

# The effect of FDI on Inequality-adjusted HDI (IHDI) in Asian countries

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## Abstract

Inequality-adjusted Human development index (IHDI) is a new measurement of countries' human development with the big advantages of considering human development with the control of inequality – a big concern of countries. Despite the fact that the impact of Foreign direct investment on human development has drawn much attention of economists, we have not found any researches using IHDI as a proxy for human development, especially for Asian countries. From the hope to narrow this gap, we have carried out this empirical research and we found that *FDI did not significantly affect human development in Asian countries in general and even in each of the three groups of very high, high and medium human development countries. Moreover, FDI did raise the inequality in income, but it helped to reduce the inequality in education.* In addition, the higher institutional quality in general did raise the countries' human development, and among sub-indices of institutional quality, better political situation and law did also lift up the human development levels of countries.

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*Key-words:* Foreign Direct Investment, Inequality-adjusted Human Development Index

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## **1. Introduction**

In the context that countries worldwide make lots of efforts to fulfill the targets of sustainable development, human development (measured by human development index - HDI) is considered as a more and more important factor which countries care about. HDI is calculated with regards to three aspects of education, longevity and income. Until now, the index is still the most popular, widely used measurement of human development. However, despite these facts, HDI has its own weakness that there is no consideration of inequality included in human development across regions of countries though the matter of unequal distribution gradually becomes a big social concern these days. As a result, a new measurement which is Inequality-adjusted Human Development Index (IHDI) has been set up and calculated by United Nations Development Program (UNDP). The new variable is a better proxy for sustainable development as it covers not only the human development in general, but also the equality in human development as well.

Foreign direct investment (FDI) is a kind of foreign flows which have played a considerably significant role to host countries's economic growth and social development in a certain aspects. Nevertheless, on the contrary of its positive effects, FDI on its own cause negative consequences to the recipients for both human development and inequality (mainly about income inequality) of countries. As a result, the final impact of FDI on human development with the control of inequality of countries is still in doubt.

However, in our perception, there have been no studies that have looked into Inequality-adjusted human development (meaning that human development is taken into consideration as inequality problem has been controlled for). To narrow the gap, the paper did a research on the effect of FDI inflows on IHDI in 23 Asian countries for the period from 2013 to 2015. We have found that FDI did not significantly affect human development in Asian countries in general and even in each of the three groups of very high, high and medium human development countries. Moreover, FDI did raise the inequality in income, but it helped to reduce the inequality in education. In addition, the higher institutional quality in general did raise the countries' human development, and

among subindices of institutional quality, better political situation and law did also lift up the human development levels of countries.

The remainder of the paper is organized as follows. Section 2 presents the literature review, while Section 3 looks into the theoretical effect of FDI on IHDI and Section 4 is about the data. Next section is about the empirical strategies. Section 6 shows the main results. The final section is the conclusion.

## **2. Literature review**

In our perception, there have been no recent researches about the impact of FDI on Inequality-adjusted Human development index (IHDI) in the world. Most researches do just focus on the impact of that financial flow on either HDI (not IHDI) or inequality (mostly on income inequality).

*Regarding the impact of FDI on HDI*, Santosa (2014) in the paper of “Analysis of the impact of Foreign direct investment on Social development in Indonesia and other ASEAN countries” did a research with a stress on Indonesia and other ASEAN countries after the financial crisis during the period of 1999-2012. The paper figured out the unclear influence of FDI in 7 ASEAN countries of Singapore, Malaysia, Brunei Darusalam, Thailand, Indonesia, Lao và Campuchia, but the positive one of FDI on human development in Vietnam and Myanmar, and negative on that in Philippines. Colen et. al. (2009) supported the idea that FDI could make a positive contribution to human development of host countries given appropriate conditions. The positive effect of FDI on HDI was also proved in the research of Makki and Somwaru (2004). In contrast, Sharma and Gani (2004) as looking into Latin American countries didn’t find any evidence for a significant impact of FDI on HDI.

*Relating to the effect of FDI on income inequality*, this is a topic which has drawn much attentions of economists, epecially after the release of Human development report in 1999. According to the report, the gap between rich and poor countries tended to widen in this modern era with the fast technological development. Basu et. al. (2007) in the paper of “FDI, Inequality and Growth” did carry out an empirical research about if FDI raised inequality in 119 developing countries from 1970 to 1999. The results presented a clear evidence about the existence of this effect. Vietnam Industrial Investment Report in 2011 of UNIDO (2012) also showed that FDI led to rise of

income inequality in the country due to the fact that FDI created a big gap in the wage between FDI and non-FDI enterprises. This point was also supported by Pham Hoang Mai (2004) in "FDI and Development: Policy implication". Meanwhile, in their research, Figini (2011) showed two opposite outcomes for two groups of countries. For the group of OECD countries, FDI did not raise the inequality, while for the one of non-OECD, the income inequality rose considerably. In contrast, other researches such Feenstra and Hanson (2001) did find the negative effect, meaning that FDI helped to reduce the inequality.

### **3. Theoretical effects of FDI on IHDI**

In theory, the effects of FDI on different variables are based on two main perspectives of **capital widening** and **capital deepening**. As a capital flow, FDI could help host countries to accumulate more capital (that direct effect is called **capital widening**). In addition to that, FDI with its advantages of pushing technology transfer, improving labor skills, expanding the linkages of domestic firms with global networks, etc., could also have spillover effects which raise host countries' productivity (this impact is called **capital deepening**).

Inequality-adjusted Human development index (IHDI) is developed by United Nations Development Program (UNDP). This index is better than the previous one of Human development index (HDI), because beside considering the 3 sub-indices of health (measured by life-expectancy), education (measured by adult literacy index and gross enrollment combined index) and income (measured by GDP per capita), IHDI also adjusts the inequality among regions for each above sub-index. Inequality for sure is also a serious problem that countries care about as human development is considered.

The impact that FDI has on IHDI is based on its effect on IHDI's aspects (including income, health, education, and inequality). As a consequence, the following section illustrates the theoretical impacts of FDI on IHDI's components via either capital widening or capital deepening.

#### ***3.1 Positive impacts***

##### ***3.1.1 The positive impacts of FDI on income***

FDI can help to raise the income of labors mostly by creating jobs and developing local skills. Since investment from other countries is used to promote businesses in a

developing country, it can generate several jobs for local people. Karlsson (2007) stated in “FDI and Job Creation in China” that FDI did positively impact employment growth, which added more income to households and strengthening spending power for local residents. To be more specific, foreign direct investment flows into the country through many channels, including multinational companies which bring advanced technologies and managerial experience. Those skills have not yet developed properly in less developed countries. According to Kurtishi -Kastrati (2013), the foreign firms have high quality training given to their employees. Some of those skills are taken with the workers when they enter domestic firms. Consequently, the host countries can benefit from “managerial superiority” of multinational companies by learning and imitating. Simultaneously, employees can have higher income as they upgrade their skills and apply for their later jobs.

The income also rises as FDI flows raise the countries’ economic growth, which indirectly boosts the income. Tran Trong Hung (2005) stated in “Impact of Foreign Direct Investment on Poverty Reduction in Vietnam” that FDI, through economic growth and employment rate, can reduce poverty rate and improve quality of local people. The increase in economic growth and demand for employment is certainly contributed by the increase in disposable income of households overall, which means the number of people living below the poverty line is reduced.

### *3.1.2 The positive impacts of FDI on health*

FDI can affect health of people in a country through several channels as follows:

The first channel is self – consciousness of people on health issues as their income increases. When people earn more money and they are aware of the importance of health, they are willing to spend more share of their disposable income on health service. Furthermore, they can also use that extra income to buy more high quality consumption necessities such as organic food. Higher spending on healthcare and high quality goods will make people’s become better, which then gradually increase life expectancy.

FDI could also help improve health conditions in recipient countries by not only paying higher salary than the domestic firms but also providing safe working places and better social services. Safe workplace is one of compulsory criteria for operation in

developed countries and expected to be exercised by the company all the time. When foreign firms set up business in the host country, it also pays attention to working condition of the employees than the domestic ones.

### *3.1.3 The positive impacts of FDI on education*

Education is always an essential part of a country's development, which FDI certainly creates a significant impact on.

Nowadays, more and more foreign investors consider education is a good way to invest in a country. They usually seek for countries that have high demand for global standard education or desire to send people to study abroad. By investing a system of education from elementary schools to universities in the host countries, foreign investors create a win – win situation: they could make money and eventually utilize the human resource while local residents can receive high quality education standard at a much lower price. Therefore, the school enrollment rate in the host countries will increase since now people will remain in their countries while study in world – standard classes.

What's more, FDI inflows make education become more diversified, creating more options for people in host countries to choose when deciding future careers. After finishing university, some people will choose to pursue master degree immediately. In the other way, some will choose to work for foreign companies and those companies will fund them to pursue certificates relevant to their jobs rather than higher education.

### *3.1.4 The positive impacts of FDI on inequality*

Working for foreign enterprises might associate with higher income on national scale. However, it does not address the inequality in income distribution which result in the remaining of poverty. Inequality in income distribution is typically discussed with the context of North – South models. The availability of cheap labor in poor countries (the South) encourages richer countries (the North) to undertake efficiency – seeking FDI by offshoring labors intensive parts of production process. This may increase skills to the South but also the inequality. As the foreign firms are usually larger, more productive and more skills intensive, they can put pressure on wages in domestic counterparts. Foreign investors are able to use their technological advantage to increase the efficiency of companies taken over. If such efficiency increase are achieved through

automation, the primary employees to suffer from that are the low-paid (low-skilled), who may be more easily replaced than the higher paid (skilled) employees.

### **3.2 Negative impacts**

#### *3.2.1 The negative impacts of FDI on income*

Most negative impacts of FDI on income come from the impact of FDI on the rise of income inequality as mentioned in the previous section.

#### *3.2.2 The negative impacts of FDI on health*

Although it is argued that FDI can have positive impact on health, there are some evidences which support the contrast argument.

First, given the concern of income, it is well known that increases in income may lead to higher life expectancy in poor countries; however, as income rises, the relationship becomes weaker or even absent among the richest countries. In other words, health is affected by standard of living in low income countries, while an increase in income has little or even no effect on health in high income countries. Indeed, if higher income associates with longer working hours leading to less social contact, more stress, less sleep, and increase in unhealthy food consumption, it could be that income – health relationship become negative. Moreover, multinational corporations (MNCs) have been often criticized due to discriminative and exploitative practices toward local employees and other resources of the host country. Regarding to the local employees, the working conditions of them in firms sponsored by FDI have been alarming. The presence of sweatshops in some countries, which subject laborers, who are sometimes child laborers, to dangerous, sub-human working conditions, often in violation of local workplace regulations, is a serious issue. According to Brown et. al. (2004), although multinationals pay their workers more than their domestic competitors, many people have complained that multinationals abuse their workers in sweatshop conditions, and have demanded that products from these sweatshops be banned from US markets.

Second, there are many studies on the effect of environmental pollution on health. Eskeland and Harrison (2003) stated that the so – called pollution of intensive goods tends to migrate from countries with high standard of environment (typically developed countries) to countries where this standard is low (developing countries). Indeed, in order to cut cost, foreign companies usually released unprocessed waste to the

environment in domestic countries, causing dramatic environment damage and eventually negatively affect health of local people.

The other effect of FDI on health may be reflected by people travelling for business, which result in the spread of infectious diseases.

In summary, FDI can have both positive, as discussed in the previous section, and negative effects on health. The net effect will vary with level of income.

### *3.2.3 The negative impacts of FDI on education*

According to De Groot (2014), the increases in FDI are associated with decreases in HDI as a result of deteriorating government policy. Due to the attractiveness of FDI, one government may have two possibilities: invest in FDI promotion policies or invest in other public projects. This implies that such FDI promotion policies by definition reduce other public expenditures which is not optimal for the social welfare. For example, foreign investor may ask for the expansion of infrastructure which government must pay for by cutting down the expenditures in education, which would have negative effect on HDI.

The negative effect of FDI on education also depends on type of foreign investment. For example, horizontal foreign investors tend to seek potential market and they must support development of the host country's market. Meanwhile, efficiency – seeking investors tend to look for cheap labor only. Therefore, they usually offer lower wages and in consequence, low motivation for the local to pursue tertiary education.

In short, FDI can have both positive and negative impacts on HDI. Understanding those impacts and analyzing in the case of Vietnam will help to generate suitable orientations and policies to further reinforce the positive influences and hinder the negative ones in order to improve HDI in Vietnam.

### *3.2.4 The negative impacts of FDI on inequality*

The explanation for these impacts clarified in the paper of Im and McLaren (2015) is that inward FDI could compete with domestic capital for domestic workers, as a result, the income of domestic investors will reduce while that of domestic workers will rise. That helps to narrow the income gap. The idea is withdrawn from political argument of Pandya (2014) that the normal people are in favor of FDI.

#### 4. Empirical strategies

Along with FDI, Institution is also an important factor which could affect human development of a country. The role of Institutional quality is also widely acknowledged in the development fields. As a result, in addition to FDI, the Institutional quality is also considered as a factor affecting human development. From those points, the main empirical specification for Fixed effect model<sup>2</sup> for panel data is as follows:

$$\mathbf{LogIHDI}_{it} = \alpha \mathbf{LogFDI}_{it} + \beta \mathbf{LogPRS}_{it} + \phi_t + \epsilon_{it} \quad (1)$$

Moreover, to further look into the impact of FDI inflow on particular aspects of inequality, the additional specification is:

$$\mathbf{Inequality}_{kit} = \alpha \mathbf{LogFDI}_{it} + \beta \mathbf{LogPRS}_{it} + \phi_t + \epsilon_{it} \quad (2)$$

The final specification that focuses on the effect of specific sub-indices of institutional quality on IHDI is:

$$\mathbf{LogIHDI}_{it} = \alpha \mathbf{LogFDI}_{it} + \beta \mathbf{LogPRS}_{lit} + \phi_t + \epsilon_{it} \quad (3)$$

where  $i$  denotes country  $i$ ,  $t$  is year  $t$ ,  $k$  is specific aspect of Inequality (comprising of Inequality in life expectancy, education and income),  $l$  is particular sub-index of Institutional quality (mentioned below).

- ❖  $\mathbf{LogIHDI}_{it}$  is the natural logarithm of Inequality-adjusted Human development index of country  $i$  in year  $t$ ;
- ❖  $\mathbf{LogFDI}_{it}$  is the natural logarithm of FDI inflow of country  $i$  in year  $t$ ;
- ❖  $\mathbf{LogPRS}_{it}$  is the natural logarithm of index calculated from sub-indices taken from International Country Risk Guide data provided by PRS group. This variable is a proxy for institutional quality of countries. Sub-indices are comprised of:
  - $\mathbf{Prsva}_{it}/\mathbf{Prsva}_{vnt}$  is the index of Voice and Accountability of country  $i$ /Vietnam in year  $t$ ;
  - $\mathbf{Prsge}_{it}/\mathbf{Prsge}_{vnt}$  is the index of Government Effectiveness of country  $i$ /Vietnam in year  $t$ ;

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<sup>2</sup> As Fixed effect could help control for all countries' time-invariant characteristics, it is considered a good model for panel data.

- $Prscc_{it}/Prscc_{vnt}$  is the index of Control of Corruption of country i/Vietnam in year t;
- $Prsrq_{it}/Prsrq_{vnt}$  is the index of Regulatory Quality of country i/Vietnam in year t;
- $Prspv_{it}/Prspv_{vnt}$  is the index of Political Stability and Absence of Violence of country i/Vietnam in year t;
- $Prsrl_{it}/Prsrl_{vnt}$  is the index of Rule of Law of country i/Vietnam in year t.

❖  $Inequality_{kit}$  is the value of Inequality in different aspects of human development (life expectancy, education and income) of country i in year t (in percentage);

❖  $\phi_t$  denotes time dummies;

The coefficient of interest in the previous equation is  $\alpha$ , which measures the effect of FDI inflows on Inequality-adjusted Human development index (equations 1 and 3) and on Inequality (equation 2) for countries in Asia. If FDI does help these Asian countries improve their human development (equations 1 and 3) or raise the inequality (equation 2), this coefficient will be positive.

Table 1 and 2 present the summary statistics and correlation of the main variables.

**Table 1: Summary Statistics of Variables**

Variable	Obs	Mean	Std. Dev.	Min	Max
LogIHDI	66	-.5255024	.1944514	-.9808292	-.2319321
LogHDI	66	-.3217014	.1292291	-.6217572	-.10425
LogFDI	66	2.213.566	1.368.926	183.622	2.496.054
LogFDI*LogPRS	66	-132.753	4.285.111	-2.308.237	-3.616.929
inequalityinlifeexpectancy	66	1.356.667	6.797.722	3.2	32.8
inequalityineducation	66	1.897.273	1.247.959	2.1	45.2
inequalityinincome	66	2.074.545	8.933.415	4.5	46.6
Logadjustedlifeexpectancy	66	.7149091	.1159188	.479	.947
Logadjustededucation	66	.5485909	.159726	.204	.798
Logadjustedincome	66	.5717727	.1025646	.357	.773
LogPRS	66	-.6016369	.1922187	-1.035.637	-.1566538
LogPRSpva	66	-.5680081	.2700943	-1.108.663	-.0833816
LogPRSpv	66	-.4718358	.1669532	-.8209805	-.198451

LogPRSge	66	-.6634073	.3792136	-1.386.294	0
LogPRSrq	66	-.4941704	.2082775	-1.139.434	-.0512933
LogPRSc	66	-.604363	.3021572	-1.386.294	-.1863296

**Table 2: Correlations of Variables**

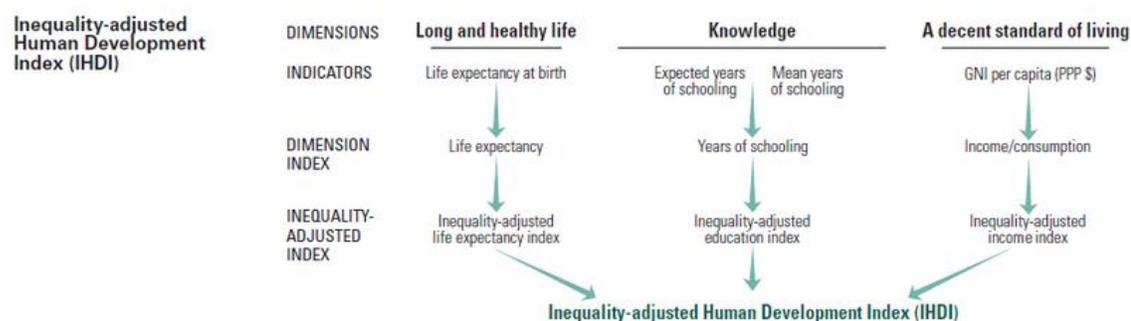
	LogIHDI	LogHDI	LogFDI	inequalityinlifeexpectancy	inequalityin education	inequalityin income	LogPRS
LogIHDI	1						
LogHDI	0.9388	1					
LogFDI	0.0562	0.1135	1				
inequalityinlifeexpectancy	-0.7962	-0.8587	-0.1051	1			
inequalityineducation	-0.7765	-0.5699	0.1310	0.4590	1		
inequalityinincome	-0.1818	0.0609	0.0185	-0.2858	0.2157	1	
LogPRS	0.3876	0.4602	0.1634	-0.4343	-0.0752	0.0155	1

## 5. Data

This section discusses briefly about the data to construct the sample with the range from 2013 to 2015.

***Inequality-adjusted Human development index (IHDI) data:*** The data is taken from the official website of United Nations Development Programme (UNDP). The data for the other variables of *Inequalityinlifeexpectancy*, *Inequalityineducation*, *Inequalityinincome*, *Inequalityadjustedexpectancy*, and *Inequalityadjustededucation*, *Inequalityadjustedincome* are also supplied by UNDP. Figure 1 describes steps to calculate IHDI which is considered to be a more efficient measurement of Human development as the problem of inequality across sections is dealt with.

**Figure 1: Steps to calculate Inequality-adjusted Human development index**



Source: The official website of United Nations Development Programme (UNDP)

<http://hdr.undp.org/en/content/inequality-adjusted-human-development-index-ihdi>

**FDI data:** The authors collect the data of net FDI inflows to country  $i$  (in current USD) from the online database of World Development Indicator on the website of World Bank.

**PRS (Institution) data:** Indices for countries' institution such as Political Stability and Absence of Violence ( $Prspv_{it}$  and  $Prspv_{vnt}$ ), Regulatory Quality ( $Prsrq_{it}$  and  $Prsrq_{vnt}$ ), Control of Corruption ( $Prscc_{it}$  and  $Prscc_{vnt}$ ), Voice and Accountability ( $Prsva_{it}$  and  $Prsva_{vnt}$ ), Government Effectiveness ( $Prsge_{it}$  and  $Prsge_{vnt}$ ) and Rule of Law ( $Prsrl_{it}$  and  $Prsrl_{vnt}$ ) are from the International Country Risk Guide (ICRG) database provided by PRS Group. The final index of PRS is calculated by taking the simple average of these above six sub-indices. According to World Bank<sup>3</sup>, ICRG is a good institutional data and it is widely used in published studies.

## 6. Results

### 6.1 Baseline results for the effect of FDI on human development

The baseline results for the impact of FDI inflows on human development are shown on **Table 3, Columns (1)-(3)**. Since the data for IHDI from UNDP and those for other variables of FDI and PRS are not available for all Asian countries, the sample just covers 66 observations of Asian countries during the period of 2013-2015. The estimators for Fixed effect (FE) model are displayed with time-dummies controlled. **From Columns (1)-(3)**, it could be seen that **FDI** consistently has no statistically significant effects on IHDI of Asian countries, meaning that in fact, FDI inflows do not really help host countries improve their human development as inequality problem is considered. Even as FDI of the previous year is controlled for in Column 2, the effect still remains insignificant. Regarding **institutional quality**, Column (1) illustrates the significant positive impact of PRS, showing that on the contrary of FDI's effect, institutional quality plays an important role to the enhancement of human development.

For checking if the above impacts stay the same as HDI rather than IHDI is considered, the authors run the regression with the results presented in Column (4). The evidence proves the consistent insignificant effect of FDI and positive one of institutional quality on Human development in both cases with and without controlling

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<sup>3</sup> <http://siteresources.worldbank.org/INTLAWJUSTINST/Resources/IndicatorsGovernanceandInstitutionalQuality.pdf>

for the problem of inequality. Column (5) demonstrates the influences of independent variables on the difference between IHDI and HDI. Again, the insignificant coefficient of FDI supports that FDI does not really help Asian countries in the sample to be better in human development.

**Table 3: Baseline results for the effects of FDI on human development**

	LogIHDI			LogHDI	Loss
	(1)	(2)	(3)	(4)	(5)
LogFDI	<b>-0.00316</b>	<b>0.0171</b>	<b>0.00755</b>	<b>-0.00381</b>	<b>-0.00894</b>
	(0.00389)	(0.0155)	(0.00632)	(0.00349)	(0.389)
LogPRS	<b>0.103**</b>	-0.645	0.00957	0.0750*	-1.905
	(0.0482)	(0.532)	(0.0642)	(0.0385)	(3.569)
_Iyear_2014	0.0153***	0.0153***	-0.0134***	0.0143***	-0.0775
	(0.00358)	(0.00348)	(0.00339)	(0.00299)	(0.295)
_Iyear_2015	0.0265***	0.0267***		0.0235***	-0.255
	(0.00551)	(0.00552)		(0.00452)	(0.360)
LogFDI*LogPRS		0.0342			
		(0.0247)			
LaglogFDI			-0.00161		
			(0.00584)		
Observations	66	66	43	66	66
R-squared	0.567	0.589	0.509	0.620	0.029
Countries	23	23	22	23	23
Type	FE	FE	FE	FE	FE
Regression	Xtreg	Xtreg	Xtreg	Xtreg	Xtreg
Timedummies	Yes	Yes	Yes	Yes	Yes

(Loss (in percentage) is the percentage difference between IHDI and HDI due to the controlling inequality. The panel technique of Fixed effect is applied. \*\*\*/\*\*/\* present significant level of t-statistics at %/5%/10% level.)

## 6.2 Results for the effect of FDI on IHDI by groups

To discover if the above effect of FDI on IHDI could change across groups of Asian countries, the authors categorize the sample into 3 groups. The classification of groups is based on the value of HDI with the reference from UNDP website (See Appendix for the list of countries included in the sample). Group 1 includes countries with very high human development ( $HDI \geq 0.8$ ); Group 2 contains countries with high human development ( $0.8 > HDI \geq 0.7$ ); Group 3 comprises of countries with medium human development ( $0.7 > HDI \geq 0.55$ ) (the rest group of low human development countries ( $HDI < 0.55$ ) includes just 1 country in the sample, hence it is not considered

here). The results from the Table present consistent insignificant effects of FDI on IHDI across all groups of countries from very high to medium human development.

**Table 4: Results for the effects of FDI on IHDI by groups**

	<b>LogIHDI</b>		
	HDIgroup1	HDIgroup2	HDIgroup3
	(1)	(2)	(3)
LogFDI	<b>0.0247</b>	<b>-0.00529</b>	<b>0.0469</b>
	(0.0268)	(0.0104)	(0.0250)
LogPRS	-4.243	0.0685	0.0575
	(2.294)	(0.0642)	(0.0898)
_Iyear_2014	-0.0219	0.0157**	0.0124**
	(0.0216)	(0.00571)	(0.00359)
_Iyear_2015	-0.00175	0.0269***	0.0270***
	(0.00504)	(0.00794)	(0.00586)
Observations	9	30	18
R-squared	0.415	0.592	0.834
Countries	4	10	6
Type	FE	FE	FE
Regression	Xtreg	Xtreg	Xtreg
Timedummies	Yes	Yes	Yes

(The classification of groups is based on the value of HDI. Group1: Countries with very high human development ( $HDI \geq 0.8$ ); Group 2: Countries with high human development ( $0.8 > HDI \geq 0.7$ ); Group 3: Countries with medium human development ( $0.7 > HDI \geq 0.55$ ).

The panel technique of Fixed effect is applied. \*\*\*/\*\*/\* present significant level of t-statistics at %/5%/10% level.)

### 6.3 Further analyses

#### a. Effects of FDI on equality in specific aspects

Beside the effect of FDI on human development in general, that on inequality is also of the authors' interest. Rather than looking into inequality generally, we consider the effects on inequality in specific aspects (life expectancy, education and income) of host countries. Results from Table 5 show the entirely different effects of FDI on distinguished dependent variables. It could be seen that while FDI inflows have no significant impacts on the inequality in life expectancy, they lead to the reduction in inequality in education, but the rise in the inequality in income. That means FDI inflows help to reduce the differences in education among regions, but make the gaps broader in income.

Table 6 explains further for these points in the way that FDI raise the education level of host countries, but reduce the income as these education and income levels have been adjusted for the inequality.

**Table 5: Results for the effects of FDI on inequality in specific aspects**

	<b>inequalityinlifeexpectancy</b>	<b>inequalityineducation</b>	<b>inequalityinincome</b>
	(1)	(2)	(3)
LogFDI	0.0102	<b>-1.140**</b>	<b>1.042*</b>
	(0.251)	(0.413)	(0.598)
LogPRS	-0.480	-3.416	-3.945
	(5.371)	(4.204)	(6.393)
_Iyear_2014	-0.000466	-0.728*	0.501
	(0.0430)	(0.409)	(0.610)
_Iyear_2015	-0.237	-1.211***	0.730
	(0.439)	(0.401)	(0.581)
Observations	66	66	66
Countries	23	23	23
Type	FE	FE	FE
Regression	Xtreg	Xtreg	Xtreg
Timedummies	Yes	Yes	Yes

(The dependent variables of Inequalityinlifeexpectancy, Inequalityineducation, Inequalityinincome are in percentage. The panel technique of Fixed effect is applied. \*\*\*/\*\*/\* present significant level of t-statistics at %/5%/10% level.)

**Table 6: Results for the effects of FDI on specific aspects of IHDI**

	<b>Logadjustedlifeexpectancy</b>	<b>Logadjustededucation</b>	<b>Logadjustedincome</b>
	(1)	(2)	(3)
LogFDI	-0.0107**	<b>0.0140**</b>	<b>-0.0138**</b>
	(0.00468)	(0.00637)	(0.00545)
LogPRS	0.120	0.0777	0.119
	(0.104)	(0.0981)	(0.114)
_Iyear_2014	0.00874*	0.0297***	0.00679
	(0.00433)	(0.00761)	(0.00837)
_Iyear_2015	0.0119	0.0611***	0.00592
	(0.00931)	(0.0105)	(0.00918)
Observations	66	66	66
Countries	23	23	23
Type	FE	FE	FE
Regression	Xtreg	Xtreg	Xtreg
Timedummies	Yes	Yes	Yes

(The panel technique of Fixed effect is applied. \*\*\*/\*\*/\* present significant level of t-statistics at %/5%/10% level.)

***b. Effects of FDI on IHDI controlling for particular subindex of institutional quality***

Institutional quality is also important for human development. In addition to the index of PRS, we would like to have a careful look into the effect of sub-indices of institutional quality on human development. The results illustrated in Table 7 also present consistent insignificant effect of FDI on IHDI regardless of sub-indices of institutional quality. The only two indices the coefficients of which are significant at 5% as controlling separately are PRSva (Voice and Accountability) and PRSrl (Rule of Law). PRSva is measured on the basis of Military in politics and Democratic accountability, while PRSrl is calculated with regard to Law and Order. The significant positive effects of these two variables on IHDI support that the political situation and law of host countries play an important role to their countries' development.

**Table 7: Results for the effects of FDI on IHDI controlling for the particular subindex of institutional quality**

	LogIHDI						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
LogFDI	<b>-0.00129</b>	<b>-0.00242</b>	<b>-0.00302</b>	<b>-0.00209</b>	<b>-0.00251</b>	<b>-0.00181</b>	<b>-0.00180</b>
	(0.00459)	(0.00420)	(0.00414)	(0.00422)	(0.00409)	(0.00412)	(0.00432)
LogPRSva	-0.00831	<b>0.0364***</b>					
	(0.0274)	(0.0109)					
LogPRSpv	-0.0248		0.0551				
	(0.0528)		(0.0386)				
LogPRSrq	0.0201*				0.0199		
	(0.0102)				(0.0121)		
LogPRSrl	<b>0.0847**</b>					<b>0.0761**</b>	
	(0.0405)					(0.0311)	
LogPRSc	-0.0269						-0.0187
	(0.0451)						(0.0412)
Iyear 2014	0.0163***	0.0156***	0.0150***	0.0150***	0.0147***	0.0160***	0.0154***
	(0.00433)	(0.00384)	(0.00363)	(0.00375)	(0.00370)	(0.00378)	(0.00408)
Iyear 2015	0.0287***	0.0274***	0.0267***	0.0274***	0.0269***	0.0276***	0.0283***
	(0.00633)	(0.00605)	(0.00597)	(0.00609)	(0.00580)	(0.00556)	(0.00671)
Observations	66	66	66	66	66	66	66
R-squared	0.597	0.546	0.549	0.535	0.550	0.580	0.538
Number of id	23	23	23	23	23	23	23
Type	FE	FE	FE	FE	FE	FE	FE
Regression	Xtreg	Xtreg	Xtreg	Xtreg	Xtreg	Xtreg	Xtreg
Timedummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PRScmpo	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(The panel technique of Fixed effect is applied. \*\*\*/\*\*/\* present significant level of t-statistics at %/5%/10% level.)

## 7. Conclusions

Using the data of 23 Asian countries during the duration of 2013-2015 and applying fixed-effect for the above panel data, our paper tried to clarify the impact of FDI inflows on Inequality-adjusted human development index (IHDI) of these countries. The findings prove for the insignificant effect of these financial flows on human development as inequality is controlled for. As a result, Asian countries do need to take a careful look into opposite effects (both positive and negative ones) of FDI as mentioned in the theoretical section on their human development. Especially from the perspective of inequality, FDI does raise the income inequality in these countries, and it even helps to reduce the inequality in education.

A further look into the role of institutional quality has shown that different from the impact of FDI, that of institution on human development is significantly positive. This means Asian countries should base more on their own institutional quality improvement rather than FDI attraction to raise the human development. Moreover, the aspects of institutional quality which they should think about first could be Political situation and Law.

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## APPENDIX

<b>Countries in the samples</b>	
ARMENIA	KAZAKHSTAN
AZERBAIJAN	KOREA, REP.
BANGLADESH	LEBANON
CYPRUS	MONGOLIA
INDIA	PAKISTAN
INDONESIA	PHILIPPINES
IRAN, ISLAMIC REP.	RUSSIAN FEDERATION
IRAQ	SRI LANKA
ISRAEL	THAILAND
JAMAICA	TURKEY
JAPAN	VIETNAM
JORDAN	