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Financial Deepening and Implication for Financial Policy Coordination: The Case of Indonesia and Other Country in Asean (2000-2018)

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Abstract: *The main purpose of this research is to investigate the relation of trade openness, inflation, interest rate, exchange rate and HHI (Herfindahl-Hirschman Index) towards financial deepening such in ASEAN and to know how theoretical link between the independent variables and dependent variable. The measurement of financial deepening used in this study is the ratio of M2 / GDP of each country. The analysis uses panel data with random effect method to find the influence factor of financial deepening in ASEAN. The results showed that the variables of trade openness, inflation, foreign direct investment, interest rate and HHI have a significant effect on financial deepening.*

Keywords: data panel, ASEAN, financial deepening, trade openness, inflation, interest rate, exchange rate, HHI.

1. Introduction

In this year, economic growth and economic development has been viewed to be essentially linked to high level of monetization of an economy and invariably, (Ogbuagu, 2017). Many studies have examined the link between financial deepening and economic development as well as the link between financial development and real sector via economic growth from both micro and macro perspectives, example, (Levine, 2004), (Fitzgerald, 2008), (Nzotta and Okereke, 2009), etc. In this study we will look at how selected variable is linked to financial sector deepening. Few will doubt that Trade openness, Inflation, Real interest rate, Official exchange rate and hhi (Herfindahl-Hirschman Index) through access to financial services leads to improvement in people's lives. Claessen and Feijen, (2006) found that without a developed financial sector, for example, domestic savers and foreign investors would be more hesitant to part with their money to otherwise sound investments, resulting in lower economic output as measured by GDP and household welfare. Financial intermediation of growth leads to financial deepening, which refers to the greater financial resource mobilization in the formal financial sector and the ease in liquidity constraints of banks and enlargement of funds available to finance projects, (Fisher, 1933).

Several studies have employed methods for cross-sectional data analysis with a hope that the causalities between the variables of interest could be generalized (e.g., Yanikkaya, 2003; Harrison, 1996). The problem of using a cross-sectional method is that by grouping countries at different stages of trade openness, financial and economic development could not take into account the country-specific effects of trade openness and financial depth on economic development and vice versa. Particularly, it fails to explicitly address the potential biases arising from the existence of cross-country heterogeneity, which may lead to inconsistent and misleading estimates (Ghirmay, 2004; Casselli et al., 1996).

In Indonesia and neighbor countries, finance depth in it is necessary to ascertain if the financial regulators have maintained a good balancing between regulating the financial sector effectively for the determinants of financial deepening for policy coordination to work effectively at all levels of the economy and providing a good environment that will promote sufficient and widely accessible financial services with less systemic crises. Studies have shown that, several indicators of aggregate welfare has fallen dramatically in the aftermath of a disappointing financial sector reforms, severely affecting the most vulnerable and poorest people and resulting in a substantial welfare loss, (Honohan, 2004b), (Jalilian and Kirkpatrick, 2001). Although, high and sustainable economic growth is central to improvement of aggregate welfare, studies by Asenso-Okyere et al (1993) revealed that promotion of efficient, sufficient and widely accessible financial services (rural banking inclusive) is a key to achieving pro-poor growth and welfare gains. Financial deepening can affect aggregate welfare in various ways and in many outcomes. Most literature has shown that firms' and households' access to financial services rises with financial deepening, Beck et al (2006).

A well function of financial system creates strong incentives for investment in order to increase productivity. Foster trade and business-linkages in order to facilitate technology transfer and improved resources used. Provide broad access to assets and markets in order to build up the asset base of the poor as well as increase the returns to such assets. Remittances from abroad and domestic transfers are important source of income for the poor, thus, reducing vulnerability. Where financial sector deepening leads to lower costs, the poor will benefit from more secure and rapid transfers, and easier access to transferred funds. Also, they enable the poor to draw down accumulated savings and borrow to invest in income-enhancing assets and start micro enterprises, thus, wider access to financial services,

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generates employment which increase incomes and welfare gains, DFID (2004).

Based on the foregoing discussion, the study is designed to answer this critical question; how trade openness, inflation, real interest rate, official exchange rate and hhi, affect the financial deepening for financial policy coordination to promote sufficient and widely accessible financial services with less systemic crises?

The countries with a relatively well-developed financial sector have a comparative advantage in industries and sectors that rely on external finance (Kletzer and Bardhan, 1987). Extending this argument and allowing both sectors to use external finance, one being more credit intensive due to increasing returns to scale, the level of financial development is found to have an effect on the structure of the trade balance (Beck, 2002). On the one hand, reforming the financial sector might have implications for the trade balance if the level of financial development is a determinant of countries comparative advantage. On the other hand, the effect of trade reforms on the level and structure of the trade balance might depend on the level of financial development. More recently, in building a model with two sectors, one of which is financially extensive, (Do and Levchenko, 2004) find that openness to trade will affect demand for external finance, and thus financial depth, in the trading countries. In particular, their model predicts that in wealthy countries, trade should be related with faster financial development. On the contrary, in poor countries, more trade should slow financial development, because these countries import financially intensive goods rather than develop their own financial system.

Multi-causal linkages among trade openness, economic development and financial deepening emerge from the evidence that not only financial development impacts but the extent of financial activity itself depends positively on growth (e.g., Bencivenga and Smith, 1998). This is because the cost of financial services carries a fix component that falls with the volume of financial transactions. As such, financial markets will develop only when a threshold level of income is attained. But, if financial outcomes are endogenous to economic development, the question of interest would be how greater trade integration affects the state of financial development itself.

Gries et al. (2009) contends that linkages between financial depth and trade could allow for more complex paths to economic development. In particular, if increasing trade contributes to a higher level of financial development, this may promote economic growth where financial depth is found to enhance growth via the allocative and accumulative channels. But if financial deepening induces trade, it may subsequently foster economic development where openness to trade is found to be a growth factor.

Blackburn and Hung (1998) employs the well-known endogenous growth model of Romer (1990) to explore the multi-causal relationships among trade openness, economic growth and financial development. In the model, economic growth is driven by horizontal innovation in intermediate

goods, which are encouraged by expanding the markets for new goods, e.g., through trade liberalization. This implies that more firms would enter the research sector and seek for external financing of risky and independent research projects. As a result, the agency cost related to the need for depositors to monitor the intermediary portfolio is reduced. The reduction in the agency cost of financial intermediation leads to higher economic growth. This is because firms in the research sector start operating at positive profits and this encourages new firms to enter the market. The rate at which new process are invented is thus increased. This is an indirect financial market's gain from trade. Specifically, trade liberalization can accelerate innovations and the development of financial markets through scale effects. Hence, there theoretically exists a complementary relationship between trade and financial development.

2. Methodology

In this research, we used descriptive analysis and panel data regression analysis using Microsoft Excel software and Stata 13. Descriptive Analysis to describe the data of each variable for each country with Microsoft Excel software through diagrams and histograms. Interpret or describe data for each variable based on diagrams and histograms. The regression analysis of panel data used in the study aims to determine the effect of independent variables on the dependent variable, as well as to see the positions of intercept or cross effect during the study period Mercan et al (2013) and Bibi et al (2014). The type of data used in this study is secondary data in the form of panel data, which is a combination of time series data and cross section data. The time series data in the study consisted of 2000 quarter 1 – 2018 quarter 2 and cross sections covering 10 countries in ASEAN. The data in the study were obtained from several international institutional database sources such as ADB, World Bank, IMF and various other sources related to the research.

Quarterly time-series observations are used as they are sufficient to ensure the quality of the analysis, as argued by Hakkio and Rush (1991). The choice of the countries to be included in the sample of this study is due to the availability of comprehensive data set. As for economic development, the trade openness is used and labeled as to. For trade openness, the sum of exports plus imports to value added is used because this measure is a simple and common indicator of trade openness as suggested by Harrison (1996). The inflation is used and labeled as X3 because this captures the macroeconomic environment. The real interest rate is used labeled as X4, exchange rate is used and labeled as X5. The panel data regression model is formulated in the form of the equation below:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \mu_i + \epsilon_{it} \dots \dots \dots (1)$$

Statis form:

$$(Y)_{it} = \alpha + \beta_1 (X_1)_{it} + \beta_2 (X_2)_{it} + \beta_3 (X_3)_{it} + \beta_4 (X_4)_{it} + \beta_5 (X_5)_{it} + \alpha_i + \epsilon_{it} \dots (2)$$

$$(FD)_{it} = \alpha + \beta_1 (TO)_{it} + \beta_2 (EXR)_{it} + \beta_3 (INT)_{it} + \beta_4 (INF)_{it} + \beta_5 (HHI)_{it} + \alpha_i + \epsilon_{it} \dots \dots \dots (3)$$

Dimana:

Y = FD, financial deepening

- $x_1 = TO$, trade openness
- $x_2 = EXR$, exchange rate
- $x_3 = INT$, interest rate
- $x_4 = INF$, inflation
- $x_5 = HHI$, Herfindahl-Hirschman Index

This research uses regression analysis of panel data. The regression analysis of panel data in the study used the best model approach between common effect, fixed effect and random effect determined based on Hausman test, Chow test and Lagrange Multiplier test. In panel data regression analysis requires classical assumption test such as heteroscedasticity, autocorrelation and multicollinearity.

- Chow test. is a test of whether the true coefficients in two linear regressions on different data sets are equal. In econometrics, it is most commonly used in time series analysis to test for the presence of a structural break at a period which can be assumed to be known a priori (for instance, a major historical event such as a war). In program evaluation, the Chow test is often used to determine whether the independent variables have different impacts on different subgroups of the population. Basically, to choose between common effect and fix effect model. If, $p\text{-value} < \alpha$, we used fix effect.

$$F = \frac{RSS_c - (RSS_1 + RSS_2) / k}{RSS_1 + RSS_2 / n - 2k}$$

- Hausman Test. The specification test devised by Hausman is used to test for whether the random effects are independent of the right hand side variables. This is a general test to compare any two estimators. The test is based on the assumption that under the hypothesis of no correlation between the right hand side variables and the random effects both fixed effects and random effects are consistent estimators of but fixed effects is inefficient (This is the assumption with random effects). Whereas under the alternative assumption (i.e. that with fixed effects) fixed effects is consistent but random effects is not. The test is based on the following Wald statistic:

$$W = [\beta_{FE} - \beta_{RE}]' \Psi^{-1} [\beta_{FE} - \beta_{RE}], \text{ where}$$

$$\text{Var}[\beta_{FE} - \beta_{RE}] = \text{Var}[\beta_{FE}] - \text{Var}[\beta_{RE}] = \Psi$$

W is distributed as X^2 with $(K-1)$ degrees of freedom where K is the number of parameters in the model. If W is greater than the critical value obtained from the table then we reject the null hypothesis of that both estimators are consistent i.e. of “no correlation between the right hand side variables and the ‘random effects’” in which case the fixed effects model is better.

- The Lagrange Multiplier test is used for detecting autocorrelation and to choose between random effect and common effect model.

$$y_t = \alpha + \beta x_t + u_t$$

$$u_t = \delta_0 + \delta_1 x_t + \delta_2 u_{t-1} + \delta_3 u_{t-2} + \varepsilon_t$$

An hypothesis that is often times tested when estimating a random-effects model is the null hypothesis of no random effects (classical linear regression model is the appropriate model) against the alternative hypothesis of random effects

(random-effects model is the appropriate model). This hypothesis is specified as follows

$H_0: \sigma_\omega^2 = 0$ (Classical linear regression model is appropriate)

$H_1: \sigma_\omega^2 \neq 0$ (Random-effects model is appropriate)

- Note that if $\sigma_\omega^2 = 0$ then each unit has the same intercept, and therefore the classical linear regression model is the appropriate model. If $\sigma_\omega^2 \neq 0$ then different units have different intercepts, and therefore the random-effects model is the appropriate model.

3. Analysis and Result

Financial deepening as noted before means an increase in the supply of financial assets in the economy. It is important to develop some models of the widest range of financial assets, including money. The sum total of all the financial assets is one broad measure that represents financial deepening. The range of financial assets to be considered in this study as measures of financial deepening include, ratio of broad money (M2) to GDP, trade openness, inflation, real interest rate, official exchange rate and hhi.

Test Result: The model specification test conducted in this research is Hausman Test which is aimed to have the accuracy of the model used between fixed effect or random effect. From the table below we can see that $\text{prob} > \chi^2$ is not positive definite so this model is appropriate in random effect model.

Table 1: Hausman Test

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fe	(B) re		
to	-.2380689	-.2380689	0	0
exr	.3359145	.3359145	0	0
intr	-.0171077	-.0171077	0	0
inf	-.0113811	-.0113811	0	0
hhi	-4.619771	-4.619771	0	0

```

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained
from xtreg
::Ho: difference in coefficients not systematic
chi2(0) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 0.00
Prob>chi2 = .
(V_b-V_B is not positive definite)
    
```

Source: stata 13, computed by researcher

The next model specification test is Lagrange Test. That test is intended to have the accuracy of the model used between random effect or a common effect. From the table below we can see that $\text{prob} > \chi^2 < \alpha$ (0,05) so this model is appropriate in random effect model.

Table 2: Lagrange Multiplier Test

Estimated results:

	Var	sd = sqrt(Var)
fd	1.564849	1.250939
e	.1355777	.3682088
u	.272224	.5217509

Test: Var(u) = 0

chibar2(01) = 2290.18

Prob > chibar2 = 0.0000

Source: stata 13, computed by researcher

Table 3: Heteroskedasticity and Autocorrelation Test

Cross-sectional time-series FGLS regression
 Coefficients: generalised least squares
 Panels: homoskedastic
 Correlation: no autocorrelation
 Estimated covariances = 1
 Estimated autocorrelations = 0
 Estimated coefficients = 6
 Log likelihood = -820.3995

fd	Coef.	Std. Err.	z
to	.1924529	.0175844	10.94
exr	-.2703201	.0173891	-15.55
intr	-.0063333	.0066763	-0.95
inf	-.0567281	.0041091	-13.81
hhi	-3.509191	.5507043	-6.37
_cons	-1.684542	.265224	-4.61

Source: stata 13, computed by researcher

There is no heteroscedasticity and autocorrelation in the model so that the model we used is appropriate and valid.

Table 4: Multicolinierity Test

Variable	VIF	1/VIF
exr	6.52	0.153483
to	6.40	0.156256
intr	5.70	0.175410
hhi	2.99	0.335003
inf	1.61	0.619534
Mean VIF	4.64	

Source: stata 13, computed by researcher

The value of mean VIF is less than 10 which is mean that there is no multicollinierity in this model.

Table 5: Regression with Random Effect Model

fd	Coef.	Std. Err.	z	P> z
to	-.2380689	.0419134	-5.68	0.000
exr	.3359145	.0196934	17.06	0.000
intr	-.0171077	.0039167	-4.27	0.000
inf	-.0113811	.0025628	-4.44	0.000
hhi	-4.619771	.3603748	-12.82	0.000
_cons	4.785085	.9079365	5.27	0.000
sigma_u	.52175093			
sigma_e	.36820883			

R-square shows the value is smaller than the critical value of α so that the data is distributed evenly. It is also show that dependency between all independent variables and dependent variable is 79,52%. the rest is affected by variables outside the model.

F-test shows the value 0,000 which is means all independent variables simultaneously have a significant effect on dependent variable.

Z-test (partial test) shows that all variable, trade openness, exchange rate, interest rate, inflation and hhi showed to be

significant at the 5% level because all of them show a value below 0.05.

Then the regression equation is:

$$(FD)_{it} = \alpha - 0,238 (TO)_{it} + 0,336(EXR)_{it} - 0,017 (INTR)_{it} + 0,011(INF)_{it} - 4,62(HHI)_{it}$$

From the regression table above we could see that trade openness has a negative correlation to financial deepening which is means the higher the trade openness the weaker the economy. Sethapramote (2010) argues that ASEAN’s external-oriented economy has relatively small output growth relying on international trade movements, but is highly dependent on international financial channels as movements in the financial channel create a marginal effect on domestic consumption and international capital flows.

4. Conclusion

As conclusion in this research that partially or simultaneously openness of trade (export and import) have negative and significant impact to financial deepening. a negative effect which means increase in trade openness will decrease the financial deepening. Strengthening exports sector and minimalize import can improve value added so that financial deepening will improve and aggregate welfare of ASEAN countries can be increased.

Besides, maintaining exchange rate stability and strengthening the currency of both countries to maintain financial security for the 1998 crisis does not happen again. Strengthening the currency will also bring an increase for financial deepening. Some of the things that governments or policy makers can do to boost the economy in Indonesia and Thailand include: boosting export growth through commodity exports that have comparative advantages, importing for certain commodities such as production raw materials, setting taxes to restrict imports of goods consumptive and luxurious, and optimizing the use of L/C in all international trade transactions in every leading commodity, so that the source of income received from trade channels can increase and be able to suppress current account deficit. Then on the financial channel can be done several steps such as providing incentives to investors who do long-term reinvestment, and the government can strengthen institutions that are tasked to oversee international trade and finance activities, so that some privileges are set directed to the right sector.

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Financial Deepening and Implication for Financial Policy Coordination: The Case of Indonesia and Other Country in Asean (2000-2018)

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Abstract: *The main purpose of this research is to investigate the relation of trade openness, inflation, interest rate, exchange rate and HHI (Herfindahl-Hirschman Index) towards financial deepening such in ASEAN and to know how theoretical link between the independent variables and dependent variable. The measurement of financial deepening used in this study is the ratio of M2 / GDP of each country. The analysis uses panel data with random effect method to find the influence factor of financial deepening in ASEAN. The results showed that the variables of trade openness, inflation, foreign direct investment, interest rate and HHI have a significant effect on financial deepening.*

Keywords: data panel, ASEAN, financial deepening, trade openness, inflation, interest rate, exchange rate, HHI.

1. Introduction

In this year, economic growth and economic development has been viewed to be essentially linked to high level of monetization of an economy and invariably, (Ogbuagu, 2017). Many studies have examined the link between financial deepening and economic development as well as the link between financial development and real sector via economic growth from both micro and macro perspectives, example, (Levine, 2004), (Fitzgerald, 2008), (Nzotta and Okereke, 2009), etc. In this study we will look at how selected variable is linked to financial sector deepening. Few will doubt that Trade openness, Inflation, Real interest rate, Official exchange rate and hhi (Herfindahl-Hirschman Index) through access to financial services leads to improvement in people's lives. Claessen and Feijen, (2006) found that without a developed financial sector, for example, domestic savers and foreign investors would be more hesitant to part with their money to otherwise sound investments, resulting in lower economic output as measured by GDP and household welfare. Financial intermediation of growth leads to financial deepening, which refers to the greater financial resource mobilization in the formal financial sector and the ease in liquidity constraints of banks and enlargement of funds available to finance projects, (Fisher, 1933).

Several studies have employed methods for cross-sectional data analysis with a hope that the causalities between the variables of interest could be generalized (e.g., Yanikkaya, 2003; Harrison, 1996). The problem of using a cross-sectional method is that by grouping countries at different stages of trade openness, financial and economic development could not take into account the country-specific effects of trade openness and financial depth on economic development and vice versa. Particularly, it fails to explicitly address the potential biases arising from the existence of cross-country heterogeneity, which may lead to inconsistent and misleading estimates (Ghirnay, 2004; Casselli et al., 1996).

In Indonesia and neighbor countries, finance depth in it is necessary to ascertain if the financial regulators have maintained a good balancing between regulating the financial sector effectively for the determinants of financial deepening for policy coordination to work effectively at all levels of the economy and providing a good environment that will promote sufficient and widely accessible financial services with less systemic crises. Studies have shown that, several indicators of aggregate welfare has fallen dramatically in the aftermath of a disappointing financial sector reforms, severely affecting the most vulnerable and poorest people and resulting in a substantial welfare loss, (Honohan, 2004b), (Jalilian and Kirkpatrick, 2001). Although, high and sustainable economic growth is central to improvement of aggregate welfare, studies by Asenso-Okyere et al (1993) revealed that promotion of efficient, sufficient and widely accessible financial services (rural banking inclusive) is a key to achieving pro-poor growth and welfare gains. Financial deepening can affect aggregate welfare in various ways and in many outcomes. Most literature has shown that firms' and households' access to financial services rises with financial deepening, Beck et al (2006).

A well function of financial system creates strong incentives for investment in order to increase productivity. Foster trade and business-linkages in order to facilitate technology transfer and improved resources used. Provide broad access to assets and markets in order to build up the asset base of the poor as well as increase the returns to such assets. Remittances from abroad and domestic transfers are important source of income for the poor, thus, reducing vulnerability. Where financial sector deepening leads to lower costs, the poor will benefit from more secure and rapid transfers, and easier access to transferred funds. Also, they enable the poor to draw down accumulated savings and borrow to invest in income-enhancing assets and start micro enterprises, thus, wider access to financial services,

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generates employment which increase incomes and welfare gains, DFID (2004).

Based on the foregoing discussion, the study is designed to answer this critical question; how trade openness, inflation, real interest rate, official exchange rate and hhi, affect the financial deepening for financial policy coordination to promote sufficient and widely accessible financial services with less systemic crises?

The countries with a relatively well-developed financial sector have a comparative advantage in industries and sectors that rely on external finance (Kletzer and Bardhan, 1987). Extending this argument and allowing both sectors to use external finance, one being more credit intensive due to increasing returns to scale, the level of financial development is found to have an effect on the structure of the trade balance (Beck, 2002). On the one hand, reforming the financial sector might have implications for the trade balance if the level of financial development is a determinant of countries comparative advantage. On the other hand, the effect of trade reforms on the level and structure of the trade balance might depend on the level of financial development. More recently, in building a model with two sectors, one of which is financially extensive, (Do and Levchenko, 2004) find that openness to trade will affect demand for external finance, and thus financial depth, in the trading countries. In particular, their model predicts that in wealthy countries, trade should be related with faster financial development. On the contrary, in poor countries, more trade should slow financial development, because these countries import financially intensive goods rather than develop their own financial system.

Multi-causal linkages among trade openness, economic development and financial deepening emerge from the evidence that not only financial development impacts but the extent of financial activity itself depends positively on growth (e.g., Bencivenga and Smith, 1998). This is because the cost of financial services carries a fix component that falls with the volume of financial transactions. As such, financial markets will develop only when a threshold level of income is attained. But, if financial outcomes are endogenous to economic development, the question of interest would be how greater trade integration affects the state of financial development itself.

Gries et al. (2009) contends that linkages between financial depth and trade could allow for more complex paths to economic development. In particular, if increasing trade contributes to a higher level of financial development, this may promote economic growth where financial depth is found to enhance growth via the allocative and accumulative channels. But if financial deepening induces trade, it may subsequently foster economic development where openness to trade is found to be a growth factor.

Blackburn and Hung (1998) employs the well-known endogenous growth model of Romer (1990) to explore the multi-causal relationships among trade openness, economic growth and financial development. In the model, economic growth is driven by horizontal innovation in intermediate

goods, which are encouraged by expanding the markets for new goods, e.g., through trade liberalization. This implies that more firms would enter the research sector and seek for external financing of risky and independent research projects. As a result, the agency cost related to the need for depositors to monitor the intermediary portfolio is reduced. The reduction in the agency cost of financial intermediation leads to higher economic growth. This is because firms in the research sector start operating at positive profits and this encourages new firms to enter the market. The rate at which new process are invented is thus increased. This is an indirect financial market's gain from trade. Specifically, trade liberalization can accelerate innovations and the development of financial markets through scale effects. Hence, there theoretically exists a complementary relationship between trade and financial development.

2. Methodology

In this research, we used descriptive analysis and panel data regression analysis using Microsoft Excel software and Stata 13. Descriptive Analysis to describe the data of each variable for each country with Microsoft Excel software through diagrams and histograms. Interpret or describe data for each variable based on diagrams and histograms. The regression analysis of panel data used in the study aims to determine the effect of independent variables on the dependent variable, as well as to see the positions of intercept or cross effect during the study period Mercan et al (2013) and Bibi et al (2014). The type of data used in this study is secondary data in the form of panel data, which is a combination of time series data and cross section data. The time series data in the study consisted of 2000 quarter 1 – 2018 quarter 2 and cross sections covering 10 countries in ASEAN. The data in the study were obtained from several international institutional database sources such as ADB, World Bank, IMF and various other sources related to the research.

Quarterly time-series observations are used as they are sufficient to ensure the quality of the analysis, as argued by Hakkio and Rush (1991). The choice of the countries to be included in the sample of this study is due to the availability of comprehensive data set. As for economic development, the trade openness is used and labeled as to. For trade openness, the sum of exports plus imports to value added is used because this measure is a simple and common indicator of trade openness as suggested by Harrison (1996). The inflation is used and labeled as X3 because this captures the macroeconomic environment. The real interest rate is used labeled as X4, exchange rate is used and labeled as X5. The panel data regression model is formulated in the form of the equation below:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \mu_i + \epsilon_{it} \dots \dots \dots (1)$$

Statis form:

$$(Y)_{it} = \alpha + \beta_1 (X_1)_{it} + \beta_2 (X_2)_{it} + \beta_3 (X_3)_{it} + \beta_4 (X_4)_{it} + \beta_5 (X_5)_{it} + \alpha_i + \epsilon_{it} \dots (2)$$

$$(FD)_{it} = \alpha + \beta_1 (TO)_{it} + \beta_2 (EXR)_{it} + \beta_3 (INT)_{it} + \beta_4 (INF)_{it} + \beta_5 (HHI)_{it} + \alpha_i + \epsilon_{it} \dots \dots \dots (3)$$

Dimana:

Y = FD, financial deepening

- x_1 = TO, *trade openness*
- x_2 = EXR, *exchange rate*
- x_3 = INT, *interest rate*
- x_4 = INF, *inflation*
- x_5 = HHI, *Herfindahl-Hirschman Index*

This research uses regression analysis of panel data. The regression analysis of panel data in the study used the best model approach between common effect, fixed effect and random effect determined based on Hausman test, Chow test and Lagrange Multiplier test. In panel data regression analysis requires classical assumption test such as heteroscedasticity, autocorrelation and multicollinearity.

- Chow test. is a test of whether the true coefficients in two linear regressions on different data sets are equal. In econometrics, it is most commonly used in time series analysis to test for the presence of a structural break at a period which can be assumed to be known a priori (for instance, a major historical event such as a war). In program evaluation, the Chow test is often used to determine whether the independent variables have different impacts on different subgroups of the population. Basically, to choose between common effect and fix effect model. If, $p\text{-value} < \alpha$, we used fix effect.

$$F = \frac{RSS_c - (RSS_1 + RSS_2) / k}{RSS_1 + RSS_2 / n - 2k}$$

- Hausman Test. The specification test devised by Hausman is used to test for whether the random effects are independent of the right hand side variables. This is a general test to compare any two estimators. The test is based on the assumption that under the hypothesis of no correlation between the right hand side variables and the random effects both fixed effects and random effects are consistent estimators of but fixed effects is inefficient (This is the assumption with random effects). Whereas under the alternative assumption (i.e. that with fixed effects) fixed effects is consistent but random effects is not. The test is based on the following Wald statistic:

$$W = [\beta_{FE} - \beta_{RE}]' \Psi^{-1} [\beta_{FE} - \beta_{RE}], \text{ where } \text{Var}[\beta_{FE} - \beta_{RE}] = \text{Var}[\beta_{FE}] - \text{Var}[\beta_{RE}] = \Psi$$

W is distributed as X^2 with (K-1) degrees of freedom where K is the number of parameters in the model. If W is greater than the critical value obtained from the table then we reject the null hypothesis of that both estimators are consistent i.e. of "no correlation between the right hand side variables and the 'random effects'" in which case the fixed effects model is better.

- The Lagrange Multiplier test is used for detecting autocorrelation and to choose between random effect and common effect model.

$$y_t = \alpha + \beta x_t + u_t$$

$$u_t = \delta_0 + \delta_1 x_t + \delta_2 u_{t-1} + \delta_3 u_{t-2} + \varepsilon_t$$

An hypothesis that is often times tested when estimating a random-effects model is the null hypothesis of no random effects (classical linear regression model is the appropriate model) against the alternative hypothesis of random effects

(random-effects model is the appropriate model). This hypothesis is specified as follows

$H_0: \sigma_o^2 = 0$ (Classical linear regression model is appropriate)

$H_1: \sigma_o^2 \neq 0$ (Random-effects model is appropriate)

- Note that if $\sigma_o^2 = 0$ then each unit has the same intercept, and therefore the classical linear regression model is the appropriate model. If $\sigma_o^2 \neq 0$ then different units have different intercepts, and therefore the random-effects model is the appropriate model.

3. Analysis and Result

Financial deepening as noted before means an increase in the supply of financial assets in the economy. It is important to develop some models of the widest range of financial assets, including money. The sum total of all the financial assets is one broad measure that represents financial deepening. The range of financial assets to be considered in this study as measures of financial deepening include, ratio of broad money (M2) to GDP, trade openness, inflation, real interest rate, official exchange rate and hhi.

Test Result: The model specification test conducted in this research is Hausman Test which is aimed to have the accuracy of the model used between fixed effect or random effect. From the table below we can see that $\text{prob} > \chi^2$ is not positive definite so this model is appropriate in random effect model.

Table 1: Hausman Test

Coefficients	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
to	-.2280689	-.2280689	0	0
exr	.2259145	.2259145	0	0
int	-.0171077	-.0171077	0	0
inf	-.0113811	-.0113811	0	0
hhi	-4.619771	-4.619771	0	0

b = consistent under Ho and Ha: obtained from xtreg
 B = inconsistent under Ha, efficient under Ho: obtained from xtreg

::No: difference in coefficients not systematic
 $\chi^2(0) = (b-B)' [(V_b-V_B)^{-1}] (b-B)$
 $= 0.00$
 $\text{Prob} > \chi^2 = .$
 (V_b-V_B is not positive definite)

Source: stata 13, computed by researcher

The next model specification test is Lagrange Test. That test is intended to have the accuracy of the model used between random effect or a common effect. From the table below we can see that $\text{prob} > \chi^2 < \alpha$ (0,05) so this model is appropriate in random effect model.

Table 2: Lagrange Multiplier Test

Estimated results:

	Var	sd = sqrt(Var)
fd	1.564849	1.250939
e	.1355777	.3682088
u	.272224	.5217509

Test: Var(u) = 0

chibar2(01) = 2290.18

Prob > chibar2 = 0.0000

Source: stata 13, computed by researcher

Table 3: Heteroskedasticity and Autocorrelation Test

Cross-sectional time-series FGLS regression
Coefficients: generalised least squares
Fpanels: homoskedastic
Correlation: no autocorrelation
Estimated covariances = 1
Estimated autocorrelations = 0
Estimated coefficients = 6
Log likelihood = -820.3995

fd	Coef.	Std. Err.	z
to	.1924529	.0175844	10.94
exr	-.2703201	.0173891	-15.55
intr	-.0063223	.0066763	-0.95
inf	-.0567281	.0041091	-13.81
hhi	-3.509191	.5507043	-6.37
_cons	-1.684542	.365224	-4.61

Source: stata 13, computed by researcher

There is no heteroscedasticity and autocorrelation in the model so that the model we used is appropriate and valid.

Table 4: Multicollinearity Test

Variable	VIF	1/VIF
exr	6.52	0.153483
to	6.40	0.156256
intr	5.70	0.175410
hhi	2.99	0.335003
inf	1.61	0.619524
Mean VIF	4.64	

Source: stata 13, computed by researcher

The value of mean VIF is less than 10 which is mean that there is no multicollinearity in this model.

Table 5: Regression with Random Effect Model

fd	Coef.	Std. Err.	z	P> z
to	-.2380689	.0419134	-5.68	0.000
exr	.3359145	.0196934	17.06	0.000
intr	-.0171077	.0039167	-4.37	0.000
inf	-.0113811	.0025628	-4.44	0.000
hhi	-4.619771	.3602748	-12.82	0.000
_cons	4.785085	.9079265	5.27	0.000
sigma_u	.52175093			
sigma_e	.36820883			

R-square shows the value is smaller than the critical value of α so that the data is distributed evenly. It is also show that dependency between all independent variables and dependent variable is 79,52%. the rest is affected by variables outside the model.

F-test shows the value 0,000 which is means all independent variables simultaneously have a significant effect on dependent variable.

Z-test (partial test) shows that all variable, trade openness, exchange rate, interest rate, inflation and hhi showed to be

significant at the 5% level because all of them show a value below 0.05.

Then the regression equation is:

$$(FD)_t = \alpha - 0,238 (TO)_t + 0,336(EXR)_t - 0,017 (INTR)_t + 0,011(INF)_t - 4,62(HHI)_t$$

From the regression table above we could see that trade openness has a negative correlation to financial deepening which is means the higher the trade openness the weaker the economy. Sethapramote (2010) argues that ASEAN's external-oriented economy has relatively small output growth relying on international trade movements, but is highly dependent on international financial channels as movements in the financial channel create a marginal effect on domestic consumption and international capital flows.

4. Conclusion

As conclusion in this research that partially or simultaneously openness of trade (export and import) have negative and significant impact to financial deepening. a negative effect which means increase in trade openness will decrease the financial deepening. Strengthening exports sector and minimize import can improve value added so that financial deepening will improve and aggregate welfare of ASEAN countries can be increased.

Besides, maintaining exchange rate stability and strengthening the currency of both countries to maintain financial security for the 1998 crisis does not happen again. Strengthening the currency will also bring an increase for financial deepening. Some of the things that governments or policy makers can do to boost the economy in Indonesia and Thailand include: boosting export growth through commodity exports that have comparative advantages, importing for certain commodities such as production raw materials, setting taxes to restrict imports of goods consumptive and luxurious, and optimizing the use of L/C in all international trade transactions in every leading commodity, so that the source of income received from trade channels can increase and be able to suppress current account deficit. Then on the financial channel can be done several steps such as providing incentives to investors who do long-term reinvestment, and the government can strengthen institutions that are tasked to oversee international trade and finance activities, so that some privileges are set directed to the right sector.

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Surakarta, 09 APR 2020

Reviewer 1**

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