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The Effects of Foreign Direct Investment on Income Inequality of Thailand

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Abstract

In the era of globalization, whether foreign direct investment (FDI) has contributed to larger income gaps is still open to debate, especially for many emerging market economies. This paper explores the effects of sectoral FDI on income inequality using panel data across the five regions of Thailand over the period of 1998–2017. We find that at the regional level, FDI in the manufacturing sector has directly contributed to reducing income inequality through employment effects and knowledge spill overs, while FDI in the agricultural sector, the manufacturing sector and the service sector have tended to lower the consumption expenditure inequality under the effects of decreasing consumption propensity. In addition, FDI in the service sector has tended to reduce absolute poverty at the aggregate level, while FDI in the agricultural sector and the manufacturing sector have contributed to increasing absolute poverty.

Keywords: Foreign Direct Investment, Income Inequality, Consumption Expenditure Inequality, Absolute Poverty, Thailand.

1. Introduction

Since the past few decades, Foreign Direct Investment (FDI) has been one of the most important driving forces of globalization. There are many studies concerning the impact of FDI on income inequality. Some studies reveal that FDI helps to improve income distribution, as FDI provides more capital, increases the transfer of technology and enhances the productivity and income of workers in the host country (Dunning, 1993; Caves, 2007; Chen, 2015). However, other studies show that FDI can worsen income distribution as multinational corporations (MNCs) use modern technology that prefers skilled labor more than unskilled labors, pay higher wages to skilled labors than unskilled labors, which widens the income inequality in the host country (Feenstra & Hanson, 2001; Zulfiu, 2014).

In the 1960s, Thailand had a low level of income inequality when compared with other Southeast Asian countries, and the agriculture sector was the main engine of Thailand's economy. In the 1990s, the level of income inequality in Thailand increased at a constant rate, and this was due to the rapid economic growth led by export and FDI. During this period, Thailand's economy was fueled by labor-intensive and export-oriented manufacturing industries, whereby FDI from developed countries employed cheap and abundant unskilled labors that ultimately raised the wage rate across all the regions in Thailand. Nevertheless, regional income gaps that accounted for about 20% of income inequality had a great impact on income inequality in Thailand. This was mainly due to a large income gap between Bangkok and the other regions (Ikemoto, 1993). Similarly, a sustained reduction of absolute poverty had occurred in spite of the increase in inequality due to the expansion of international trade and FDI within Thailand's economy (Warr, 2004). Despite a considerably high but decreasing inequality rate in the past decade, Thailand's economy still exhibited strong growth

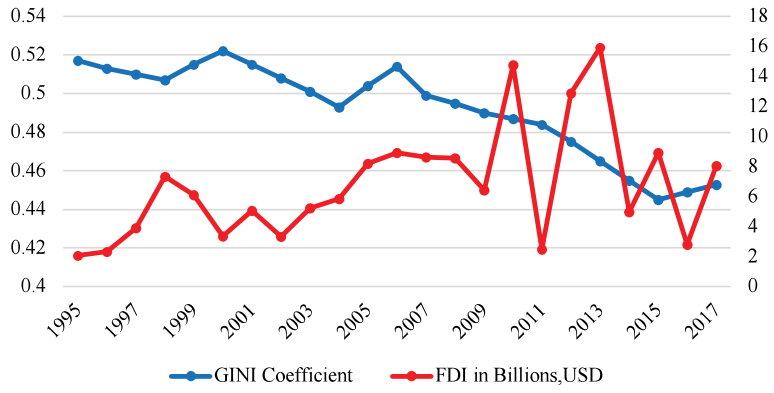
momentum. As shown in Figure 1, the graph illustrates a negative relationship between FDI and income inequality. The Gini coefficient in the 1990s was above 0.5 and slowly declined to 0.4 in 2007, whereas FDI inflows had long been an important contributor to Thailand's economy, which, for the past decade, had seen an inflow of FDI reaching 7.6 billion dollars in 2017.

There are two significant reasons to conduct the study on the impact of FDI on income inequality in Thailand. First, although poverty rates in Thailand had fallen sharply since the mid-1980s, from 67% in 1986 to 7.1% in 2015 (World Bank, 2018), Thailand still had the widest income inequality among the ASEAN countries (Global Wealth Report, 2018). Hence, the alleviation of poverty and the reduction of income inequality remains a pressing issue and a major challenge for Thailand. Second, Thailand, as a developing economy with an upper-middle-income status, is one of the important recipients of FDI and a regional gateway to international markets. Today, Thailand not only supports the liberalization and promotion of free trade but also offers abundant resources in addition to a skilled and cost-effective workforce to foreign investors.

Therefore, the main purpose of this study is to analyze whether FDI, as one of the driving forces of globalization, has contributed to a larger or small income gap in Thailand. The findings from this study may provide some insights and policy recommendations for Thailand to maximize the benefits from FDI in order to increase the nation's welfare, alleviate income inequality and propel Thailand toward a higher stage of economic development.

The rest of the paper is organized as follows. Section 2 begins with a brief literature review on the relationship between FDI and income inequality. Section 3 discusses the methodology and describes the data used. Empirical results are presented in Section 4, and Section 5 serves to conclude the results of this paper.

Figure 1. FDI Inflows and Gini Coefficient, 1995-2017



2. Literature Review

In this section, the theoretical foundation of this research will be outlined, followed by the empirical studies that focus on the relationship between FDI and income inequality.

2.1 Theoretical Arguments

There are many theories that focus on the causes of multinational enterprises (MNES) in attracting FDI inflows into the host countries. FDI can generate positive spillover effects to the host countries with the transfer of new technology, packages of capitals, spillover of knowledge, modern managerial skills, enhancement of competition, etc.(Dunning,1993). Furthermore, FDI can affect income distribution through impacting employment and wage structure, contributing to economic growth and changing factors of endowments of developing countries.

2.1.1 Heckscher-Onlin Theorem

International trade can play an important role in affecting income inequality by creating employment in developing countries. Free trade can decrease profits and increase wages for labor-abundant countries, and, at the same time, it can also increase profits and decrease wages for capital-abundant countries. Therefore, this shows that international trade can affect income inequality depending on a country's factor endowments. According to the Heckscher-Ohlin Model and Stopler -Samuelon theorem (Heckscher & Onlin 1991), if a country is abundant with unskilled labors, an increase in FDI would make use of unskilled labors, which would lead to an increase in the demand of unskilled labor (Lee & Vivarelli, 2006). As a result, the income of unskilled labors would increase relative to the income of skilled labors. Therefore, FDI can help to improve the income inequality of the country. Therefore, if this theory is valid, one would expect a negative correlation where FDI reduces income inequality:

Hypothesis 1(H1): An increase in FDI leads to lower income inequality by the increase of the demand for unskilled labors in the host country.

2.1.2 Endogenous Growth Model

The endogenous growth theory by Aghion and Howitt (1998) explains the relationship between multinational firms and inequality in developed host countries. The theory assumes that investment in human capital, innovation and knowledge are significant contributors to economic growth. As many countries use old technologies, with the presence of MNES, new technologies are introduced to the host countries, whereby the domestic firms learn by imitating the advanced production technologies.

The model describes the two stages of development after the introduction of a new technology by the MNEs. During the early stage, new technological

innovation from the MNES tends to increase the gap between skilled and unskilled labors, as skilled labors can be employed to imitate new technology. However, at the second stage, when the new technology has been implemented and standardized, less skilled labors are employed. Hence, income inequality will decrease over time as MNEs move into both stages, causing a fall of relative demand for unskilled labor. The higher the number of MNES present in the economy, the more skilled labors are used to implement new technology and the faster the speed of development. In reference to the endogenous model, Aghion and Howitt (1988) explicitly referred to the Kuznets curve (1995). According to the Kuznets inverted –U curve hypothesis, income inequality increases at the early stage of development but declines later once a certain stage of development is reached. Therefore, if the Kuznets hypothesis is valid, the prediction of the Kuznets curve would allow proposing the following:

Hypothesis 2 (H2): An increase in FDI leads to an increase in income inequality, but at a decreasing rate over time.

2.2 Empirical Studies on FDI and Income Inequality

Recently, there are numerous FDI-related researches on income inequality, factors influencing income inequality and its relationship with economic growth. This section presents an overview of the literature focusing on the relationship between FDI and income inequality.

2.2.1 Aggregate FDI and Income Inequality

In a cross-country framework, a large number of studies in the past have shown that FDI can deepen income inequality. For example, Tsai (1995) conducted a study on 33 developing countries and found that FDI increased income inequality in some Asian countries, whereas Alderson and Nielden (1998) used panel data of 88 countries from the 1967–1994 period and showed that FDI

had a positive impact on income inequality. Additionally, Choi's (2006) study that used pooled data from 119 countries from 1993–2002 reveals that an increase in FDI stocks led to an increase in income inequality. A similar conclusion was reached by Basu and Guariglia (2007), who found that FDI helped to promote income inequality in 119 developing countries in the period 1970–1999. From a study on 14 European countries in the period 1951–1992, Lee (2006) found that FDI increased income inequality, whereas a study by Herzer and Nunnenkamp (2013) noted that FDI deepened income inequality in 10 European countries in the period 1980–2000. Furthermore, Herzer et al. (2014) pointed to a long-run relationship between FDI and income inequality and found that FDI widened income gaps in five Latin American host countries. A recent study by Asterious et al. (2014) reveals that FDI had the highest influence on income inequality for 27 EU countries. A case study on China during the period 1985–1998 by Zhang and Zhang (2003) shows that FDI helped to widen the regional inequality in China. According to the study by Gopinath and Chen (2003), the result pointed out that FDI tends to increase the income gap between unskilled and skilled labors in the 15 developing countries.

In addition to the cross-national studies, numerous works of literature have found that FDI can help reduce the income gap between the rich and the poor that leads to a decrease in income inequality in the host country. Additionally, Jensen and Rosas (2007) showed that an increase in FDI inflow led to a decrease in income inequality in Mexico, and Chintrakarn et al. (2012) pointed out that FDI had a significant effect in reducing the income inequality in the 48 US states from 1977–2001. Similarly, Herzer and Nunnenkamp (2013) conducted a study on 10 Europeans nations and showed that inward and outward FDI had a positive short-run effect and a negative long-run effect on income inequality. Lin et al. (2013) noted that when the threshold of human capital was below 6.0 years of secondary schooling, FDI brought about a reduction in income

inequality. For OECD and non-OECD countries, Figini and Görg's (2011) study revealed that FDI increased inequality in developing host countries. Farhan et al. (2014) analyzed the relationship between FDI and income inequality in five ASEAN countries and noted that FDI had an inequality-reducing effect in Malaysia, Philippines and Thailand, whereas inflows of FDI led to higher income inequality in Indonesia and Singapore. A similar conclusion was reached by Mugeni (2015), who conducted a study on 153 developing and developed countries over the period 1995–2010, and the results showed that FDI inflows tend to reduce income inequality. Similarly, a recent study by Hyungsun and Miguel (2016), who conducted a study on seven Southeast Asian countries over the period 1990–2013, reveals that FDI inflows tend to reduce income inequality in the long run.

Correspondingly, some studies have shown that FDI has insignificant to no impact on income inequality of host countries. For instance, Milanovic (2005) carried out a study on 89 countries over the period 1985–1997 and found that FDI had no impact on income distribution. Similarly, Santarelli and Figini (2006) also pointed out that FDI has no effect on income inequality in 54 developing countries in the period 1970–1998. Likewise, a study by Sylwester (2005) on 29 countries from 1970-1989 also reached the same conclusion that FDI did not have a significant relationship with income inequality.

2.2.2 Sectoral FDI and Income Inequality

The majority of FDI-related studies in the past have focused on the aggregate effect of FDI on income inequality, yet few have focused on the effects of FDI in the three economic sectors, namely the agricultural, manufacturing and service sectors. In addition, as the FDI aggregate analysis can only reflect the effects of FDI at the macroeconomic level, therefore, the sectoral analysis, or analysis on the three economic sectors namely agricultural, manufacturing and

service sectors, is necessary to analyze the effects of FDI in the aforementioned sectors on income inequality.

Some empirical studies have identified the effects of FDI on income inequality in different economic sectors. For instance, Tondl and Fornero (2010) conducted a study on Latin American economies and found that FDI, especially in the agricultural sector and financial services, had the highest direct productivity effects. On the other hand, Cornia (2015) pointed out that FDI would worsen inequality in sectors that were capital-intensive with skilled labor but it tended to reduce inequality in sectors with more intensive in unskilled labor. Suanes (2016) analyzed the relationship between FDI and income inequality in 13 developing countries over the period of 1980–2009, and the result revealed a negative effect of FDI on income inequality in the agriculture sector and a positive effect in the manufacturing and service sectors. Bogliaccini and Egan (2017) conducted a study on 60 middle-income countries from 1989–2002, and their findings show that FDI in the manufacturing sector was not related with higher inequality, whereas FDI in the service sector had a high relationship with income inequality.

3. Research Design

To explore the effects of sectoral (agricultural, manufacturing and service sector) FDI on income inequality over the period 1998-2017, the empirical analysis first examines the effects of sectoral FDI on income inequality and consumption expenditure inequality at the regional level, before proceeding to examine the effects of sectoral FDI on absolute poverty at the aggregate level.

3.1 The Effects of Sectoral FDI on Inequality at the Regional Level

In order to determine the effects of sectoral FDI on income inequality, this paper uses region-level panel data that consists of the five regions, namely

Bangkok, Central, Northern, Southern and Northeastern Thailand, during the period 1998–2017. In accordance with the previous studies (Cornia, 2015; Mihaylova, 2015), the model also includes several control variables that are expected to have an impact on income inequality (Table 1). The following equations are estimated to investigate the impact of sectoral FDI on inequality:

$$lnGINCOME_{it} = \propto + \beta lnFDI_{jt} + \sum_{k=1}^{K} \gamma_k \, lnX_{k,it} + u_i + \varepsilon_{it}, \quad (1)$$

$$lnGCONSUMP_{it} = \propto + \beta lnFDI_{jt} + \sum_{k=1}^{K} \gamma_k \, lnX_{k,it} + u_i + \varepsilon_{it}, \quad (2)$$

According to the equation, the dependent variable is a measure of the *GINCOME* income inequality and the *GCONSUMP* consumption expenditure inequality (the Gini Coefficient) for region *i* in period *t*. The three sectors *FDIA, FDIM* and *FDIS* represent the agricultural sector, manufacturing sector and service sector, respectively. Equation (1) and equation (2) are estimated under two different specifications, fixed-effects (FE) and random-effects (RE) models are applied to check for robustness of the results.

Gini Coefficient (GIN): The main dependent variable Gini Coefficient (or Gini Index) are widely used by many researchers for the measure of inequality among recipients of income as well as consumption expenditure. The value of the Gini coefficient lies between 0 (perfect equality) and 1 (perfect inequality), which implies that one person has all the income or consumption and all others have none. Many studies usually use the Gini coefficient for the analysis of income distribution (Georgantopoulos & Tsamis, 2011).

Foreign Direct Investment (FDI): FDI is the main independent variable that may have a positive or negative impact on income inequality (Chintrakarn et al., 2010; Kurtovic et al., 2016).This study uses sectoral FDI including the agriculture sector, manufacturing sector and service sector. FDI can help to

reduce income distribution if it leads to more employment; however, it can also worsen income distribution if the demand for unskilled labor is lower than the demand for skilled labor.

Secondary Education (EDU): According to Barro and Lee (2001), the ratio of the number of students enrolled in secondary education overpopulation was the most comparable measurement of human capital. Furthermore, previous studies have shown that an increase in education can help to increase human capital, which leads to an increase in employment and, thus, reduction in the income distribution (Tsai, 1995; Jensen & Rosas, 2007). This is in line with Figini and Gorg (2011) who stated that an increase in education inferred an increase in the supply of skilled labor, which should eventually lower income distribution. Therefore, the higher the level of education, the lower the income distribution.

GDP Per Capita (GDPC): This variable is used to measure the level of economic development (Choi, 2006; Kai & Hamori, 2009). A rise in the level of economic development can lead to an increase in income inequality; therefore, income inequality can be affected by the different stages of economic development (Kuznets, 1995).

Inflation Rate (INF): This variable uses the provincial Consumer Price Index (CPI) as the annual inflation rate. An increase in inflation may decrease the purchasing power of the poor more than that of the rich. However, it can also lead to an increase in investment, which results in higher employment creation, thus, improving income distribution (Kai & Hamori, 2009).

Population Size (POP): This variable uses the population of the five regions and is assumed to increase income inequality in developing countries (Lundqvist, 2014).

Trade Openness (TRADE): This variable uses the trade-to-GDP ratio as an indicator of the degree of openness. As stressed by Feenstra and Hanson (2001), increased trade in countries with abundant skilled labor should increase inequality. In contrast, it should decrease inequality in trade countries with abundant unskilled labor (Heckscher & Ohlin, 1991). In addition, Jaumotte et al. (2013) pointed out that trade liberalization can help lower income inequality, whereas financial openness tends to increase income inequality. In short, many studies have shown that trade openness could either increase or decrease the income inequality of a country (Kai & Harmori, 2009).

3.2 The Effects of Sectoral FDI on Absolute Poverty at the Aggregate Level

In order to investigate the impact of sectoral FDI on absolute poverty, this study uses time series data during the period 1998-2017. The same control variables are also used in Equation (1) and Equation (2). Both the FE model and the RE model are applied to check for the robustness of the results. Furthermore, the following equation is estimated:

$$PHR_t = \propto + \beta FDI_t + \sum_{k=1}^{K} \gamma_k X_{k,t} + \varepsilon_t, \quad (3)$$

In accordance with the study by Warr (2004), absolute poverty can be measured by using the poverty headcount ratio at $1.90, $3.30 and $5.50 a day as the percentage of the population living on less than $1.90, $3.30 and $5.50 a day, respectively, at the 2011 international prices.

The dependent variable is a measure of absolute poverty (the poverty headcount ratio) in period *t*. Equation (3) is estimated under three different specifications—poverty headcount ratio at $1.90, $3.30 and $5.50 in order to test the robustness of the results.

Table 1. Variable Definitions

Variables	Variable Definition	Source
GINCOME	Gini Coefficient of Income by region	NESDB
GCONSUMP	Gini Coefficient of Consumption Expenditure by region	NESDB
PHR	Poverty Headcount Ratio	World Bank
FDI	Foreign Direct Investment by sectors	BOI
EDU	School Enrollment, secondary (% gross) by country	World Bank
GDPC	Gross Domestic Product per Capita	NESDB
POP	Population by region	NESDB
TRADE	Trade Openness(Sum of exports and imports as a % of GDP)	BOT
INF	CPI Regional Inflation Rate	NSO

4. Empirical Results

This section presents the empirical results on the effects of sectoral FDI on inequality at the regional level and the effects of sectoral FDI on absolute poverty at the aggregate level over the period 1998-2017.

4.1 Estimating the Effects of Sectoral FDI on Income Inequality at the Regional Level

Tables 2-4 present the results of sectoral FDI on income inequality across the five regions of Thailand by using the FE model.

The results reveal that FDI in the agricultural and service sector do not have a significant relationship with income inequality, whereas FDI in the manufacturing sector has a negative and statistically significant relationship

with income inequality at the 5% level of significance. The result is robust to the addition of other control variables; this implies that the FDI in the manufacturing sector will increase the demand for unskilled labor with more job creations. This employment effect of FDI will increase the income of unskilled labor, contributing to reducing income inequality across the five regions of Thailand. This result is similar to that stated in the Hecksher-Ohlin model and the Stolpher-Samuelson theorem and also with that hypothesized in this paper, which is an increase in FDI leads to lower income inequality by the increase of the demand for unskilled labors in the host country. FDI can generate positive spillover effects to the host countries with the transfer of new technology, packages of capitals, spillover of knowledge, etc.(Dunning,1993). This result also supports the Kuznets inverted–U curve hypothesis, which hypothesize that an increase in FDI leads to an increase in income inequality, but at a decreasing rate over time. New technological innovation from the MNES tends to increase the income gap, as skilled labors are employed to imitate new technology. However, the income gap will decrease over time, as less skilled labor is used when the new technology has been implemented. Furthermore, this result is in line with the findings of Corina (2004), who pointed out that FDI is expected to worsen inequality in those sectors that are capital-intensive with skilled labor but FDI tends to reduce inequality in sectors that are more intensive with unskilled labor.

Similarly, secondary education is negative and statistically significant at the 1% level, and the result is robust and consistent. This implies that the level of education is another important factor that not only has a strong impact on income distribution but also has contributed to decreasing income distribution in Thailand. The result is in line with the previous studies of Tsai (1995) which revealed that an increase in education can help to increase human capital, which leads to an increase in employment and, thus, reduces the income distribution.

Trade openness, on the other hand, has a positive effect on income inequality. This implies that trade liberalization can contribute to increasing income inequality in Thailand. In the 1990s, Thailand's economy was driven by labor-intensive and export-oriented manufacturing industries, which were mainly concentrated in urban areas. Therefore, trade liberalization has widened the gaps between the urban and the rural areas.

In addition, population is another variable that has a positive effect on income inequality and is statistically significant at the 1% level, which is in line with the finding of Lundqvist (2014), which revealed that an increasing population was likely to increase income inequality. Furthermore, other variables such as inflation rate and regional GDP per capita are not statistically significant with income inequality.

Therefore, FDI not only can increase employment rate for many labors, but also can generate positive spillover effects to the host countries with the transfer of new technology, capitals inflows and spillover of knowledge, which eventually leads to a decrease in income distribution.

Table 2. The Effects of FDI (Agricultural Sector) on Income Inequality

Dependent Variable: LnGINCOME					
	Fixed Effects				
	(1)	(2)	(3)	(4)	(5)
LnFDIA	-0.0106	-0.0097	-0.0138	-0.0117	-0.0113
	(-1.10)	(-1.04)	(-1.66)	(-1.40)	(-1.34)
LnEDU	-0.1464***	-0.1048***	-0.2583***	-0.2252***	-0.1941***
	(-7.11)	(-3.94)	(-6.76)	(-5.12)	(-3.37)
LnGDPC		-0.0548**	0.0071	-0.0123	-0.0112
		(-2.39)	(0.30)	(-0.46)	(-0.41)
LnPOP			0.2719***	0.2245***	0.2443***
			(5.11)	(3.63)	(3.69)

LnTRADE				0.0596	0.0637
				(1.49)	(1.57)
LnINF					-0.0532
					(-0.84)
Observations	100	100	100	100	100
R-Squared Within	0.3551	0.3927	0.5280	0.5393	0.5429

Note: Values in parentheses are t-statistics. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Table 3. The Effects of FDI (Manufacturing Sector) on Income Inequality

Dependent Variable: LnGINCOME					
Fixed Effects					
	(1)	(2)	(3)	(4)	(5)
LnFDIM	-0.0249*	-0.0212**	-0.0223**	-0.0197**	-0.0196**
	(-1.81)	(-1.94)	(-2.17)	(-2.01)	(-1.99)
LnTRADE	0.1357***	0.1392***	0.1708***	0.1015**	0.1052**
	(2.69)	(3.47)	(4.40)	(2.40)	(2.47)
LnEDU		-0.1405***	-0.0832***	-0.2006***	-0.1680***
		(-7.44)	(-3.46)	(-4.76)	(-3.04)
LnGDPC			-0.0769***	-0.0220	-0.0205
			(-3.55)	(-0.84)	(-0.77)
LnPOP				0.2002***	0.2222***
				(3.31)	(3.41)
LnINF					-0.0572
					(-0.91)
Observations	100	100	100	100	100
R-Squared Within	0.0782	0.4244	0.4944	0.5494	0.5536

Note: Values in parentheses are t-statistics. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Table 4. The Effects of FDI (Service Sector) on Income Inequality

Dependent Variable: LnGINCOME					
Fixed Effects					
	(1)	(2)	(3)	(4)	(5)
LnFDIS	0.0017	0.0029	-0.0014	-0.0012	-0.0010
	(0.34)	(0.58)	(-0.32)	(-0.26)	(-0.22)
LnEDU	-0.1421***	-0.1005***	-0.2456***	-0.2097***	-0.1762***
	(-6.89)	(-3.83)	(-6.47)	(-4.88)	(-3.11)
LnGDPC		-0.0570**	0.0052	-0.0168	-0.0155
		(-2.46)	(0.22)	(-0.62)	(-0.57)
LnPOP			0.2667***	0.2130***	0.2349***
			(4.87)	(3.40)	(3.50)
LnTRADE				0.0687*	0.0727*
				(1.72)	(1.81)
LnINF					-0.0583
					(-0.91)
Observations	100	100	100	100	100
R-Squared Within	0.3543	0.3878	0.5142	0.5296	0.5340

Note: Values in parentheses are t-statistics. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

The results of sectoral FDI on income inequality using the RE model can be found in Table 5. The estimation results are consistent with the FE model's results. The findings reveal that FDI in the manufacturing sector has contributed to reducing income inequality across the five regions of Thailand, whereas that in the other sectors are not statistically significant. In addition, an increase in education is another important factor that is likely to lower the income gap, whereas trade liberalization has contributed to increasing income inequality.

Table 5. The Effects of FDI Sectors on Income Inequality (Random Effects)

Dependent Variable: LnGINCOME			
	Agricultural Sector	Manufacturing Sector	Service Sector
LnFDI	-0.0076	-0.0219**	0.0011
	(-0.88)	(-2.15)	(0.25)
LnEDU	-0.1259**	-0.1128**	-0.1164**
	(-2.38)	(-2.22)	(-2.24)
LnGDPC	-0.0631***	-0.0648***	-0.0641***
	(-3.66)	(-3.83)	(-3.71)
LnPOP	0.0256**	0.0263**	0.0259**
	(2.02)	(2.11)	(2.05)
LnTRADE	0.1209***	0.1573***	0.1243***
	(3.45)	(4.01)	(3.34)
LnINF	0.0224	0.0142	0.0147
	(0.36)	(0.23)	(0.23)
Observations	100	100	100
R-Squared Within	0.4870	0.5073	0.4833

Note: Values in parentheses are t-statistics. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

4.2 Estimating the Effect of Sectoral FDI on Consumption Expenditure Inequality at the Regional Level

Tables 6-8 show the results of sectoral FDI on consumption expenditure inequality across the five regions of Thailand by using the FE model.

The results reveal that FDI in the three sectors has a negative and statistically significant relationship with consumption expenditure inequality at the 1% level of significance. The result is robust to the addition of other control variables. This implies that the FDI in the three sectors helps to increase income, but does not help to lower the income inequality. As income increases, marginal

propensity to consume decreases. This is in line with the concept of Marginal Propensity to Consume that states that an increase in personal consumer spending (consumption) occurs with an increase in disposable income (income after taxes and transfers). However, after reaching a certain point, marginal propensity to consume will decline with an increase in income. This is because as the income increases, high-income people have the tendency to consume less and save more, whereas low-income people have the tendency to consume more than high-income people; hence, the Gini consumption will eventually decrease. Therefore, investment in these sectors will help to increase the income of many laborers, which leads to a decrease in consumption expenditure inequality.

Similarly, the increase in education level is another important factor that has a great influence on improving consumption expenditure distribution. However, trade openness seems to worsen consumption expenditure.

Table 6. The Effects of FDI (Agricultural Sector) on Consumption Expenditure Inequality

Dependent Variable: LnGCONSUMP					
Fixed Effects					
	(1)	(2)	(3)	(4)	(5)
LnFDIA	-0.0178***	-0.0188***	-0.0163***	-0.0141***	-0.0140***
	(-3.40)	(-3.65)	(-3.31)	(-2.97)	(-2.96)
LnEDU	-0.1627***	-0.1257***	-0.2315***	-0.1599***	-0.1260**
	(-7.24)	(-4.55)	(-5.70)	(-3.59)	(-2.16)
LnGDPC		-0.0517**	-0.0059	-0.0471*	-0.0456
		(-2.21)	(-0.23)	(-1.70)	(-1.64)
LnPOP			0.1979***	0.0977	0.1204*
			(3.41)	(1.54)	(1.76)
LnTRADE				0.1346**	0.1387***
				(3.24)	(3.31)

LnINF					-0.0592 (-0.90)
Observations	100	100	100	100	100
R-Squared Within	0.3605	0.3928	0.4615	0.5176	0.5219

Note: Values in parentheses are t-statistics. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Table 7. The Effects of FDI (Manufacturing Sector) on Consumption Expenditure Inequality.

Dependent Variable: LnGCONSUMP					
Fixed Effects					
	(1)	(2)	(3)	(4)	(5)
LnFDIM	-0.0187*** (-3.52)	-0.0193*** (-3.70)	-0.0175*** (-3.53)	-0.0162*** (-3.47)	-0.0162*** (-3.46)
LnEDU	-0.1471*** (-7.11)	-0.1107*** (-4.16)	-0.2227*** (-5.54)	-0.1486*** (-3.42)	-0.1150** (-2.01)
LnGDPC		-0.0493** (-2.12)	-0.0025 (-0.10)	-0.0472* (-1.73)	-0.0457* (-1.67)
LnPOP			0.2046*** (3.57)	0.0962 (1.54)	0.1188* (1.77)
LnTRADE				0.1421*** (3.50)	0.1462*** (3.58)
LnINF					-0.0587 (-0.91)
Observations	100	100	100	100	100
R-Squared Within	0.3656	0.3951	0.4693	0.5329	0.5371

Note: Values in parentheses are t-statistics. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Table 8. The Effects of FDI (Service Sector) on Consumption Expenditure Inequality.

Dependent Variable: LnGCONSUMP					
Fixed Effects					
	(1)	(2)	(3)	(4)	(5)
LnFDIS	-0.0124***	-0.0122***	-0.0134***	-0.0112***	-0.0110***
	(-3.25)	(-3.25)	(-3.86)	(-3.27)	(-3.22)
LnEDU	-0.1373***	-0.1051***	-0.2408***	-0.1737**	-0.1456**
	(-6.74)	(-3.92)	(-6.01)	(-3.88)	(-2.48)
LnGDPC		-0.0427	0.0123	-0.0276	-0.0265
		(-1.81)	(0.49)	(-0.99)	(-0.95)
LnPOP			0.2428***	0.1454**	0.1634**
			(4.29)	(2.28)	(2.39)
LnTRADE				0.1225***	0.1261***
				(2.93)	(2.99)
LnINF					-0.0483
					(-0.74)
Observations	100	100	100	100	100
R-Squared Within	0.3543	0.3765	0.4084	0.5267	0.5296

Note: Values in parentheses are t-statistics. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

The results of sectoral FDI on consumption expenditure inequality using the RE model can be found in Table 9. The estimation results of the RE model are consistent with the FE model's results. The findings reveal that FDI in the three sectors has contributed to reducing the consumption expenditure inequality across the five regions of Thailand, and an increase in education is another important factor that is likely to lower the income gap. However, trade liberalization and regional GDP per capita have contributed to increasing income inequality.

Table 9. The Effects of FDI Sectors on Consumption Expenditure Inequality (Random Effects)

Dependent Variable: LnGCONSUMP			
	Agricultural Sector	Manufacturing Sector	Service Sector
LnFDI	-0.0142*** (-2.99)	-0.0102*** (-2.97)	-0.0089*** (-2.48)
LnEDU	-0.1249** (-2.52)	-0.1207** (-2.44)	-0.1224*** (-1.60)
LnGDPC	-0.0464*** (-4.32)	-0.0450*** (-4.17)	-0.0285 (-1.17)
LnPOP	0.0201*** (3.06)	0.0193*** (2.91)	0.0306 (1.10)
LnTRADE	0.1525*** (4.11)	0.1565*** (4.24)	0.2674*** (4.93)
LnINF	-0.0084 (-0.14)	0.0118 (0.19)	0.0324 (0.29)
Observations	100	100	100
R-Squared Within	0.5047	0.5032	0.5073

Note: Values in parentheses are t-statistics. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

4.3 Estimating the Effects of Sectoral FDI on Absolute Poverty at the Aggregate Level

Tables 10 present the results of FDI in the three sectors (the agricultural sector, manufacturing sector and service sector) on absolute poverty by using the poverty headcount ratio at $1.90. The result reveals that FDI in the agricultural sector and manufacturing sector are positive and statistically significant with the absolute poverty, whereas FDI in the service sector has a negative and statistically significant relationship at the 1% level and is robust to the addition of other control variables. This implies that FDI in the service sector can help to reduce

absolute poverty rate, whereas FDI in the manufacturing sector and agriculture do not promote the reduction of absolute poverty but seem to even worsen the absolute poverty. Since the 1990s, the service sector had been experiencing steady growth due to the boom of the tourism industry. The service sector is not only the driver of Thailand's economy but also comprises of various industries such as tourism, health, transportation, retail, etc. that account for approximately 40% of Thailand's labor force. Although an increase in FDI in the service sector can help to increase job opportunities for labor, which lead to an increased income, it still cannot reduce the poverty rate of Thailand.

The results of sectoral FDI on absolute poverty using the poverty headcount ratio at $3.30 and $5.50 for robustness check can be found in Table 11. The results are consistent with the poverty headcount ratio at $1.90.

Table 10. The Effects of FDI Sectors on Absolute Poverty

Dependent Variable: Poverty Headcount Ration $1.90			
	Agricultural Sector	Manufacturing Sector	Service Sector
FDI	0.0046***	0.0047**	-0.0126***
	(3.06)	(2.76)	(-3.96)
EDU	0.0172*	0.0174*	0.0124
	(1.96)	(1.90)	(1.59)
INF	-0.0923	-0.1093	-0.0133
	(-1.28)	(-1.43)	(-0.21)
GDPC	0.0044	0.0004	00004
	(1.10)	(1.11)	(1.30)
POP	-0.1991	-0.1623	-0.7474***
	(-1.41)	(-1.04)	(-5.18)
TRADE	-0.0100	-0.0055	0.0003
	(-1.00)	(-0.53)	(0.04)
Observations	20	20	20
R-Squared	0.9151	0.9078	0.9338

Note: Values in parentheses are t-statistics. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Table 11. The Effects of FDI Sectors on Absolute Poverty.

	Poverty Headcount Ration $3.20			Poverty Headcount Ration $5.50		
	Agricultural Sector	Manufacturing Sector	Service Sector	Agricultural Sector	Manufacturing Sector	Service Sector
FDI	0.0024***	0.0023**	-0.0056***	0.0026**	0.0019	-0.0072***
	(3.78)	(2.88)	(-3.52)	(2.77)	(1.65)	(-3.61)
EDU	0.1060**	0.1069**	0.0846**	0.0146	0.0155	-0.0127
	(2.79)	(2.49)	(2.12)	(0.27)	(0.25)	(-0.26)
INF	-0.6720**	-0.7458**	-0.3009	-0.7394	-0.7775	-0.2894
	(-2.16)	(-2.09)	(-0.91)	(-1.64)	(-1.49)	(-0.71)
GDPC	0.0025	0.0025	00026	0.0059	0.0002	0.0016
	(1.50)	(1.37)	(1.49)	(0.02)	(0.05)	(0.08)
POP	-1.2543*	-1.1569	-3.8700***	-1.9839**	-2.1219*	-5.1058***
	(-2.06)	(-1.59)	(-5.31)	(-2.25)	(-1.98)	(-5.63)
TRADE	-0.0749	-0.0524	-0.0267	-0.0907	-0.0707	-0.0309
	(-1.73()	(-1.06)	(-0.58)	(-1.44)	(-0.97)	(-0.54)
Observations	20	20	20	20	20	20
R-Squared	0.9729	0.9653	0.9709	0.9895	0.9863	0.9917

Note: Values in parentheses are t-statistics. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

5. Conclusion and Policy Recommendations

The effects of FDI on income inequality has been explored by many researchers in the past, where some findings have revealed that FDI helps to reduce income inequality and others have shown that FDI leads to an increase in income inequality. Therefore, this study aims to analyze the impact of sectoral FDI on inequality across the five regions of Thailand over the period of 1998–2017 by using the FE model and the RE models to show the robustness of the results.

5.1 Conclusion

The study has reached the following main findings:

First, the estimation result on the effects of sectoral FDI on income inequality at the regional level reveals that FDI in the manufacturing sector has a negative and statistically significant relationship with income inequality and is consistent for both the FE model and the RE model. This implies that huge inflows of FDI into the manufacturing sector not only has a strong impact on income distribution but also has contributed to reducing income inequality across the five regions of Thailand. As Thailand's comparative advantage lies in the manufacturing sector, especially in the labor-intensive manufacturing industries, FDI in the manufacturing sector can lead to higher investment and help to utilize low-income unskilled labors with more job creations. This employment effects not only will increase the income of low-income unskilled labor but also are beneficial to the reduction of the income gap in the economy. The finding supports the Hecksher-Ohlin model and the Stolpher-Samuelson theorem, which hypothesize that an increase in FDI leads to lower income inequality due to the increase of the demand for unskilled labors in the host country. This result also supports the Kuznets inverted–U curve hypothesis, which hypothesize that an increase in FDI leads to an increase in income inequality, but at a decreasing rate over time. New technological innovation from the MNES tends to increase the income gap, as skilled labors are employed to imitate new technology. However, the income gap will decrease over time, as less skilled labor is used when the new technology has been implemented. In addition, secondary education has contributed to reducing income inequality in Thailand. The result is in line with the previous studies of Tsai (1995) and Jensen and Rosas (2007), that have pointed out that an increase in education is likely to increase human capital, which leads to more job creation for unskilled workers and, thus, has a significant effect in

lowering the overall income inequality. Trade openness, however, worsens the income distribution in Thailand, as it will benefit only the export sector and affect the import-competing sector. Therefore, FDI not only can increase employment rate for many labors, but also can generate positive spillover effects to the host countries with the transfer of new technology, capitals inflows and spillover of knowledge, which eventually leads to a decrease in income distribution.

Second, the estimation result on the effects of sectoral FDI on consumption expenditure inequality at the regional level reveals that FDI in the three sectors has a negative and statistically significant relationship with consumption expenditure inequality and is consistent for both the FE model and the RE model. This implies that investment in these sectors will help to increase the income of many laborers. However, low-income people have the tendency to consume more than high-income people; hence, this leads to a decrease in consumption expenditure inequality.

Third, estimation result on the effects of sectoral FDI on absolute poverty at the aggregate level reveals that except for the service sector, the other two sectors have contributed to increasing or worsening the absolute poverty of Thailand. Therefore, while attracting FDI into Thailand, the government also needs to adopt measures to reduce the absolute poverty rate.

5.2 Policy Recommendations

FDI, as one of the key drivers of globalization, has contributed to reducing income inequality across the five regions of Thailand. It can affect income distribution through impacting employment and wage structure, thus, contributing to economic growth and changing factors of endowments of developing countries. From the above estimation results, this paper concludes that FDI has two mechanisms in reducing the inequality of social consumption expenditure. One is to directly promote the narrowing of income inequality, and the other is

to increase the consumption of low-income people by promoting the increase of income under the effects of decreasing consumption propensity. Thus, the result of this research may provide policy recommendations for Thailand.

First, the government should encourage more innovation, R&D and value creation in the manufacturing and service sectors. Offering more incentives to invest in these sectors not only helps to enhance national competitiveness but also helps to reduce social and economic inequality.

Second, the government should encourage FDI flows into the sectors that are in line with Thailand's overall economic structural adjustments and industrial upgrading. Currently, the government has targeted five additional New S-Curve industries to accelerate Thailand's future growth: automation and robotics, aerospace, bioenergy and biochemicals, digital and medical and healthcare. Maximizing the benefits from FDI in these industries helps to decrease the unemployment rate, foster productivity and propel Thailand toward a higher stage of economic development.

Third, the government should focus on improving the quality of education at all levels, including access to quality education at both urban and rural areas. An increase in government expenditure on education is likely to increase human capital that leads to more job creation for unskilled workers, which would eventually narrow the gap between the demand and supply of sufficiently skilled labor.

Therefore, it is favorable for the five regions to attract more FDI, as it can help to increase investment and employment opportunities, which, in turn, will lead to an increase in labor wage and, ultimately, reduce the income gap between the affluent and the poor across the five regions of Thailand.

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