNINF worsens the income distribution by 0.11% and 0.5%, respectively.

4.3. Thailand

The outcomes of Thailand revealed that both LNFD and LNINF were positiv d significantly influenced the country's income distribution in the short run. Technically, a 1% increase in LNFD and LNINF, increased the country's Gini coefficient by 5.57% and 0.38%, respectively. The rest of the variables were not signficant at any level, thus, failing to influence the income distribution. Based on long-run elasticities, it postulated that LNFD and LNFDSQ were significant at 1% level and its expected sign confirmed the validation of inverted Financial Kuznets Curve in this country. The deepening of financial development reached it maturation and the financial institutions were willing to ease their borrowing policy towards smaller companies, which then improve the income distribution in the country. Similar to Malaysia, Thailand's trade openness (LNTO) also helped to reduce the income inequality, with 0.44% reduce for each 1% increase in the international trade activities. The outcomes also showed that higher and prolonged inflation (LNINF) can reduce the income inequality, given that more companies are willing to provide an increment to their worker's salary in order to cope with the rising cost of living. Based on statiscal data, 1% increase in inflation reduced the income inquality or Gini coefficient by 0.13%.

4.4. Philippines

Philippines' economic growth, LNGDP, seemed to be the only variable in the short run that influenced the country's income distribution. The result showed that higher economic growth could help the country to reduce the income gap by 0.6%, for each 1% increase in LNGDP. However, the country's economic growth could only reduce the income distribution in th short run; it was not able to influence the income distribution in the long run. Meanwhile, based on the long-run coefficient outcomes, it is confirmed that the country experienced Financial Kuznets Curve just like Indonesia. This means that the deepening of financial institutions could worsen the country's income disparity problem. Similar to Indonesia, Philippines financial instituions are very strict in providing loan especially to a new borrower, thus limits these potential entrepreneur to run their own business. Additionally, LNTO was also found to have a positive sign, implying that deepening of international trade activities imposed greater income distortation.

4.5. ECT outcomes

As depicted in Table 5, the estimated lagged ECT in ARDL regression for the four developing ASEAN countries appear to be negative and statistically significant. Based on the ECT value, the highest speed of adjustment was obtained by Thailand (−1.58), followed by the Philippines (−0.62), Indonesia (−0.55), and Malaysia (−0.17). For instance, more than 158%, 62%, 55%, and 17% of adjustments were completed within less than a year for Thailand, whereas a year for Philippines, Indonesia and Malaysia due to short-run adjustment, which is considered as very rapid.

5. CONCLUSION AND POLICY RECOMMENDATION

In summary, the long-run analysis has detected the presence of inverted U-shaped Financial Kuznets hypothesis in Malaysia and Thailand, while the U-shaped Financial Kuznets curves were found in Indonesia and Philippines. This means that deepening of financial institutions has helped Malaysia and Thailand to reduce their income inequality trend, while the opposite effects were observed in Indonesia and Thailand.

The reformation of financial institutions in Malaysia and Thailand should be prolonged and among the recommended policies include easy accessibility for entrepreneurs to reach the wide range of financial services including conventional and Islamic financial products, the expansion of capital market, as well as giving proper attention to the financial sector. Granting the access to capital markets for low income groups or underprivileged individuals might be helpful to them either by developing entrepreneurial skill or involvement in productive activities and receive better salaries. Next, given that economic growth improved income distribution in Malaysia and Indonesia, the policymakers could propose a long-term economic planning that focuses on technological innovation and proper human capital development. These aspects are very crucial to encourage a sustained long-run growth path of a national economy besides providing better job prospects for citizens. As openness to trade improved income distribution in Malaysia and Thailand, policymakers could enhance the trading activities as a medium to generate employment opportunities, both for skilled and unskilled labor. Not only does an increase in interna nal trade activities promote economic growth, it als improves the income levels of the poor segments of population. This will therefore lead to a decline in income inequality. Last but not least, higher inflation has benefited the income distribution in Thailand. Therefore, policymakers need to ensure that any reformation such as financial reform leading towards inflation must overall bring about positive effect on economic growth as well as societal development by keeping the income distribution gap kept at minimum level.

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