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Intellectual Property Rights Protection, Foreign Direct Investment and Economic Growth in Malaysia: An ARDL Bound Test Approach

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Abstract

The main objective of present study is to investigate the implications of intellectual property rights (IPR) protection on foreign direct investment and economic growth in Malaysia. We used the ARDL bounds testing approach to cointegration for long run relationship between the variables. Although researches with regards to foreign direct investment and economic growth have been conducted extensively in the Malaysian economic context, the role of IPR protection however has yet to be discussed in detail. These findings highlight that IPR plays a significant role in attracting FDI in the past and indirectly explains the growth process.

Introduction

The establishment of the World Trade Organization (WTO) with the introduction of the TRIPS (trade-related aspect of intellectual property rights agreements) which was effectively enforced in January 1995 has led to major reform on laws protecting the IPR for all members. Despite efforts to harmonize the standard of IPR legislation, it is also targeted to support and promote balanced practices on international trade activities across the globe. The harmonization process on trade-related IPR activities is seen as a tool to promote greater opportunities and minimize threats to the adopted nations. Generally the strength of the IPR framework offered as the technological capacity owned by a country was to securely protect inward FDI and thus promote growth. Although the impact of IPR towards economic growth and investment has been discussed in a number of studies, the scope is limited to a heterogeneous cross-country sample either comparing a group of developing or developed countries. This misleads the generalizations made with regards to the impact of strengthening IPR framework across the heterogeneous countries as neither consistent nor suggestive. Research intended for a single country is unfortunately still very limited and in Malaysia, a study with respect to IPR as one of the institutional policies to promote future foreign direct investment and growth has yet to be

discovered. One critical aspect that the majority of the existing literatures failed to identify, is the capacity played by the IPR in sustaining and promoting future FDI and growth. Technically the technological capacity of a small country does not rely upon the capability of local research and development activities, but on how to maintain foreign investors' confidence so that they keep on investing over time. Building the investors' confidence is not an easy task, since it involves supportive institutional policies or trade related policies with regards to protecting technology bundled in the investment.

The aim of this study is to examine the role of IPR protection in the Malaysian economic context with specific objectives to investigate whether a synergy from both short- and long-run relationship exists in affecting future inward foreign direct investment and economic growth. This study is different from the existing research by several aspects. First, although researches on FDI and economic growth in Malaysia have been conducted in quite a number of studies, none of them include IPR protection as one of the factors. Second, this study investigates whether IPR impacts as a signaling policy to attract investments thus promoting future growth, and third, to draws implications from such synergies.

The impact of changes on any economic policy cannot be observed immediately, sometimes taking years to take effect. The laggard features of such a mechanism are also observed in many economic variables. Due to that, the impact of IPR policy as a signal to attract future foreign direct investment and thus growth will portray a similar effect. For that purpose, we employ the ARDL bounds testing approach developed by Pesaran et al. (2001). The use of this method will be further explained in Section 4.

The remainder of this article is organized as follows. Section 2 discusses the literature review. Section 3 will explain the data and measurements. Section 4 explains the methodology. The empirical results are presented in Section 5. The last section draws the conclusion.

Literature Review

For the past two decades, economists have formed different views on how IPR protection might possibly affect the foundation of macro and microeconomics. Despite massive efforts taken to estimate the impact of IPR through various approaches, methods and techniques, economists have been unsuccessful in getting a conclusive picture. This in turn raises some debates and question of what the real impact of IPR protection should be. The following two sub-sections will look into the issues.

IPR, FDI and Economic Growth: What should be the role of IPR?

The reform of global IPR policy as triggered by the TRIPS agreements in 1995 has led to greater concerns from prospective perspective countries to safeguard technology and innovation. The process of technological transfer bundled in the FDI has generated a significantly positive spillover effect resulting from new discoveries on technological innovations and upgrading management skills to reach higher growth (Sylwester, 2005)

The intersection of IPR protection to lure FDI and thus economic growth has been discussed in quite a number of researches. Different views have been observed from past research. Economists believe that strong IPR protection is important to achieve higher economic growth (Gould and Gruben, 1996), greater impact on FDI (Seyoum, 1996), and indirectly stimulate foreign exports and licensing (Smith, 2001) into a developing country and improve direct import (Awokuse and Yin, 2010a) and bilateral import especially manufactured goods from developing countries (Maskus and Penubarti, 1995). Despite the rigorous findings, there are some studies where economists tend to reach to an indecisive and unique outcome.

IPR Impact Comparing the North and the South

Studies on the impact of IPR between the north and the south have been conducted by a quite number of researchers. A study by Maskus and Penubarti, (1995) is dubbed as the first systematic empirical evidence comparing the impact of IPR protections between the north and the south towards international

trade. They found that with higher IPR, a developing country's bilateral import increased especially across all manufactured goods sectors. Further, Smith (2001) reported that a strong foreign IPR protection was found to be a direct stimulator to U.S export, increase in affiliate sales and licensing. Moreover, those factors were only recorded in a country with strong imitative incidence.

Gould and Gruben, (1996) posted a question of whether stricter IPR enforcement was a good strategy to attain higher economic growth. By utilizing a cross-country sample with the interactions of patent protection, trade regime and country specific characteristics, they found strong significant support of the hypothesis. They also noted that the effect of IPR protection is slightly higher for open economies.

Yang and Maskus, (2009) also portrayed an interesting message on the implications of strengthening IPR protection among developing countries. They found that although export penetration from developing countries increased as a result of an increase in IPR protection, excessive protection would diminish competition and welfare among the developing countries. However, in order to sustain the mechanism, technology transfer channeled via FDI should be enhanced over time.

Ginarte and Park, (1997) reported that developed economies tend to provide stronger protection compared to developing nations. The results however, are subject to the optimal size of R&D activity. They also noted that, in order to raise patent protection levels in countries providing less protection, it is important to foster a significant research base in those countries and thereby create incentives for protecting patent rights.

Parello, (2008) examined the possible impact of IPR between the south and the north. Hypotheses were developed on three processes, namely R&D investment, technology transfer and skill accumulation. Surprisingly, the effect of stronger IPR protection has a temporarily positive effect on rate of innovation whereas a negative impact

was recorded on imitation rate in the long-run. Additionally, they also noted that the role of technical knowledge was found to be crucial in attracting FDI but the process may be ineffective if the level of local skill is low even though the IPR protection in a country was strong. They explained that the wide gap on wage inequality in the north was due to the negative impact of skill accumulation and expressed that even though the impact was ambiguous in the south, the process of skill accumulation might increase with a proper education system.

Interesting points are noted by Yang and Cheng, (2008). In the process of analyzing the effect of IPR and trade policy on FDI and social welfare of the host country, they found possible emerging conclusions. First, to attract more FDI, a strong IPR protection or a higher tariff was found to be a significant factor even when the market size was relatively small. Second, for a larger market neither strong IPR nor higher tariff would attract more FDI. These suggest that under a large market, governments tended to experience the trade-off between optimal tariff and level of IPR protection, whereas under the small market, the flexibility between optimal tariff and IPR level is more flexible.

Allred and Park, (2007) argued that changes on patent enactment were needed to reward firms to keep innovating. They found that, a strong relationship between propensities to invest in innovation was directly influenced by patent rights with prominent effects recorded for advanced and high-tech industries such as scientific instruments and chemicals. Krammer, (2009) showed the crucial elements of IPR protection and business climate as a policy measure to increase patent propensity as an indicator of innovations. Similarly, Seyoum, (1996) believed that the impact of IPR policy is more apparent in attracting inward FDI as compared to other economic policies.

IPR impact on Developing Countries: the Case of China
As a brief history, China has been a member of the WIPO since 1980 and to date; China has been actively involved in 17 WIPO treaties

and participated in nearly 15 WIPO bodies. China's accession into the WTO only occurred in late 2001. The accession of China into the WTO was seen as the new paradigm towards international trade. Since then, researches in reviewing China's economic performance for the past few decades have been growing tremendously. Despite the enormous development and high imitation incidences of IPR for the past decades, economists have always been fascinated with China economic development.

The historical development of IPR in China's economy is unique (Yang, 2003) and the role of IPR is a bit controversial when clarifying its impact towards FDI, trade and growth (Yang, 2003; Awokuse and Yin, 2010a; Yueh, 2009; Hu and Jefferson, 2009). Yang, (2003) provides an interesting development on China's IPR legislation. She stressed that constant improvements and enforcement on current IPR were needed for China's consistent economic development. The history of IPR development in China started as early as 1979 when the Open Door Policy was initiated under the new market reform regime in 1978. She concludes, the IPR protection in China was under strong revolution with historical, economic and cultural underpinnings in comparison to the evolutionary pattern observed in most developed countries.

The revision of IPR law, started in the 1990s reflects the international development before China's entry into the WTO in 2001 (Bosworth and Yang, 2000). Clearly, as according to Bosworth and Yang, (2000) offering adequate IPR protection was indeed crucial as a vehicle for greater trade and investment and accession to the WTO and fulfillment of the TRIPS requirement.

Sun, (2003) noted that China's IPR system is oriented towards promoting technology diffusion rather than protecting inventors' rights even though the system is not differently significant from those in most countries. Since China's patent law was effectively enforced in 1985, both foreign and domestic patenting activities have grown rapidly but the category and intensity of protection was found to be different. Foreign patent in China dominated the invention category whereas the utility model was dominated by local patent. The domination of foreign patent in China as indicated by the increasing number of application on inventions was due primarily to import factor. Sun, (2003) also noted that as foreign patent has started to show its significance in China's economy, this is an indication that competition in China's market has started to grow.

Liu, (2005) revealed that China's IPR regime encountered two fundamental problems, namely limited experience and defects on legislation and enforcement. Although effort has been taken to improve the system of IPR, the coordination between national laws; provincial and local government laws remain a challenging problem. However, he noted that despite those challenges, China's future economic progression is promising, when they took a giant step to improve such deficiencies by showing international commitment effort through multilateral and bilateral negotiations.

Although imperfect enforcement on IPR law in China exists, China's economy has boosted tremendously over the past decades as a result of comprehensive patent law reform which led to greater innovation opportunities (Yueh, 2009). This view is similar to what has been discussed by Hu and Jefferson, (2009). Hu, (2010) explained that such threats have increased the competitive edge between foreign firms in order to protect their technology as a result of strong market demand.

The significant role of IPR is also noted by Awokuse and Yin, (2010b). In their findings, the increasing trend of FDI received by China for the past decades as a result from strengthening IPR protection was found to be highly significant. Additionally, the findings were a bit controversial as a strong threat of imitation incidence in China was recorded relatively high. They also concluded that despite relatively high imitations threat, the patenting surge in China for the past decades have positively increased inwards of FDI.

FDI Development and Economic Growth in Malaysia: Is IPR really a needed?

For the case of Malaysia, as far as improvements on the global standard of IPR protection is concerned, improvements on the Malaysian IPR framework with respect to the changes on macroeconomics policy has yet to be discussed. Thus makes this issue timely to be investigated. Furthermore, the need for new direction and corrective action in IPR reform as proposed by TRIPS has to be responded to immediately due to strong economic interdependence.

Recently, IPR in Malaysia is governed by the Intellectual Property Office of Malaysia (MyIPO), a semi government corporate body under the Ministry of Domestic Trade, Co-operative and Consumerism. From the historical point of view, the IPR development in Malaysia was first observed in 1969 when the Copyright Act was first enforced. Since then, lists of IPR laws followed in subsequent years. The Trademark Act 1976 (Regulation in 1997), The Patent Act 1983 with Regulations were enforced in 1986. The amendment of modern Copyright Act in 1987, followed by the Industrial Design Act 1996, the Regulations in 1999, the Geographical Indications Act 2000 (Regulations in 2001) and the Layout-design of Integrated Circuit Act 2000[1].

At the international level, Malaysia is currently a member of six WIPO treaties and nine WIPO bodies. Malaysia is also one of the founding members of the WTO since 1995 by virtue of its membership in GATT (General Agreements on Tariff and Trade) since 1957. As a member of the WTO, Malaysia is also bound to the WTO-TRIPS agreement in which compliance to the minimum standard was achieved in 2002, after a delay of almost two years. So, Malaysia's response to the TRIPS will accelerate the process of technology transfer brought through the FDI or other means of international investment or trade activities. Strong IPR protection policies offered by Malaysia are seen critical and important to lure future foreign direct investment parallel with existing trade policy and incentives provided to the foreigners as a tool to achieve better position at the international stage.

As far as international investment involvement in Malaysia's economic context is concerned, although FDI has successfully fostered the development of the economy for almost 3 decades, the persistent declining pattern of FDI as observed since 1990 has to be promptly responded with comprehensive modifications on certain economic policies. The selective modification and integration of economic policies is important because as a small and open country, economic interdependence is crucial. Challenges in the global economic arena have called for a higher degree of economic integration to suite the changes in the global economic policy. Additionally, Carbaugh, (2009) that after the first wave of economic globalization by means of industrial revolution in Europe, every country had to mobilize their resources. Now such influences have resulted in big changes in every European technological landscape.

In Malaysia, studies focusing on foreign direct investment (FDI) and economic growth were found monotonous in terms of reporting the findings on major determinants. These monotonous findings are actually repeating the generalizations suggested by Dunning (1981). The observed factors which either directly or indirectly promoted FDI in the past includes inter alia, domestic market size, openness, terms of trade, basic infrastructure, currency stability, political stability and other financial instruments. These generalizations can be found from numerous studies: for example Yol

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[1] Due to changes in global IPR standards, series of amendments have been made. The Trademark Act 1976 has been amended four times in 1994, 2000, 2002 and the latest in 2011. The Patent Act 1983 was amended several times, in 1986, 1993, 2000, 2002, 2003, 2006, with the latest amendment made in 2011. The Industrial Design Act was amended in 2000 and 2002. The Geographical Indications Act 2000 was amended in 2001. The Copyright Act 1987 has also been amended quite number of times. The first amendment was observed in 1975, followed by 1979, 1990, 1996, 1997, 2000 and the latest in 2002. The Copyright Regulations 1987 however has been improvised with the inclusion of import prohibition notice in the year 1987, followed by another two amendments in 1999 and 2000.

and Teng, (2009); Mun et al. (2008); Sulong and Harjito, (2005); Yusop and Ghaffar, (1994). Although the factors seem to be exhaustive, from the policy point of view, they should be consistently promoted for future economic development[2].

Ang (2008) noted that macroeconomic uncertainty might attract FDI. He believed that investment in Malaysia is synonymous with risk and reward taking activities. High risk investment always pays-off with greater rewards and vice versa. This speculative motive moves works in tandem with other private financial development, infrastructure development and openness. Furthermore, a control on statutory corporate tax and currency appreciation also need to be closely monitored to support future FDI development.

Therefore a new policy approach needs to be taken in order to effectively sustain the development of FDI and for future economic growth. As TRIPS suggests, global IPR treaty now and then will dominate every aspect of trade-related activities. As noted by Lee and Mansfield, (1996) and later quoted in study by Shapiro and Hassett, (2005); a country with weak IPR protection tend to attract less sophisticated technology as a result of relatively less FDI. This implies that despite major policies put forward by Malaysia in order to attract FDI, IPR should be first in the list. This will bridge the gap left untouched between existing implemented trade-related policies in Malaysia.

Data and Measurement
The series used in this study are inward foreign direct investment, intellectual property index and gross domestic product (GDP) in Malaysia over the period of 1970-2005. Inward foreign direct investment is gathered from UNCTAD, intellectual property index is adopted from Park, (2008) and gross domestic product (GDP) is taken from World Development Indicator (CD-ROM, 2007). All

data (except the IPR indexes) are deflated into real terms to minimize the price effect and expressed in natural logarithm form.

Methodological Framework
The adopted model is based on the recent autoregressive distributed lag model (ARDL) proposed by Pesaran et al. (2001). The ARDL model is used to establish the direction of causation between variables using a single reduced form equation. Testing for cointegration between series is also a bit different to the conventional methods as proposed by Johansen (1988, 1995). The ARDL approach does not involve pre-testing variables, in which tests on the existence of relationship between variables in levels. This approach is applicable irrespective of whether the underlying regressors are purely I(*0*), purely I(*1*) or mixture of both. Furthermore, the ARDL method avoids the larger number of specification to be made in the standard cointegration test.

Amongst other advantages, the ARDL method of cointegration analysis is also unbiased and efficient. This is because it performs well in small samples. One can also estimate the long- and short-run components of the model simultaneously, removing problems associated with omitted variables and issue on autocorrelations. Finally, the ARDL method can distinguish the dependent and explanatory variables. In what follows, the methodology is detailed.

The proposed error correction representations of the ARDL (*p, q, r*) specification model with unrestricted constant (Pesaran et al. 2001, Case III) is as follow;

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[2] Shahbaz and Rahman (2010) and Shahbaz et al. (2011) reported that financial development promotes the link between FDI and economic growth through R&D activities in Pakistan and Portugal respectively.

$$\Delta \ln FDI_t = \alpha_0^1 + \sum_{i=1}^{p} \theta_i^1 \Delta \ln FDI_{t-i} + \sum_{i=0}^{q} \omega_i^1 \Delta \ln GDP_{t-i} + \sum_{i=0}^{r} \gamma_i^1 \Delta \ln IPR_{t-i}$$
$$+ \delta_1^1 \ln FDI_{t-1} + \delta_2^1 \ln GDP_{t-1} + \delta_3^1 \ln IPR_{t-1} + \upsilon_t^1 \qquad (1)$$

$$\Delta \ln GDP_t = \alpha_0^2 + \sum_{i=1}^{p} \omega_i^2 \Delta \ln GDP_{t-i} + \sum_{i=0}^{q} \theta_i^2 \Delta \ln FDI_{t-i} + \sum_{i=0}^{r} \gamma_i^2 \Delta \ln IPR_{t-i}$$
$$+ \delta_1^2 \ln FDI_{t-1} + \delta_2^2 \ln GDP_{t-1} + \delta_3^2 \ln IPR_{t-1} + \upsilon_t^2 \qquad (2)$$

The optimal lag length of p, q and r are determined by Schwartz Bayesian Criteria (SBC). The null hypothesis of the non-existence of a long-run relationship in equation-1 and 2 are denoted by $H_0 : \delta_1 = \delta_2 = \delta_3 = 0$ against the alternative hypothesis $H_1 : \delta_1 = \delta_2 = \delta_3 \neq 0$. Testing for the long-run relationship is simply denoted by accumulated F-test. The test involves asymptotic critical bounds, depending whether the variables are $I(0)$ or $I(1)$ or a mixture of both. Two sets of critical values were used which one set refers to the $I(1)$ series and the other for the $I(0)$ series. Critical values for the $I(1)$ series are referred to upper critical bounds, while the critical values for $I(0)$ series are referred to the lower critical bounds.

If the F test was found to be statistically significant, then the evidence of long-run relationship can be said to exist and the equations estimating the long run relationship between the variables is specified by equations 3 and 4;

$$\ln FDI_t = \alpha_0 + \sum_{t=1}^{p} \theta \ln FDI_{t-1} + \sum_{i=0}^{q} \omega \ln GDP_{t-i} + \sum_{i=0}^{r} \gamma \ln IPR_{t-i} + \mu_t \quad (3)$$

$$\ln GDP_t = \alpha_0 + \sum_{t=1}^{p} \omega \ln GDP_{t-1} + \sum_{i=0}^{q} \theta \ln FDI_{t-i} + \sum_{i=0}^{r} \gamma \ln IPR_{t-i} + \mu_t \quad (4)$$

Pesaran and Shin, (1999) recommend a maximum of lags 2 for data observed annually. However in our study, the lags order in the model is determined by Schwarz Bayesian criterion (SBC).

The causality version of ECM-ARDL (p, q, r) specifications with combinations of short- and- long runs dynamics with unrestricted constant are derived in the following form:

$$\Delta \ln FDI_t = \alpha_0 + \sum_{t=1}^{p} \theta \Delta \ln FDI_{t-1} + \sum_{i=0}^{q} \omega \Delta \ln GDP_{t-i} + \sum_{i=0}^{r} \gamma \Delta \ln IPR_{t-i} + \eta_1 ECT_{t-1} + \varphi_t \quad (5)$$

$$\Delta \ln GDP_t = \alpha_0 + \sum_{t=1}^{p} \omega \Delta \ln GDP_{t-1} + \sum_{i=0}^{q} \theta \Delta \ln FDI_{t-i} + \sum_{i=0}^{r} \gamma \Delta \ln IPR_{t-i} + \eta_2 ECT_{t-1} + \varphi_t \quad (6)$$

The coefficients η_1 and η_2 denote the speed of adjustment for long run convergence. Whereas the coefficients of θ, ω and γ denote the short run dynamics towards the convergence to equilibrium for the respective equation 5 and 6. The ECT_{t-1} component entering each equation was derived from equation 3 and 4 above. The causality effect for each variable is now easily observed using the F statistical test. The $\ln IPR_t$ is said granger cause $\ln FDI_t$ and $\ln GDP_t$ if and only if $\sum_{i=0}^{r} \gamma \Delta \ln IPR_{t-i}$ is statistically significant. Whereas $\ln GDP_t$ is said granger

cause $\ln FDI_t$ if and only if $\sum_{i=0}^{q} \omega \Delta \ln GDP_{t-i}$ is statistically significant. Additionally, $\ln FDI_t$ is said granger cause $\ln GDP_t$ if and only if $\sum_{i=0}^{p} \theta \Delta \ln FDI_{t-i}$ is statistically significant.

Empirical Results

The unit root test for each series is shown in Table 1. All series except IPR is stationary at first difference for both ADF (Dickey and Fuller 1979) and KPSS (Kwiatkowski et al. 1992) test. A mixed result of stationarity for IPR series is detected at level from with trend. Both ADF and KPSS test report consistent results.

The results in Table-1 show that there is a mixture of *I*(1) and *I(0)* of underlying regressors and therefore, the ARDL testing could be proceeded. As far as the ARDL bounds testing is concerned, the cointegration test on mixed results from different stationarity test can still be carried out. This is the advantage of the ARDL approach as it allows specific characteristics of the cyclical components of series to exist in the model.

Table-1: The Unit Root Analysis

Series	Term	ADF	KPSS
lnFDI	C	-1.355(1)	0.837***(2)
	C/T	-1.914(1)	0.124*(2)
ΔlnFDI	C	-4.584***(1)	0.0699(2)
	C/T	-4.449***(1)	0.0678(2)
LnIPR	C	-0.792(1)	0.773***(5)
	C/T	-5.447***(1)	0.220***(5)
ΔlnIPR	C	-6.263***(1)	0.552**(5)
	C/T	-7.833***(1)	0.079(5)
lnGDP	C	-2.162(0)	1.240***(2)
	C/T	-2.107(0)	0.155**(2)
ΔlnGDP	C	-4.509***(0)	0.129(5)
	C/T	-4.808***(0)	0.121(5)

Note: *, **, *** significant level at 10%, 5% and 1% respectively. Figure in parenthesis denoted lag length used for the unit root estimation.
C: constant term
C/T: constant with trend

Testing for the existence of any cointegration as proposed by Eq.1 and 2 (refer Table-2) suggest that cointegration indeed exists for both ARDL specifications model. The computed F-statistic from all δi at the selected lag structure for both specified FDI and GDP model is 41.02 and 14.39 respectively. The reported lower bound and upper bound critical values generated by Pesaran et al. (2001) at 10%, 5% and 1% are (4.04, 4.78), (4.94, 5.73) and (6.84, 7.84) respectively. However, Narayan (2004) had produced the critical values for a small sample. The critical values at 10%, 5% and 1% are (2.676, 3.586), (3.272, 4.306) and (4.614, 5.966) respectively. Comparing the F-statistic with the respective critical values from both studies reveal that the null hypothesis of no cointegration in both models is consistently rejected at 1% respectively.

Table-2: The ARDL Cointegration Analysis

ARDL Log model	F-stat	Diagnostic
$FDI_{[gdp,ipr]}^{[0,4,3]}$	41.02***	ARCH(4) = 0.283 D-h(4) = 3.32 SBC = -27.28
$GDP_{[fdi,ipr]}^{[2,0,1]}$	14.39***	ARCH(2) = 0.681 D-h(2) = 3.07 SBC = 41.89

Note: ARCH is refers to LM Autoregressive Conditional Heteroscedasticity. D-h refers to Durbin's alternative test for serial correlation. Values in the parenthesis are refers to the highest lag structure as observed in the respective ARDL specification. SBC is refers to Schwarz Bayesian Criterion.*, * * and * * * indicate significance at the 10%, 5% and 1% levels, respectively.

The result of the error correction-ARDL model is presented in Table-3. The significance of error correction term (ECT_{t-1}) shows evidence of long run effects for each of the stipulated model. The significant lagged error terms (ECT_{t-1}) as exhibited in Table-3 are observed on both of the specified models namely ECM-ARDL for lnFDI with lag structure [1, 0, 1] and ECM-ARDL for lnGDP with lag structure [1, 0, 0]. The coefficient shown by the ECT_{t-1} indicates the rate effect of long-run convergence. It is found that the speed of adjustment process to reach equilibrium in the long-run FDI model is relatively moderate compared to the marginally slow process recorded for GDP effect.

Table-3: The ECM-ARDL Causality Analysis

ECM-ARDL model	coefficient	Diagnostic
ΔlnFDI [1, 0, 1] ΔlnIPR $\not\Rightarrow$ ΔlnFDI ΔlnGDP $\not\Rightarrow$ ΔlnFDI ECT_{t-1}	5.49** 5.91** -0.694***	ARCH(1) = 0.89 D-h(1) = 0.87
ΔlnGDP [1, 0, 0] ΔlnFDI $\not\Rightarrow$ ΔlnGDP ΔlnIPR $\not\Rightarrow$ ΔlnGDP ECT_{t-1}	5.14** 0.92 -0.106**	ARCH(1) = 0.66 D-h(1) = 0.19
Note: *, * * and * * * indicate significance at the 10%, 5% and 1% levels, respectively.		

In terms of causality effect between variables in each model, our study found that there is a bi-directional causality effect between GDP and FDI. A unidirectional causality effect was detected from IPR to FDI and no significant evidence of causality effect found from IPR to GDP. The reason might be due to the slow process to reach the long-run equilibrium once the variable was affected by a shock. In other words, the effect response of IPR in the specified model is inelastic in the long run.

Conclusion

This study discusses the effect of IPR protection with respect to the process of attracting FDI and economic growth in Malaysia. It was found that IPR protection significantly affects FDI in the short-run and a suggestive effect was also found in the long-run. However, for the economic growth process, IPR was found to be insignificant but a positive relationship was recorded in the system. Although a long-run effect was found to exist in the long-run economic growth process, the insignificant effect in the short-run causality between IPR and GDP led to a slower convergence in the process of reaching the steady state.

At least two implications can be offered from these findings with regards to the role of IPR protection towards foreign direct investment and economic growth in Malaysian economic context. First, to attract more foreign investment, a conducive IPR policy should be constantly and consistently promoted over time. This is because, IPR protection is seen as the protective mechanism to securely uphold

new technology transmitted through the FDI process. This mechanism will ultimately improve investors' confidence as threats towards technology infringement will be minimized. Generally, the strength of IPR protection is seen as a pull-factor to lure inward foreign investment and promote growth in future. It reflects the technological capacity owned by a country with ability to spur research and development needed to achieve higher growth.

Second, in order to promote future economic growth, stronger IPR protection is a necessary consequence under some circumstances. Although IPR protection was found to have a weak effect to the process as reported in Table-3, the effect of IPR to reach higher economic growth is achieved through the intermediary channel which is FDI, a critically important factor to spur higher growth. The indirect link of IPR towards growth process in this study is characterized as a two-stage mechanism and thus makes it less apparent in the empirical result. A specific policy intervention targeted to improve IPR protection should be placed accordingly to accelerate this process. As noted by Khoury and Peng, (2011), institutional reform of IPR for a host country is critically important and subject to the speed-up process in adopting such reform. However, such acceleration must be accompanied with the local host country's innovation base.

As highlighted from this study, IPR protection plays a significant role in attracting FDI in the past and the same capacity is believed to affect the future. An additional ECM-ARDL causality test shows that, the strength of IPR protection in Malaysia is motivated by both FDI and GDP. This relationship is sustainable in both short-and-long runs.
To conclude, the role of IPR protection in the process of achieving higher economic growth is huge. Therefore, a specific government policy might be formulated to achieve a conducive IPR environment within the economy. As suggested by Wint and Williams (2002), in order to promote international investment, small and open economies are needed to implement functional policies rather than selective policies. However, there are

some cases where the selective policies are more prominent when both policies simultaneously integrate (Wint, 1998).

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