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On the relation between foreign direct investment and regional income inequality towards ASEAN's economic integration

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Abstract

This study examines the impacts of foreign direct investment, regional economic integration, and human capital development on regional income inequality in the Association of Southeast Asian Nations. Using panel cointegration and causality techniques, the empirical evidence illustrates that ASEAN's income inequality is sensitive to foreign direct investment, whereas it has no relation to regional economic integration and human capital. Moreover, to achieve the equitable development in ASEAN, the slow-but-sure policy on regional complementarity will alleviate the economic development gap across ASEAN countries rather than the competitive policy with fast-and-furious.

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1. INTRODUCTION

In the past decade, the Association of Southeast Asian Nations (ASEAN) has been experiencing a transition from an international market-driven economy to a regional market-driven economy. The crucial factors driving this matter forward are obviously a result of globalization, regional economic integration, the surge of trade and foreign direct investment (FDI) and geographical economic development. Indeed, the age of regionalization in ASEAN has been seen since the declaration to create ASEAN Economic Community (AEC) in 2003. The AEC is an ideology that leads ASEAN countries to become regionalization. Under the AEC paradigm this region will achieve completely free flows of goods, services, investment and skilled labor, freer flows of capital, and equitable development by 2015. It is believed that the higher the FDI inflows to ASEAN, the higher the ASEAN's economic growth. Consequently, upstream and downstream market development results in the FDI-led growth for employment creation and equality. From World Bank database (2012), an income inequality (proxied by GINI index) in ASEAN ranged from 0.35 to 0.46 in the current year. Malaysia and the Philippines have somewhat higher GINI index than others with 0.43 and 0.46, respectively. During 2005-2011, an income inequality in most of ASEAN members has been declining, whereas it has been raising only in Indonesia and Malaysia. Moreover, with robust AEC roadmap, ASEAN has made great strides in an equality development in this region. The income gap between ASEAN-5 (Indonesia, Malaysia, the Philippines, Singapore, Thailand) and CLMV (Cambodia, the Lao People's Democratic Republic, Myanmar, Viet Nam) are gradually diminishing due to the growth of FDI inflows. However, the results of existing studies apparently indicated that the relationship between income inequality and inward FDI is either negative or positive. Thereby, regional equality development becomes an issue which receives considerable attention among governments, researchers, economists, geographers and policy makers in ASEAN.

Until now, there were a number of studies to determine the influences of globalization on income inequality, especially the impacts of FDI, trade and economic integration. The theoretical and empirical evidence on FDI and inequality were yet mixed (Li and Wei, 2010; Basu and Guariglia, 2007; Barrios and Strobl, 2009; Cheng and Li, 2006). Typically, empirical analysis yielded a negative relationship between income inequality and globalization factors such as Herzer and Nunnenkamp (2011) and Chintrakarn et al. (2012), while the contradictory result was found in the studies of Basu and Guariglia (2007), Yu et al. (2011), Herzer and Nunnenkamp (2011) and Choi (2006). Moreover, there has been extensive research on the impacts of human capital development on income inequality and FDI (Mughal and Diawara, 2011; Fleisher et al., 2010; Mughal and Vechiu, 2010). The first of three studies showed the paradoxical conclusions on the relationship between human capital development and income inequality, whereas Mughal and Vechiu (2010) indicated the positive linkage of human capital and FDI. However, the relative importance of these contributing factors on income inequalities in ASEAN members is still lacked currently. Hence, the interactions between FDI, regional economic integration and human capital on ASEAN's income equality development deserve more research efforts. In particular, the question is whether the entry of multinational enterprises improves or worsens the ASEAN's equality development. Therefore, in order to fill this gap, this study focuses on the long-run impacts of FDI, regional economic integration and human capital on income inequality in the ASEAN economy.

The paper is organized as follows. Section 2 discusses the stylized facts of FDI inflows to ASEAN. In section 3, we describe the research methodology and data source, and discuss the empirical results. Section 4 concludes the paper.

2. OVERVIEW OF THE FOREIGN DIRECT INVESTMENT IN ASEAN

This section focuses attention on the stylized facts of foreign direct investment to ASEAN. Figure 1 presents FDI inflows to ASEAN as a percentage of GDP during 1998-2010, comparing with the GDP per capita. The ASEAN has seen a twofold increase in its FDI/GDP from 1998 and 2010 with an increase in Intra-ASEAN FDI by 9.86% and Extra-ASEAN FDI by 2.72%, whereas there was approximately a sevenfold increase in its GDP per capita. With the high average growth in Intra-ASEAN FDI, it implied its importance itself to ASEAN economy. Inward FDI is not only a driver of economic growth and development in ASEAN, but also a potential engine in the ASEAN economic recovery from the 1997 Asian financial crises and the 2008 global economic crisis. It has also appeared the sharp increase in FDI/GDP ratio in 2010 by 4.12% from the previous year, with an increase in extra-ASEAN FDI 3.46% and in intra-ASEAN FDI 0.66%.

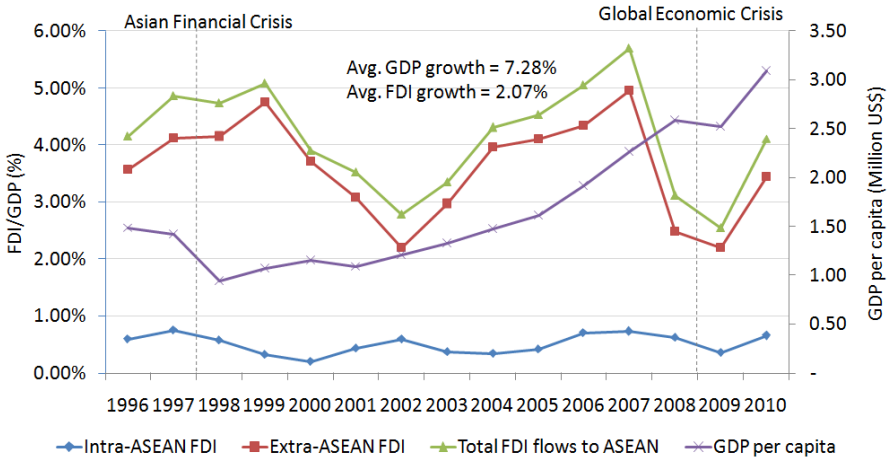

Figure 1: ASEAN's FDI as a percentage of GDP and GDP per capita, 1996-2010
Source: ASEAN Secretariat (2012)

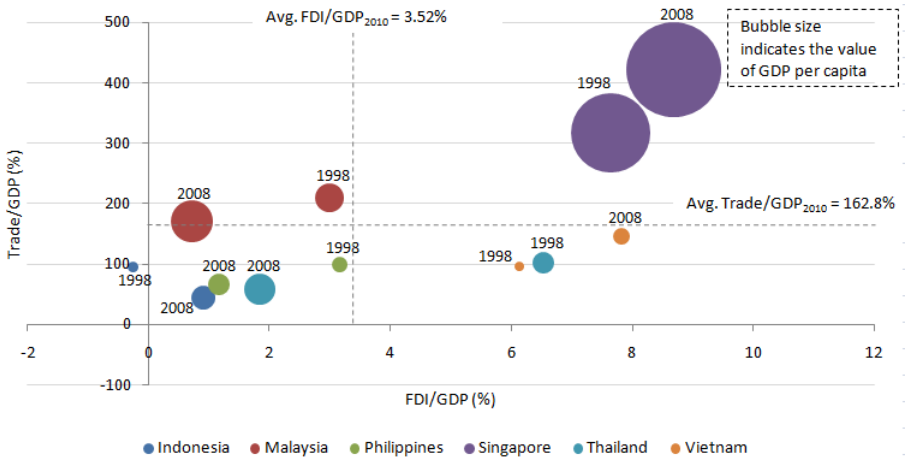

Figure 2: The linkages of ASEAN's FDI, trade and GDP per capita, 1998 and 2008
Source: World Bank (2012)

It is commonly believed that the ASEAN Comprehensive Investment Agreement (ACIA) is an effective implementation mechanism which is able to create any incentives for Intra- and Extra-ASEAN investors into ASEAN region. The ACIA that was signed in 2009 accredited the accession of ASEAN investors and foreign-owned ASEAN-based investors into *"a more liberal,*

facilitative, transparent and competitive investment destination" (ASEAN, 2013). Not only investment liberalization and facilitation encourage firms to either duplicate plants or fragment production process in the partner country, but also protection and promotion will help to ensure that the firms' operation can run smoothly. Hence, the ACIA is as one of the roadmap's key factors to success in building the ASEAN Economic Community.

Moreover, Figure 2 depicts the linkages of ASEAN's FDI, trade and GDP per capita in 1998 and 2008. The x-axis, FDI/GDP ratio, shows the ASEAN's ability in attracting FDI while the y-axis, trade/GDP ratio, measures the degree of openness. The figure also uses the bubbles to present GDP per capita. Singapore dominates the scenario, having the largest bubble and the point farther from the origin of the axes. During 1998 to 2008, the Singapore's ability in attracting FDI was improved, compared to other Southeast Asian economies and did so at a higher income per capita. The Viet Nam's FDI growth had significantly a high average FDI growth rate in later years which showed a standout FDI performance, but the amount of GDP per capita was still quite small. Even though Malaysia exhibited a dismal FDI performance, the Malaysian trade openness was over the ASEAN average index and income per capita was much better. Thailand showed lower FDI performance and lower trade openness in the last decade. The figure also reveals some interesting facts about the linkage of trade and FDI. FDI in ASEAN tends to change, following the same direction of trade; that is, ASEAN region more attracts vertical FDI and export-platform FDI that complement ASEAN's export and import flows. In other words, the MNEs deem the ASEAN to be the most attractive destination owing to its rich natural resources, abundant cheap labor, huge domestic market, and well-qualified export-import platform. It is expected that the ACIA will facilitate the transformation of ASEAN into an investment hub that would be able to compete with other Asian emerging economies.

3. EMPIRICAL EVIDENCE

This paper aims at analyzing empirically the long-run impacts of foreign direct investment, regional economic integration and human capital development on regional income inequalities in ASEAN. The conceptual framework of this study starts with model setup, collects the data, determines an appropriate methodology, investigates and interprets the empirical results.

3.1 Model Setup

To estimate the long-run impacts on regional income inequality, the following models are well suited to capture these impacts as shown in the vector autoregressive (VAR) equations below:

$$\Delta \mathbf{INEQ_{i,t}} = \propto_{\mathbf{0}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\beta}_{\mathbf{k}} \Delta \mathbf{INEQ_{i,t-k}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\theta}_{\mathbf{k}} \Delta \mathbf{FDI_{i,t-k}} + \mathbf{u_{i,t}} \quad (1)$$

$$\Delta \mathbf{INEQ_{i,t}} = \propto_{\mathbf{0}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\beta}_{\mathbf{k}} \Delta \mathbf{INEQ_{i,t-k}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\theta}_{\mathbf{k}} \Delta \mathbf{OPEN_{i,t-k}} + \mathbf{u_{i,t}} \quad (2)$$

$$\Delta \mathbf{INEQ_{i,t}} = \propto_{\mathbf{0}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\beta}_{\mathbf{k}} \Delta \mathbf{INEQ_{i,t-k}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\theta}_{\mathbf{k}} \Delta \mathbf{HCAP_{i,t-k}} + \mathbf{u_{i,t}} \quad (3)$$

$$\Delta \mathbf{FDI_{i,t}} = \propto_{\mathbf{0}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\beta}_{\mathbf{k}} \Delta \mathbf{FDI_{i,t-k}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\theta}_{\mathbf{k}} \Delta \mathbf{INEQ_{i,t-k}} + \mathbf{u_{i,t}} \quad (4)$$

$$\Delta \mathbf{OPEN_{i,t}} = \propto_{\mathbf{0}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\beta}_{\mathbf{k}} \Delta \mathbf{OPEN_{i,t-k}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\theta}_{\mathbf{k}} \Delta \mathbf{INEQ_{i,t-k}} + \mathbf{u_{i,t}} \quad (5)$$

$$\Delta \mathbf{HCAP_{i,t}} = \propto_{\mathbf{0}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\beta}_{\mathbf{k}} \Delta \mathbf{HCAP_{i,t-k}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\theta}_{\mathbf{k}} \Delta \mathbf{INEQ_{i,t-k}} + \mathbf{u_{i,t}} \quad (6)$$

$$\Delta \mathbf{FDI_{i,t}} = \propto_{\mathbf{0}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\beta}_{\mathbf{k}} \Delta \mathbf{FDI_{i,t-k}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\theta}_{\mathbf{k}} \Delta \mathbf{OPEN_{i,t-k}} + \mathbf{u_{i,t}} \quad (7)$$

$$\Delta \mathbf{FDI_{i,t}} = \propto_{\mathbf{0}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\beta}_{\mathbf{k}} \Delta \mathbf{FDI_{i,t-k}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\theta}_{\mathbf{k}} \Delta \mathbf{HCAP_{i,t-k}} + \mathbf{u_{i,t}} \quad (8)$$

$$\Delta \mathbf{OPEN_{i,t}} = \propto_{\mathbf{0}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\beta}_{\mathbf{k}} \Delta \mathbf{OPEN_{i,t-k}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\theta}_{\mathbf{k}} \Delta \mathbf{FDI_{i,t-k}} + \mathbf{u_{i,t}} \quad (9)$$

$$\Delta \mathbf{HCAP_{i,t}} = \propto_{\mathbf{0}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\beta}_{\mathbf{k}} \Delta \mathbf{HCAP_{i,t-k}} + \sum_{\mathbf{k=1}}^{\mathbf{p}} \boldsymbol{\theta}_{\mathbf{k}} \Delta \mathbf{FDI_{i,t-k}} + \mathbf{u_{i,t}} \quad (10)$$

where $i = 1,2, \dots, N$ is the country index, $t = 1,2, \dots k$ is the time index. INEQ stands for country's income inequality measured by the weighted GINI index (Shankar and Shah, 2003) shown as $G_w = \left(\frac{1}{2\bar{y}}\right)\sum_i^n \sum_j^n |y_i - y_j| \frac{p_i p_j}{P^2}$, where $\bar{y}$ is national mean per capita GDP; p_i and p_j are population of regions i and j, respectively; P is total population; and n the numbers of the regions. FDI stands for the percentage share of FDI in GDP; OPEN denotes the percentage share of trade in GDP or openness index as a proxy for economic integration; and HCAP denotes the percentage of gross tertiary education enrolment as a proxy for human capital development.

3.2 Data and Methodology

The data set consists of cross-country observations for selected ASEAN members (Indonesia, Malaysia, the Philippines, Thailand and Viet Nam) during the period 1985 to 2011. FDI as a percentage of GDP, an openness index as a percentage share of trade in GDP, a percentage of gross tertiary enrolment, and income inequality as a weighted difference of GDP per capita by population are extracted from the World Data Bank. In our estimation, panel unit root test, panel cointegration test, and causality test techniques are applied. The panel unit root test is a test for a stationary in time series data, whereas the panel cointegration test is a test for determining the existence of long-run equilibrium relationship between two variables. Only stationary and co-integrated variables are further employed to estimate the bidirectional Granger causality. It begins with testing the stationarity of all determinants of INEQ, FDI, OPEN, and HCAP panel data by applying the unit root tests given Levin, Lin and Chu (LLC) test (Levin et al., 2002), Im-Pesaran-Shin (IPS) W-test (Im et al., 2003) and ADF-Fisher (ADF) Chi-square test (Maddala and Wu, 1999). After getting the order of the integration, we use panel data setting to test the cointegration among variables in the model. This panel cointegration test is conducted using Pedroni approach (Kao and Chiang, 2001; Pedroni, 1995). Finally, the long-run model is estimated using Granger causality test to indicate the causal relationship between FDI, economic integration, human capital and income inequality in the ASEAN region.

3.3 Empirical Results

The first step is to test whether the variables used in this study are stationary or non-stationary.

Table I: Panel unit root tests

	Panel Level Series				Panel First-difference Series		
	LLC	IPS	ADF		LLC	IPS	ADF
INEQ	-1.591	-2.376	37.006	ΔINEQ	-7.506	-6.899	71.388
	(0.055)	(0.008)*	(0.005)*		(0.000)*	(0.000)*	(0.000)*
FDI	-1.407	-3.133	37.316	ΔFDI	-5.138	-5.890	60.154
	(0.079)	(0.000)*	(0.004)*		(0.000)*	(0.000)*	(0.000)*
OPEN	-2.795	-0.195	15.540	ΔOPEN	-7.063	-6.628	69.832
	(0.002)*	(0.422)	(0.624)		(0.000)*	(0.000)*	(0.000)*
HCAP	3.050	3.994	10.178	ΔHCAP	1.735	-4.746	53.660
	(0.998)	(1.000)	(0.925)		(0.958)	(0.000)*	(0.000)*

*Note: a. The p values are in the parentheses. b. * denotes rejection of null hypothesis: Panel series has a unit root at the 1%level of significance.*

Table I presents the panel unit root test results of four level series and their first-difference series. Both IPS and ADF panel unit root tests indicate that the panel level series of openness and human capital development are non-stationary series. Moreover, the IPS and ADF tests exhibit that the panel first-difference series: ΔINEQ, ΔFDI, ΔOPEN and ΔHCAP are all stationary

series. It implies that INEQ, FDI, OPEN and HCAP are integrated of order one I(1) and first differences are integrated of order zero, I(0). So, we employ the four panel first-difference series in the panel cointegration estimation.

The next step is to test cointegration in a panel data setting for examining the existence of long-run equilibrium relationship between variables. Table II exhibits the panel cointegration test for five panel data models: Model 1 tests the cointegration between INEQ and FDI; Model 2 between INEQ and OPEN; Model 3 between INEQ and HCAP; Model 4 between FDI and OPEN; and Model 5 between FDI and HCAP. Most of Pedroni test statistics reject the null hypothesis of no cointegration for the two estimated panel data setting. It concludes that all variables in five panel data models are cointegrated with each other. There exist the long-run relations between income inequality, FDI, trade openness and human capital development.

Table II: Panel cointegration test

	Panel v-stat	Panel rho-stat	Panel PP-stat	Panel ADF-stat	Group rho-stat	Group PP-stat	Group ADF-stat
Model 1:INEQ and FDI	-1.070 (0.999)	-3.740 (0.001)*	-4.123 (0.000)*	0.246 (0.596)*	-2.419 (0.007)*	-4.460 (0.000)*	1.050 (0.853)*
Model 2:INEQ and OPEN	-1.009 (0.999)	-3.235 (0.006)*	-2.998 (0.001)*	-0.691 (0.244)*	-2.136 (0.016)*	-3.145 (0.008)*	-0.410 (0.340)*
Model 3: INEQ and HCAP	-1.179 (0.999)	-3.262 (0.006)*	-2.996 (0.000)*	-3.492 (0.000)*	-1.646 (0.000)*	-2.678 (0.000)*	-3.319 (0.000)*
Model 4:FDI and OPEN	-3.380 (0.996)	-7.740 (0.000)*	-7.876 (0.000)*	-1.572 (0.057)*	-5.998 (0.000)*	-8.964 (0.000)*	-1.181 (0.118)*
Model 5:FDI and HCAP	-1.332 (0.908)	-7.641 (0.000)*	-8.280 (0.000)*	-3.006 (0.001)*	-5.358 (0.000)*	-9.743 (0.000)*	-2.799 (0.002)*

*Note: * denotes rejection of null hypothesis: Panel model has cointegration at the 1% level of significance.*

The final step is to estimate the causal relationship between income inequality and inward FDI (Model 1), between income inequality and regional economic integration (Model 2), between income inequality and human capital development (Model 3), between inward FDI and regional economic integration (Model 4), and between inward FDI and human capital development (Model 5) in ASEAN countries using Granger causality test technique.

Table III: Granger Causality Test Results

Null Hypothesis (H_0)	VAR	F-Stat.	p-value	Results
Model 1:ΔFDI no Granger cause ΔINEQ	6	1.082	0.374	Accept
ΔINEQ no Granger cause ΔFDI	6	2.694	0.015**	Reject
Model 2: ΔOPEN no Granger cause ΔINEQ	8	0.992	0.443	Accept
ΔINEQ no Granger cause ΔOPEN	8	1.693	0.103	Accept
Model 3: ΔHCAP no Granger cause ΔINEQ	2	1.198	0.304	Accept
ΔINEQ no Granger cause ΔHCAP	2	0.283	0.756	Accept
Model 4: ΔOPEN no Granger cause ΔFDI	7	1.849	0.080***	Reject
ΔFDI no Granger cause ΔOPEN	7	1.119	0.352	Accept
Model 5: ΔHCAP no Granger cause ΔFDI	2	3.960	0.020**	Reject
ΔFDI no Granger cause ΔHCAP	2	0.473	0.620	Accept

*Note: The p-values ** and *** indicate a statistical significance at 5% and 10%, respectively.*

The Final Prediction Error and Akaike Information Criterion are used to determine the appropriate lag order of VAR. Given these standard information criterions, the number of optimal lag length of Model 1 to Model 5 are 6, 8, 2, 7 and 2, respectively. According to the results of unit root test and cointegration test, the series employed in testing the causality are the one of the series I(0) and cointegrated. Table III exhibits the limited support to the causality between FDI and income inequality in ASEAN-5 (Model 1). The results suggest a uni-directional causality from income inequality to FDI, implying that the income equality development in ASEAN leads that of inward FDI in this region. At the same time, there is no evidence of a causal relationship from FDI to income inequality. It is possible that inward FDI to ASEAN is more significant for economic sectors as a whole than for the level of income inequality. Or, the surge of FDI inflows tends to give rise to the indirect effect on ASEAN's income inequality. The results of causality between income inequality and trade openness indicate the absence of a feedback between these two variables (Model 2). Similar results are found in the causality between income inequality and human capital development (Model 3). However, the Granger causality test gives strong evidence that regional economic integration and human capital development causes inward FDI in ASEAN (Model 4 and 5). There are uni-directional causalities between regional economic integration, human capital development and FDI. The regional economic integration through the trade, investment, finance, and human development agreements leads to an increase in FDI inflows to ASEAN countries. Hence, appropriate economic integration policies in ASEAN must be implemented abruptly. Surprisingly, there is no causality from FDI to trade openness and human capital development. This is an interesting result, which reflects ASEAN's FDI policies with an overall bias toward stimulating trade-oriented FDI. That is because the ASEAN's governments expected that trade-oriented foreign investment can directly and indirectly improve human capital or labor and trade openness in this region.

4. CONCLUSION

This paper focuses on the long-run impacts of foreign direct investment, regional economic integration and human capital development on regional income inequality in ASEAN countries. The panel unit root tests, panel cointegration test and causality test techniques are used to investigate these impacts. Data on FDI, trade, tertiary enrolment, GDP and population for five ASEAN economies over the period of 1985-2011 are employed. The long-run model results reveal a uni-directional causality from income inequality to inward FDI in ASEAN. Moreover, the findings suggest a uni-directional causality from trade openness and human capital development to inward FDI in ASEAN, whereas FDI inflows have no any support. Even though the results showed that the FDI inflows have no direct effect on income inequality, the implementation of the AEC roadmaps can directly affect an increase in income inequality in this region. However, the observations in this study are limited to only five ASEAN countries because of data limitations and difficulties in obtaining longitudinal data. It is regarded as the limitation of the study.

In order to achieve the equitable development in ASEAN, ASEAN would hold the slow-but-sure policy rather than the fast-and-furious policy. The slow-but-sure economic policy will help to decline the existence of high income gap among ASEAN countries which is as a hindrance in building the equality in this region, and lead to economic growth and sustainable development in ASEAN. However, even though the fast-and-furious economic policy will induce a higher economic growth in ASEAN, it will fully accelerate to widen an income gap among ASEAN

countries. In fact, there are the advantages along with the AEC implementation: geographical proximity advantage, cost comparative advantage and complementary cooperation advantage. The first two advantages arise from the objective development, whereas the latter one is from the subjective development. With more efforts by following the AEC roadmap, it brings about the geographical proximity advantage and cost comparative advantage in the region. Especially, it leads ASEAN to be more attractive and sustainable destination for foreign investment. For better objective development, ASEAN's investment agreement should be designed from a multi-disciplinary perspective relying on the diverse international economic activities such as trade, investment, facilitation, logistics and finance, etc. Moreover, in order to gain the highest effectiveness from ASEAN's economic agreements, ASEAN should create ways to enhance complementary cooperation between member countries than competitive cooperation. This helps ASEAN to have more economic power in the world, and bring about a sustainable development.

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