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Intellectual Property Rights, Foreign Direct Investment and Economic Growth

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ABSTRACT

The objective of this study is to investigate the moderating role of IPR on the impact of FDI inflows on economic growth. By include an interaction term for FDI and IPR in each model, Two-step System GMM was applied for three proxies of IPR, namely patent, trademark and industrial design on a panel of 103 countries from 1998 to 2013. The result shows that interaction between FDI-trademark and FDI-design obtained a positive and significant result towards economic growth. It can be concluded that countries with high IPR's could enhance their economic growth via higher inflows of FDI. A strict enforcement of IPR is vital in ensuring positive impact on economic growth as investors preferably place the FDI in a safe and secure nation that promises enforcement of law against imitation.

JEL Classification: F21**,** O11, O34

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INTRODUCTION

For the past few decades, many countries around the globe had opened up their markets to the world economy, with the aim to bring in more FDI which would increase the output of an economy. In addition, incoming FDI is able to promote job opportunity to the local community and at the same time increases output and local productivity. However, not every high recipient of FDI enjoyed high economic growth. Therefore, it is interesting to find out what kind of characteristic of a country is important to the FDI and economic growth.

Intellectual property rights (IPR) can be defined as creations or invention of the mind. Any creation or invention is meant to be protected as intellectual property. The common types of IPR granted to inventors of intellectual properties are trademarks, copyright, patents and industrial designs.[1] There are two views on the impact of IPR on FDI inflows. Firstly, high intellectual property rights encourage FDI inflow to host countries. Therefore establishments that seeking protection for their invention will opt to invest in a country with greater protection. This in turn, could increase incoming FDI, while could enjoy productivity increase in the nation as well. Despite this positive attribution of FDI, countries with better protection would encourage more transfer of technologies towards local firms. FDI is not only transfer of capital itself but also transfer of technology. An improved technology could in turn produce high quality product which come with IPR protection. Countries with stronger IPR protections are a safer vault for investors as their inventions or products are free from imitation (Alexiou et al., 2016; Frandsen, 2015; Kashcheeva, 2013). Thus, their rights are enforceable by law. These do encourage more inflow of FDI to countries with higher IPR.

Secondly, high IPRs may hinder the inflow of FDI. High IPRs raising the costs of product development as imitation is not allowed, this may shy away those would like to imitate and produce goods in shorter time. Therefore, it is interesting to know whether intellectual property right matters in the FDI-growth nexus. In other words, whether FDI affects economic growth contingents to IPR? For example, whether FDI inflows to those countries with higher IPR will bring greater economic growth as compared to those countries with lower IPR? This is because a high-technology product that brings in higher income would normally seek for better protection. Or whether FDI inflows to those countries with lower IPR will bring greater economic growth as imitation allows more goods to be produced in a shorter time.

In order to magnify the effect of IPR on economic growth, Figure 1 shows that relationship between FDI and economic growth depends on the level of IPR. The effect varies and gives a different slope for high and low IPR. Specifically, the scatter plots for total industrial design application shows those countries with high IPR are able to attract more FDI and achieve higher economic growth. But, countries with Low IPR show flatter slope while receiving lesser FDI and achieving lesser economic growth.

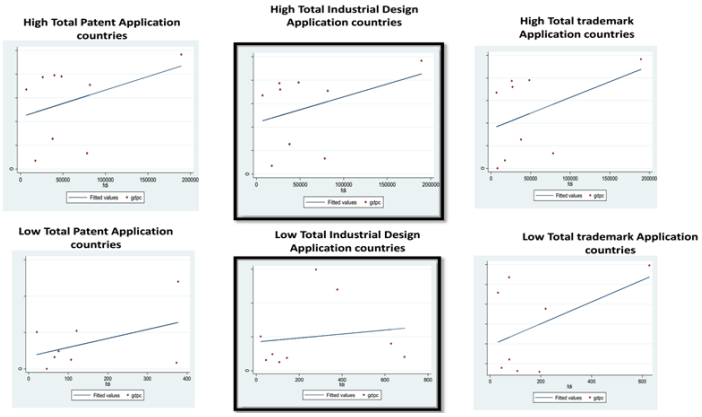

Figure 1 Scatter Plot of Economic Growth to FDI, 1998-2013
Source: UNCTAD and WIPO

The aim of this study is to investigate the moderating role of intellectual property rights in promoting economic growth of host countries via FDI. This study contributes to the literatures in two ways. First, the

[1] Copyright is not included in this study due to complete data unavailability.

impact of IPR on economic growth is been explored using three proxies for IPR, namely patent, trademark and industrial design. Most of the previous studies just used one. Second, the interaction between FDI and IPR had been discovered. Thus the reaction on inflow of FDI against different proxies of IPR had been analyzed. The scope of interaction term on the FDI and IPR to the best of our knowledge has yet to have any papers published.

LITERATURE REVIEW

Theoretical Review on the Impact of FDI on Economic Growth

The research world has witnessed various theories and research on economics policies which aimed in explaining and designing economic growth. Solow assumed the production as a function of capital and labor. He emphasized that long term economic growth is caused by technological change. Although Solow's model behaves as a complete theory for economic growth, it has failed in explaining exogenous variables and determinants of saving, population growth and worldwide technological change (Hsiao and Hsiao, 2006; Mankiw et al., 1992; McCallum, 1996).

Therefore, the endogenous growth model became more broadened where the determinants of growth had expanded whereby it includes financial development, education, population, international trade, public policy and so on. Essentially, the first neoclassical models were previously described by Romer (1990), later being stretched and introduced to transition economies by Borensztein et al. (1998) and Aleksynska (2003). The inclusion of human capital measures, domestic financial development, institutional quality, lagged values of FDI and other growth factors according to Alfaro (2004), Xu (2000), Bevan et al. (2004) shows robust results. FDI has been considered to have permanent growth effect in the host country through technology transfer and spillover in the New Growth Theory (1980). They Referring to surveys of the literature by De Mello (1997, 1999), Fan (2002) and Lim (2001), debates are ongoing related to the FDI's impact towards host country's economy.

In addition, Wang and Blomstrom (1992) had contributed in the aspect of technology transfer through international capital movement. They mentioned that local firms would be turn to be more efficient due to technology spillover via foreign direct investment. Earlier than that, Findlay (1978) had already developed a simple model on relative backwardness, foreign direct investment and technology transfers. Findlay concludes that host countries that borrowing the technology from home country will take the lead in productivity as compared to home country. Therefore, this shows that, host countries receiving FDI via technology transfer too enjoys higher productivity which improves economic growth of it.

Empirical Review on the Impact of FDI on Economic Growth

Previous study by Mello (1997), Calvo and Robles (2003), Sattar et al. (2013) and Nistor (2014) revealed a positive correlation between FDI and economic growth. Similarly, Fry (1993) found a positive correlation between FDI and economic growth for Pacific Basin countries. Berthelemy and Demurger (2000) assessed the role of FDI towards economic growth for Chinese provinces and gained a positive outcome as well. In addition, studies by Kotrajaras (2010), Alfaro et al. (2004), Sghaier and Abida (2013), Haan et al. (2006), Soumia and Abderrezzak (2013), and Azman Saini et al. (2010) supported that FDI led to growth. However, Carkovic and Levine (2002) and Athukorala (2003) found that there is a negative relationship between FDI and growth. There are also other studies such as Durham (2004), Mohamed et al. (2013) and Jallab et al. (2008) that found FDI has no direct impact on economic growth. Similarly, Mohamed et al. (2013) in their study found no causality between FDI and economic growth.

The common variables being used in FDI-growth studies are market size (Melnyk et al., 2014; Calvo and Robles, 2003), inflation (Mallik and Chowdhury, 2001; Hussain and Malik, 2011; Prasanna and Gopakumar, 2010), gross fixed capital formation (Gibescu, 2010; Bal et al., 2016; Ali, 2015), economic freedom (Sattar and Mahmood, 2011; Ofili, 2014; Park and Ginarte, 1997; Xu and Chiang 2005), trade openness (Ang, 2008; Lee et al., 2004) , and so on. Noticeably, these variables such as market size, FDI, economic freedom, gross

fixed capital formation and trade openness providing positive effect towards economic growth. A contradict result usually obtained by inflation.

It is worth to mention that Azman-Saini et al. (2010) examine the role of economic freedom in FDI-growth nexus by including an interaction term of economic freedom and FDI. Employed generalized method-of moment system estimator method on 85 countries, the study found that there is no any direct effect by FDI on economic growth. On the contrary, the FDI effect is contingent to the level of economic freedom of the hosting nations. Their study concludes that countries that uphold grander freedom of economic activities will be able to adapt the technologies via the inflow of FDI from multinational corporations (MNCs).

Generally, there are many aspects in economic freedom to be taken into account. However, out of all the aspects, intellectual property rights seems to be the most evaluated and observed aspect before even taking a decision to invest (Hall, 2014; Ofili, 2014). The reason being is the growing pattern of imitating ideas and goods which eventually creates losses for the inventor or original producer. Stronger IPR protection could lead to increase in FDI and simultaneously causes enhancement of economic growth as suggested by Alexiou et al. (2016), Frandsen (2015) and Kashcheeva (2013). A country that providing better protection in terms of IPR could then attract more FDI inflow in which this will turn out to be a boost for economic growth of host countries (Branstetter et al., 2007). This effect is consistent with Gould and Gruben (1996)'s effort which accounts an encouraging and significant outcome of IPR protection on GDP growth using a measure of IPR protection based on that of Rapp and Rozek (1990); consistent with Lee and Mansfield (1996); Maskus (1998) and Park and Lippoldt (2008).

Literature Gap

Although the theoretical literature predicts that FDI inflows bring economics growth to the host country, the empirical studies on the impact of FDI and economic growth found mixed results. Some recent studies suggested that the criteria of the host country played an important role whether the host country will benefit from the FDI inflows. This study contended that the high IPR protection is important to attract multinational corporations with new technology. These kinds of FDIs will bring in technology transfer, increase productivity and contribute to economic growth. Although there are literatures that emphasized on the role of IPR, the focus has been primarily on its direct effect on economic growth. To close such gap, this study observes the effect of FDI on economic growth via IPR. In addition, current study employed three proxies of IPR instead of only one like previous studies- a gap we addressed.

Three different proxies of IPR are included in each estimation model to observe how FDI inflow reacts towards individual proxies of IPR. In addition, interaction between IPR and FDI inflow had been assessed to find out whether it has any effect on economic growth. Thus, this would set a new milestone for the study of interaction between IPR and FDI, as current study entirely focuses on three major proxies of IPR to reveal its moderating effects on economic growth.

MODEL AND METHODOLOGY

Model Specification on impact of FDI on Economic Growth

The model specification is adopted and mostly similar to Alfaro et al. (2004) and Durham (2004). The expression for the impact of foreign direct investment on growth is as stated below;

$$y_{i,t} - y_{i,t-1} = (1-\alpha)y_{i,t-1} + \beta_1 FDI_{it} + \beta_2 IPR_{it} + \beta_3 X_{it} + \eta_i + \varepsilon_{it} \quad (1)$$

Equivalently, eq. (1) can be written as follows:

$$y_{i,t} = \alpha y_{i,t-1} + \beta_1 FDI_{it} + \beta_2 IPR_{it} + \beta_3 X_{it} + \eta_i + \varepsilon_{it} \quad (2)$$

Where i is country index, t is time index, y is the logarithm of real GDP per capita, FDI is foreign direct investment, IPR is intellectual property rights, X is a vector of other conditional variables that affect economic

growth, η_i is unobserved country-specific effect term, and ε_{it} is the usual error term. The group of conditional variables is comprised of variables frequently used in the FDI-Growth literature including population growth, investment ratio, inflation, trade openness and years of schooling as a proxy for human capital. This specification uses patent, trademark and industrial design as proxies for intellectual property rights.

This model is adopted and modified according to objective of current study from Alfaro et al. (2004) and Durham (2004). Both previous studies are focusing on FDI and economic growth conditional to local financial market. Therefore, this study adopted their model for growth and modified the conditional factor. Thus, current study focusing on IPR as conditional factor for FDI and economic growth for selected countries and years covered. This study will entirely focus on how IPR play a conditional role in attracting more inflow of FDI which affects economic growth. This would be a great contribution to the literature of IPR as a conditional factor for FDI and economic growth relationship.

Control variable used in this study are population growth, domestic capital (gross fixed capital formation), inflation, trade openness and proxies of IPR (trademark, patent and design). Trade openness is the ratio of total trade (import + export) to GDP which is very often used as a proxy to measure openness of an economy according to Ang (2008) and Asiedu (2002). Thus, trade openness is a very important aspect among others for a country to receive more foreign investment and varieties of goods and services. Despite receiving more FDI, trade openness is closely related to economic growth as per Lee et al. (2004).

Inflation and economic growth is somehow a controversial topic among scholars. However, in this study inflation is included as one of the control variables following macro aspect in objective two. Inflation is happening to encourage economic growth according to Mallik and Chowdhury (2001), Hussain and Malik (2011) and Prasanna and Gopakumar (2010). Low and mild inflation are good for economic growth as compared to high inflation which tends to affect growth negatively according to Sweidan (2004), Hussain (2005) and Hussain and Malik (2011).

Market size on its own appears to be an important variable especially in the studies of economic growth. According to the market size hypothesis, multinationals tend to invest in larger countries in order to exploit economies of scale (Calvo and Robles, 2003). Thus, for the objective of this study population growth is employed as a proxy for market size. Population growth is seemed to play a major role in fostering economic growth. Also, population growth does represent positive influence of FDI on economic growth (Melnyk et al., 2014).

Gross domestic capital or gross fixed capital formation denotes the value of the durable goods for non-military purposes which are being purchased by the resident. Those produced goods are to be used at least one year in the production process, as well as the value of services incorporated in fixed capital goods (Gibescu, 2010). Increase in gross fixed capital formation will then have a positive effect on economic growth according to Gibescu (2010), Bal et al. (2016) and Ali (2015).

The IPR protection is being considered as an engine of economic growth in developed and developing economies (Sattar and Mahmood, 2011). Contribution of IPR towards economic growth is really significant as such protection would guarantee return of investment for investors. Despite the fact the IPR boost economic growth, IPR also emboldens research and development (R&D), innovation of ideas and goods (Cela, 2016). In most countries, they are four primary types of IPR that can be legally protected: trademarks, copyright, patents, industrial designs and copyright. The common proxies of IPR used by the previous research are patent (Gould and Gruben, 1996; Hall, 2014; Narwal et. al., 2014; Alexiou et al., 2016) and trademark (Hall, 2014). This study argues that IPR protection comes in different forms and they are often used together as they might protect the idea or innovation in a broader sense. Therefore, this study intends to include all dimensions of IPR in the analysis. Present study employs three proxies of IPR, namely trademark, patent and industrial design in the analysis. Copyright is not included in this study due to insufficient of data. Various studies like Ofili (2014) Park and Ginarte (1997) and Xu and Chiang (2005), found that stronger IPR could encourage more FDI inflow and hence enhanced economic growth. The effect of those proxies of IPR towards economic growth will be assessed in this study.

METHODOLOGY

In order to examine the impact of FDI on economic growth, the second model of this study also applies the generalized method-of-moments (GMM) panel estimator first proposed by Holtz-Eakin et al. (1988) and subsequently extended by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). There are two justifications for choosing this estimator. The first and foremost reason is to control for country- specific effects. Due to the dynamic structure of the regression equation, this cannot be done using country-specific dummies. The second justification is the estimator controls for a simultaneity bias caused by the possibility that some of the explanatory variables may be endogenous. Some authors, for example, Choe (2003), Bellak (2004) have found that FDI is likely to be endogenous as higher output may attract more market-seeking FDIs.

To eliminate country-specific effects, Arellano and Bond (1991) suggest converting Eq. (2) into first differences as follows:

$$y_{i,t} - y_{i,t-1} = \alpha\left(y_{i,t-1} - y_{i,t-2}\right) + \beta_1\,(FDI_{i,t} - FDI_{i,t-1}) + \beta_2\,(IPR_{i,t} - IPR_{i,t-1}) + \beta_3\,(X_{i,t} - X_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) \quad (3)$$

Arellano and Bond (1991) proposed that the lagged levels of the regressors to be used as a tool to address the possible simultaneity bias of explanatory variables and the correlation between $\left(y_{i,t-1} - y_{i,t-2}\right)$ and $(\varepsilon_{i,t} - \varepsilon_{i,t-1})$.

This is valid under the assumptions:

The error term is not serially correlated, and
The lag of the explanatory variables are weakly exogenous.

This approach is identified as difference GMM estimation. The following moment conditions are being set according to Arellano and Bond (1991):

$$E[y_{i,t-S} \cdot (\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \text{ for } s \geq 2; t = 3, \ldots, T \quad (4)$$
$$E[FDI_{i,t-S} \cdot (\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \text{ for } s \geq 2; t = 3, \ldots, T \quad (5)$$
$$E[IPR_{i,t-S} \cdot (\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \text{ for } s \geq 2; t = 3, \ldots, T \quad (6)$$
$$E[X_{i,t-S} \cdot (\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \text{ for } s \geq 2; t = 3, \ldots, T \quad (7)$$

Even though the difference estimator stated above is capable to control for country-specific effects and simultaneity bias, it however has one key shortcoming. Lagged levels of the variables turn into weak instruments when the explanatory variables are persistent as shown by Alonso-Borrego and Arellano (1999) and Blundell and Bond (1998); weak instruments might lead to biased parameter estimates in small samples and larger variance asymptotically. Previously, Arellano and Bover (1995) had suggested an alternative system estimator that combines the difference Eq. (3) and the level Eq. (2). Blundell and Bond (1998) show that this estimator is able to reduce biases and imprecision associated with difference estimator. Following Arellano and Bover (1995), the additional moment conditions for the second part of the system (the regression in levels) are set as follows:

$$E[y_{i,t-S} - y_{i,t-S-1} \cdot (\eta_i - \varepsilon_{i,t})] = 0 \text{ for } s = 1 \quad (8)$$
$$E[FDI_{i,t-S} - FDI_{i,t-S-1} \cdot (\eta_i - \varepsilon_{i,t})] = 0 \text{ for } s = 1 \quad (9)$$
$$E[IPR_{i,t-S} - IPR_{i,t-S-1} \cdot (\eta_i - \varepsilon_{i,t})] = 0 \text{ for } s = 1 \quad (10)$$
$$E[X_{i,t-S} - X_{i,t-S-1} \cdot (\eta_i - \varepsilon_{i,t})] = 0 \text{ for } s = 1 \quad (11)$$

The consistency of the GMM estimator depends on two specification tests. The first is the Sargan (1958) test of over-identifying restrictions. Under the null of joint validity of all instruments, the empirical moments have zero expectation, so the J statistic is distributed as a $\chi 2$ with degrees of freedom equal to the degree of over-identification. The second test examines the hypothesis of no second-order serial correlation in the error

term of the difference Eq. (3) (Arellano and Bond, 1991). Failure to reject the null of both tests provides support to the estimated model.

Commonly the GMM estimators are applied in one-step and two-step variants (Arellano and Bond, 1991). The one-step estimators use weighting matrices that are independent of estimated parameters, whereas the two-step GMM estimator uses the so-called optimal weighting matrices in which the moment conditions are weighted by a consistent estimate of their covariance matrix. Thus, it makes the two-step estimator asymptotically more efficient than the one-step estimator. However, the use of the two-step estimator in small samples has several problems that result from the proliferation of instruments. In a simulation analysis, Windmeijer (2005) shows that the two-step GMM estimation with numerous instruments can lead to biased standard errors and parameter estimates. In order to alleviate the problems induced by the proliferation of instruments, Roodman (2009) recommended reducing the dimensionality of the instrumental variable matrix.

Consequently, this study uses the moment conditions presented in Eq. (4) – Eq. (11) and employs the two-step estimator. Following the recommendation of Roodman (2009), this study reduces the dimensionality of the instrumental variable matrix.

Basically there are two variants of GMM, difference generalized method of moment (DGMM) and system generalized method of moment. Alonso-Borrego and Arellano (1999) and Blundell and Bond (1998) show that instrumental variable (i.e. lagged level of the explanatory variable) are weak if the explanatory variable are persistent. These could lead to biased parameter estimates in small sample and larger variance asymptotically. To mitigate this problem, Arellano and Bover (1995) propose SGMM estimator that combines Eq. (8) and Eq. (7). Blundell and Bond (1998) reveal that the SGMM estimator is able to reduce biases and imprecision associated with DGMM estimator. Thus, this study employs two-step system generalized method of moment to obtain a more robust result.

Variables, Measurement and Data Sources

This study uses a panel data set for 103 countries that covers the time-period of 16 years from 1998-2013[2]. The list of countries was presented in Appendix. These data had been collected from World Development Indicator (WDI) database, World Bank, United Nations Conference on Trade and Development (UNCTAD), WIPO and UNDP HDR Statistics, respectively. The definition of variables and unit of measurement used for economic growth are provided in Table 1. The descriptive statistics for all variables are provided as Table A2 in Appendix.

Table 1 Proxy and explanatory sign for Economic growth

Variable	Description	Measurement	Expected sign	Source
GDPC	Real GDP per capita divides the GDP by the population.	US$		WDI, World Bank
INFDI	Foreign direct investment inflows	US$ millions	+	unctad.org
POP	Total population by country	total	+	WDI, World Bank
GFCF	Gross fixed capital formation (gross domestic investment)	% GDP	+	World Bank & OECD
CPI	Inflation, consumer prices	annual %	+/-	UN Database
PATENT	Total patent applications	Total applications	+/-	WIPO
TM	Total trademark applications	Total applications	+/	WIPO
DESIGN	Total design applications	Total applications	+/-	WIPO
OPEN	Trade openness, Total Trade/GDP	Trade (% of GDP)	+	WDI

RESULTS AND DISCUSSION

Table 2 and 3 present the estimated coefficients for our main models as well as robustness checks. It is important to perform a series of robustness checks beforehand. First, we will test the basic model that included only FDI, GFCF and POP (Model 1). Next, we will add OPEN and CPI one at a time into the model (Model 2 and 3). Then, we will add IPR into the model (Model 4, 5 and 6). Three alternative proxies, namely trade mark (TM), patent (PATENT) and industrial design (DESIGN) applications will be used in the analysis. Finally, our final specifications were presented by adding the interaction term into the model (Model 7, 8 and 9).

[2] The sample period is based on the data availability of IPR.

The results for robustness checks are presented in Table 2. Generally, the results in Table 2 are quite similar to the results in Table 3; in particular, all of the variables carry a similar sign. The FDI, GFCF, OPEN and CPI carried the sign as predicted by theory. Although the coefficients of POP in Model 1 – 3 carried the unexpected sign and are statistically significant, they became insignificant in Model 4 - 9. As shown in Table 2, among three proxies of IPR, only PATENT (Model 4) and DESIGN (Model 6) are showing a significant relationship against economic growth at a 5% level. Patent and design produces a positively significant relationship with economic growth while trademark is positively related but not significant to GDPC. This indicated that IPRs promote economic growth in general. This result is supported by previous studies by Zouhaier and Fatma (2014); Hall (2014) and Fedderke and Romm (2006).

Interaction between Foreign Direct Investment and Intellectual Property Rights

Table 3 presents the results for our main models. The indirect impact of FDI on economic growth was accessed via interaction term (FDI*IPR) of IPR. Interaction between FDI and IPR was tested to prove how far IPR could moderate the effect of FDI on economic growth. Therefore, interaction between proxies of IPR and FDI had been tested one by one (FDI*tm, FDI*patent, and FDI*design). Among three interactions, only (FDI*TM) and (FDI*DESIGN) shows a positive and significant effect towards economic growth, however, (FDI*PATENT) shows no significant effect with economic growth. This suggested that trademark and industrial design applications enhance the impact of FDI on economic growth. In other words, FDI had a greater impact on economic growth for countries with high IPRs.

Although the result for interaction term of FDI and IPR shows that (FDI*TM) and (FDI*DESIGN) is positively significant at 10% and 1% levels, unfortunately the magnitude for the interaction term for these two models is very small; (2.12e-12 =Exponent negative 12 which means 0.000000000000). This result although significant at a 1% level; IPR proxies are still considered less important in explaining the mediation effect of IPR towards economic growth. Thus, the effect is negligible.

Table 2 The Impacts of FDI on Economic Growth

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
L.lgdpc	**0.662*** **	**0.642*** **	**0.644*** **	**0.824*** **	**0.813*** **	**0.818*** **
	(0.0353)	**(0.0358)**	**(0.0372)**	**(0.0283)**	**(0.0283)**	**(0.0239)**
Linfdi	**0.00921** **	**0.00906** **	**0.00824***	**0.00479** **	0.00515	0.00199
	(0.00409)	**(0.00437)**	**(0.00492)**	**(0.00219)**	(0.00323)	(0.00339)
Lgfcf	**0.0433*** **	**0.0482*** **	**0.0436*** **	**0.0174*** **	**0.0224*** **	**0.0167*** **
	(0.00554)	**(0.00558)**	**(0.00847)**	**(0.00495)**	**(0.00561)**	**(0.00522)**
Lpop	**-0.324*** **	**-0.349*** **	**-0.327*** **	-0.115	-0.0620	-0.0304
	(0.0513)	**(0.0565)**	**(0.0598)**	(0.0716)	(0.0490)	(0.0601)
Lopen		0.0374	0.00909	0.00526	0.0124	**0.0673***
		(0.0416)	(0.0449)	(0.0266)	(0.0362)	**(0.0359)**
Lcpi			**0.0264***	**0.0213***	**0.0224*** **	**-0.0181***
			(0.0137)	**(0.0125)**	**(0.00596)**	**(0.0109)**
Lpatent				**0.0129** **		
				(0.00571)		
Ltm					0.00939	
					(0.0147)	
Ldesign						**0.0112** **
						(0.00572)
Constant	**8.189*** **	**8.590*** **	**8.325*** **	**3.417*** **	**2.546*** **	**1.873***
	(0.782)	**(0.855)**	**(0.926)**	**(1.124)**	**(0.872)**	**(1.034)**
Observations	393	387	387	266	298	281
Number of code	99	99	99	76	79	78
Sargan	**11.73094**	**8.567338**	**9.75149**	**8.401612**	**9.895733**	**9.438864**
	(0.1636)	**(0.3801)**	**(0.2829)**	**(0.3953)**	**(0.2724)**	**(0.3066)**
AR2	**.93162**	**.601140**	**.54514**	**.64794**	**.18613**	**-.81901**
	(0.3515)	**(0.5477)**	**(0.5857)**	**(0.5170)**	**(0.8523)**	**(0.4128)**

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Above result shows the two-step system GMM for impact of FDI on economic growth. All data of this study had been up-scaled in accordance with applied method. A two-step system GMM method had been applied for this estimation. Dependent variable is GDPC represents gross domestic product per capita as a proxy for economic growth; control variable are INFDI represents inflow of FDI; GFCF represents gross fixed capital formation as a proxy for domestic capital; POP represents population and OPEN represents trade openness; CPI represents consumer price index as a proxy for inflation; and TM represents trademark applications; PATENT represents patent applications and DESIGN represents industrial design applications are three proxies of IPR.

Table 3 The Impact of Interaction between FDI and IPR on Economic Growth

VARIABLES	(7) Model 7	(8) Model 8	(9) Model 9
L.lgdpc	**0.826*** **	**0.809*** **	**0.809*** **
	(0.0294)	**(0.0289)**	**(0.0221)**
linfdi	**0.00480** **	0.00423	0.000299
	(0.00219)	(0.00366)	(0.00330)
lgfcf	**0.0173*** **	**0.0222*** **	**0.0135*** **
	(0.00496)	**(0.00548)**	**(0.00493)**
lpop	-0.115	-0.0714	-0.0421
	(0.0717)	(0.0483)	(0.0582)
lopen	0.00535	0.0198	**0.0899*** **
	(0.0266)	(0.0367)	**(0.0339)**
lcpi	**0.0206***	**0.0213*** **	**-0.0235** **
	(0.0124)	**(0.00595)**	**(0.0103)**
lpatent	**0.0131** **		
	(0.00577)		
infdi*patent	-4.03e-14		
	(4.11e-13)		
ltm		0.00933	
		(0.0141)	
Infdi*tm		**4.48e-13***	
		(2.30e-13)	
ldesign			**0.00994***
			(0.00549)
infdi*design			**2.12e-12 *** **
			(5.93e-13)
Constant	**3.390*** **	**2.719*** **	**2.097** **
	(1.132)	**(0.857)**	**(1.002)**
Observations	266	298	281
Number of code	76	79	78
	8.375923	**10.8954**	**12.95454**
Sargan	**(0.3976)**	**(0.2077)**	**(0.1134)**
AR2	**.64379**	**.16651**	**-.79087**
	(0.5197)	**(0.8678)**	**(0.4290)**

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Above result shows the two-step system GMM for impact of interaction between FDI and IPR on economic growth. All data of this study had been up-scaled in accordance with applied method. A two-step system GMM method had been applied for this estimation. Dependent variable is GDPC represents gross domestic product per capita as a proxy for economic growth; control variable are INFDI represents inflow of FDI; GFCF represents gross fixed capital formation as a proxy for domestic capital; POP represents population and OPEN represents trade openness; CPI represents consumer price index as a proxy for inflation; TM represents trademark applications; PATENT represents patent applications and DESIGN represents industrial design applications are three proxies of IPR. INFDI*PATENT, INFDI*TM and INFDI*DESIGN represents interaction between INFDI and IPR proxies.

CONCLUSION

The main aim of this study is to investigate the moderating role of intellectual property rights in promoting economic growth of host countries via FDI. To investigate this impact, this study had employed a panel data of 103 countries over a 16 year period, from 1998-2013. Thus, IPR was represented by three proxies: patent, trademark and design applications. Each proxy was estimated individually to investigate individual effects of those IPR proxies on FDI inflow for selected sample countries. Thus, empirical investigations done in identifying the role of IPR in triggering inflow of FDI and how it lead to economic growth of host countries. In order to assess the moderating effect of IPR on FDI in promoting economic growth, an interaction term was incorporated into this study. The interaction term for FDI and each of the proxies of IPR had been applied in separate models. Two-step System GMM was applied and the results showed that the interaction between FDI-trademark and the interaction between FDI-design exerted positive and significant effect towards economic growth. Meanwhile, interaction of FDI-patent showed no significant relationship towards economic growth. Consequently, it can be concluded that countries with high IPR's could enhance their economic growth via higher inflow of FDI. Even though this study obtained significant and expected result, unfortunately interaction between FDI and IPR proxies are of very small magnitude. Thus, it shows that these outcomes are positive and significant but do not strongly suggest that economic growth of host countries via

FDI inflow is mainly attracted by IPR. The effects of IPR on FDI in stimulating economic growth are negligible.

Policy Implications

The policy implications for this study are as follows: Policy makers generally, government can have high economy growth by encouraging FDI, opening up the economy and accumulate more domestic capital. These features will open up host countries as the best platform for investors to bring their foreign direct investments.

Intellectual property rights seem to be another aspect which all countries policy makers need to concentrate on. Governments should be stricter with regard to the enforcement of IPR because it enhances the positive impact of FDI on economic growth. Such enforcement will then be able to create new inventions by FDI inflow as well as high end products via research and development. Investors are more likely to place the FDI in countries providing the best platform for the protection of IPR they will benefit from, with FDI inflow in exchange. A country could benefit from strong IPR protection in terms of transfer of technologies via higher FDI from high-tech industries, hence increase in value-added activities, promotes productivity and economic growth.

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APPENDIX

Table A1 The list of countries

Country	Code	Country	Code	Country	Code
Aruba	**1**	Czech Republic	**42**	Japan	**83**
Andorra	**2**	Germany	**43**	Kazakhstan	**84**
Afghanistan	**3**	Djibouti	**44**	Kenya	**85**
Albania	**4**	Dominica	**45**	Cambodia	**86**
United Arab Emirates	**5**	Denmark	**46**	Korea, Rep.	**87**
Argentina	**6**	Dominican Republic	**47**	Kuwait	**88**
Armenia	**7**	Algeria	**48**	Lebanon	**89**
Australia	**8**	Ecuador	**49**	Liberia	**90**
Austria	**9**	Egypt, Arab Rep.	**50**	Sri Lanka	**91**
Belgium	**10**	Euro area	**51**	Luxembourg	**92**
Benin	**11**	Spain	**52**	Macao	**93**
Burkina Faso	**12**	Estonia	**53**	Morocco	**94**
Bangladesh	**13**	Ethiopia	**54**	Madagascar	**95**
Bulgaria	**14**	Finland	**55**	Mongolia	**96**
Bahrain	**15**	Fiji	**56**	Malaysia	**97**
Bosnia	**16**	France	**57**	Philippines	**98**
Belarus	**17**	United Kingdom	**58**	Singapore	**99**
Belize	**18**	Georgia	**59**	Sweden	**100**
Bermuda	**19**	Ghana	**60**	Thailand	**101**
Bolivia	**20**	Guinea	**61**		
Brazil	**21**	Gambia, The	**62**		
Barbados	**22**	Equatorial Guinea	**63**		
Brunei Darussalam	**23**	Greece	**64**		
Bhutan	**24**	Grenada	**65**		
Botswana	**25**	Greenland	**66**		
Central African Republic	**26**	Guatemala	**67**		
Canada	**27**	Guyana	**68**		
Central Europe and Baltic	**28**	Hong Kong	**69**		
Switzerland	**29**	Honduras	**70**		
Chile	**30**	Croatia	**71**		
China	**31**	Haiti	**72**		
Cote d'Ivoire	**32**	Hungary	**73**		
Cameroon	**33**	Indonesia	**74**		
Congo, Rep.	**34**	India	**75**		
Colombia	**35**	Ireland	**76**		
Comoros	**36**	Iraq	**77**		
Cabo Verde	**37**	Iceland	**78**		
Costa Rica	**38**	Israel	**79**		
Caribbean small states	**39**	Italy	**80**		
Cuba	**40**	Jamaica	**81**		
Cyprus	**41**	Jordan	**82**		

Table A2 Descriptive Statistics

Variable	Observation	Mean	Standard Deviation	Minimum	Maximum
Gross domestic per capita income	1680	18081.06	20529.48	0	113706
FDI inflow	1680	32088.39	62941.06	0	565814.3
Domestic capital	1680	21.98898	11.01454	-10.973	80.73199
population	1680	5.50e+07	1.75e+08	0	1.34e+09
openness	1680	85.30874	64.97007	0	443.3335
inflation	1680	7.764924	9.270175	0.4011124	181.3896
patent	1680	15352.11	61972.29	0	523455.3
Trade mark	1679	29869.17	97352.59	0	1355252
design	1671	4561.74	28535.4	0	533441