INTELLECTUAL PROPERTY RIGHTS AND PRIVATE FOREIGN DIRECT INVESTMENT IN SUB-SAHARAN AFRICA

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Abstract

This article examines the impact of Intellectual Property Rights (IPRs) on private foreign direct investments (PFDI) for a cross-section of Sub-Saharan African (SSA) countries. The results of the study indicate that: (1) strengthening IPRs has a significant positive effect on PFDI, however, beyond a certain optimal level, the effect becomes negative; (2) the trade related agreement on intellectual property has had positive but insignificant effect on PFDI; (3) investors are sensitive to the investment climate of the countries in which they invest; and (4) inflation rate is negatively correlated with PFDI inflows.

Introduction

During the past two decades, academicians and policymakers in all regions of the world have directed attention to the benefits of intellectual property rights (IPRs). Globalization of trade and ideas and the resulting increase in international transactions in knowledge intensive products have generated intense interest as well as disagreements about this topic. The intensity of interests increased especially after the agreement on the Trade Related Aspects of Intellectual Property Rights (TRIPS) by the World Trade organization (WTO) in 1994. Under the terms of TRIPS, current and future members WTO must adopt and enforce strong non-discriminatory minimum standards of IPRs protection in each of the areas commonly associated with IPRs, including patents, copyrights, trademarks, and trade secrets (Commission on Intellectual Property Rights [CIPR], 2002).

IPRs have therefore become part of the infrastructure supporting investments in research and development that is important for innovation and new business development. By granting temporary exclusive rights on inventions, IPRs allow the right holders to price their products above marginal cost, and hence recoup their initial research investment costs (Leger, 2006). Accordingly, the creation of an effective IPRs regime has an effect not only on the incentive for new knowledge creation and its dissemination, but even more important the business location decision of firms, prices, and the market structure.

A review of the literature shows that the importance of IPRs is generally associated with its double function of promoting PFDI and innovation, which are important determinants of economic growth. This paper contributes to a better understanding of the former - how IPRs affect PFDI inflows in developing countries, especially in Sub-Saharan Africa (SSA). Obviously, the impact of IPRs on PFDI is important for many developing countries where PFDI inflows have not reached the expected levels needed for their development. Even more important is the fact that PFDI has become one of the stable sources of development finance in developing countries. For example, by the end of 2004, the total foreign aid (grants) and net official flows (aid and debt) to developing countries were $47.4 billion and $22.6 billion respectively, while net PFDI flows were $165 billion dollars (Global Development Finance [GDF], 2005).

Nevertheless, PFDI inflows have tended to concentrate in a few countries. Of the $648 billion of global PFDI inflows in 2004, SSA accounted for only $12 billion or 2% and increased slightly to 3% in 2005 (United Nations Conference on Trade and Development [UNCTAD], 2006). Although, most SSA countries offered favorable incentives to investors, they failed to attract the desired investments or did not make it to the short list of the PFDI decision of foreign investors. Africa's

situation presents a paradox. Most studies report that the return on investment is greater in Africa than in any other region of the world yet the region accounts for the least amount of PFDI inflows (UNCTAD, 1999). Africa's low share in global PFDI over the past two decades reflects its slow progress in increasing production capacity and diversification, and an inability to create a large regional market. Consequently, Africa's per capita PFDI inflows was only $34 in 2005 compared with $64 for developing economies as a whole (UNCTAD, 2006).

Accordingly, it is important that the effect of IPRs on PFDI inflows in the SSA context is examined to guide policymakers in the development of programs that are important in promoting the continent as an important PFDI destination. The focus on SSA is important for many reasons. First, many of the studies on IPR and PFDI link suggest that regional and cross - country differences influence the effect of IPRs on PFDI in particular and the economy in general (Falvey et al., 2006; Park and Lippoldt, 2003). Falvey et al. (2006) demonstrated that strengthening IPRs has differential effects in low, middle, and high-income countries. Similarly, Park and Lippoldt (2003) reported that IPRs' effect on PFDI is different for least developing countries and the rest of the developing countries.

The findings of the above two studies are important considering the fact that out of the 54 countries classified by the World Bank (2007) as low-income, 35 are SSA countries and 35 of the 50 least developed countries are in SSA (UNCTAD, 2005). The findings of the two studies provide support for Kobrin's (2005) claim that a broad consensus on determinants of PFDI has been elusive because most studies have analyzed determinants of PFDI by pooling together structurally diverse countries in their regression analysis. Further, Sethi et al. (2003) argued that multinational enterprises usually evaluate prospective PFDI destinations on a regional basis. Asiedu (2002), for instance, has also shown that there are some differences in the factors that drive PFDI in SSA and other developing countries.

Finally, while PFDI has become an important alternative source of development in almost all regions of the world, aid flows still represent the largest source of foreign finance in Africa (Ismail, 2007). Hence, understanding how strengthening IPRs affect PFDI inflows to the region might help policymakers in the design and implementation of the necessary programs and polices that will allow the countries in the region to become competitive in attracting PFDI.

Consequently, the objective of this paper is to examine the effect of IPRs on PFDI in SSA with similar social, economic, and institutional characteristics to help to reduce bias due to sample selection. The rest of the paper is organized as follows: Section 2 reviews the literature on the IPRs – PFDI relation and Section 3 describes the data and methodology for the analysis. This is followed by the discussion of the results in Section 4 and the implications, directions for future research and concluding remarks are given in Section 5.

Literature Review

There are many models that have been used to explain why firms will like to invest abroad, however, the OLI (Ownership - locational - internalization) framework by Dunning (1993) is by far the most comprehensive and accepted. Therefore, we explain how the protection of IPRs affects PFDI from this perspective. The ownership advantages are generally intangible assets in the form of superior technology, organizational skills, trademarks, trade secrets, patents, reputation, and innovative capacity, which other firms do not have. From this viewpoint, firms that wish to invest abroad must have ownership advantages to make it compete effectively with indigenous firms in the host country.

The two other factors (locational and internalization) help to explain why the multi-national enterprise (MNE) should invest abroad. First, the locational characteristics of the country must make it profitable for firms wishing to invest. These locational advantages include low transportation costs, market size, favorable local government regulatory environment, skilled labor, low input prices and adequate roads and communications infrastructure. Second, it must be more profitable for the firm to internalize production rather than license or export goods on the open market. As a result, internalisation explains why a foreign firm prefers to retain full control over the production process or try to acquire a subsidiary rather than license its intangible assets to local firms or an independent foreign firm. By helping firms to overcome the high transaction costs associated with regulating and enforcing contracts and protecting quality, internalization helps firms to gain from exploiting their knowledge-based assets (KBA) within the confines of their international operations (Braga and Fink, 1998; Maskus, 1998; Smarzynska, 2004).

The discussion above shows that firms that create intellectual property are likely to engage in foreign production in countries with strong IPRs. This is because weak IPR protection increases the probability of imitation, which erodes a firm's ownership advantages and decreases vocational advantages of the host country. Further, the level of protection in the national IPRs system may influence a firm's decision to internalize or externalize its knowledge-based assets. A weak IPRs system, for example, increases the benefits of internalization since it is associated with a greater risk of the licensee's breeching of the contract and acting in direct competition with the seller. The implication is that firms are more likely to invest in countries with strong protection, since the smaller risk of imitation leads to a relatively larger net demand for protected products.

Nonetheless, because almost all the countries in SSA are buyers rather than producers of key products and technologies, the benefits of enhanced IPRs regime is doubtful (Lesser, 2002). This is because the strengthened IPRs system could lead to higher level of imports and prices and hence a loss in consumer welfare. Further, a strong IPRs system could provide knowledge-based firms with market power and might actually cause firms to divest and reduce their service to foreign countries (Braga and Fink, 1998). Additionally, a strong IPRs system may have a negative effect on PFDI, as this will encourage MNEs to shift from local production to licensing. The effects of higher levels of IPRs protection on PFDI in low innovation countries are thus theoretically ambiguous. This has led to many studies being conducted to validate the relationship between IPRs and PFDI inflows. In the discussions that follow we examine a few of these studies.

The empirical studies that have examined the impact of IPRs on PFDI have been inconclusive. For example, Seyoum (2006), Lesser (2002), and Smarzynksa (2004) found a positive relationship between IPRs on PFDI, while Kondo (1995) and Seyoum (1996) make claims to the contrary. Seyoum (2006) examined the effect of IPRs on PFDI in 63 developed and developing countries over two time periods (1990 and 1995). Using ordinary least squares (OLS) estimation technique, Seyoum (2006) found that the level of patent protection, which was measured by the Ginarte-Park index was positive and significantly correlated with PFDI. Likewise, Lesser (2002) examined the relationship between IPRs and PFDI for a sample of 44 developing countries based on a survey of patent attorneys and licensing executives. He found that strong IPRs were positively associated with PFDI inflows. It is important to note that all these studies employed a cross - sectional design and therefore the results could suffer from omitted variable bias, as they could not control for country specific effects.
Seyoum (1996), for instance, employed pooled time series estimation technique to examine the

impact of patent protection on PFDI in 27 developed, newly industrialized, and less developed countries from 1975 to 1990. He demonstrated that patent protection was not significantly correlated with PFDI for the total sample. However, the regression results showed a significant relationship between IPRs and PFDI for developed countries and an insignificant relationship for the less developed countries. In contrast to the studies mentioned above, Kondo (1995) used cross-sectional and time series designs to analyze the impact of IPRs on the flow of US PFDI to 33 countries from Europe, Asia and Latin America between 1976 and 1990. The results of both methodological designs suggest that patent protection was not significantly correlated with PFDI inflows. Accordingly, Kondo (1995) concluded that there was no evidence that patent protection facilitated PFDI.

In response to the findings of Kondo (1995) and Seyoum (1996), Park and Lippoldt (2003) argued that the earlier studies do not capture the benefits of the TRIPS agreement which came into effect in 1995. They therefore used data (between 1990 and 2000) that captures the post TRIPS agreement. They indicated that strengthening IPRs had a positive effect on PFDI inflows. However, they also noted that IPRs' effect is dependent on the level of development and other relevant unobserved country-specific characteristics (e.g., culture and quality of institutions). Further, Park and Lippoldt (2003) showed that IPRs' effect was largest in the least developed countries and second largest in developing nations (where IPRs regimes are next weakest). This suggests the possibility of diminishing returns of patent protection on PFDI

The review of the empirical literature indicate that not much has been done in the context of SSA, and thus, most of the studies used to support a positive effect of IPRs on PFDI have been that which relates to developing countries as a whole. However, because the genenralizability of most of the studies is limited as discussed earlier, we contribute to the literature by examining the effect of IPRs on PFDI in the context of SSA. Further, we contribute to the IPRs-PFDI literature by analyzing whether there is a differential effect of IPRs on PFDI between the pre and post-TRIPS era for SSA countries.

Data and Methodology

The empirical analysis is based on a panel data set consisting of four separate 5–year periods (the last period is 4 years), 1985-1989, 1990-1994, 1995-1999, and 2000-2003.

All variables represent the average over the sub-periods, except the IPRs variable, for which we use the initial values of the sub-periods because it is assumed that it takes time for the IPRs reform to have an effect on PFDI. The equation we estimated is specified as follows:

$$PFDI = \beta + \beta ARG + \beta LGCAP + \beta OPEN_{it} + \beta INF + \beta POPit + \beta SEC + \beta RISK + \beta IPR + \beta IPRSQ + \beta IPR^{*}TRIPS_{it} + \mu_i + \varepsilon_{it}$$

where:

1. PFDI is the PFDI share in GDP for country i in year t;
2. β_0 is the constant term;
3. βs are the coefficients of the variables to be estimated;
4. ARG is Real GDP per capita growth rate used in this study to control for business cycles in the economy;
5. LGCAP represents the level of development, which is measured by the Real GDP per capita;
6. OPEN is the degree of openness of the economy which is measured as a percentage of trade (imports plus exporters) share in GDP;
7. INF is the inflation rate, which is included to capture the consistency of monetary

and fiscal policies as high inflation rates may deter foreign investors;

8. SEC is secondary school enrollment, which is a measure of the human capital or absorptive capacity of the population;
9. RISK is a composite risk measure of the political, financial and economic risk of the PFDI;
10. IPR is the intellectual property rights protection variable;
11. IPRSQ is the square of IPR, which is included to capture any nonlinear relationships between IPR and PFDI
12. TRIDS represent the trade-related aspects of intellectual property rights;
13. μ_i represents the country-specific effect which is assumed to be time invariant, and
14. ε_{it} is the classical disturbance error component.

The fixed effects specification allows us to control for unobserved country heterogeneity and the associated omitted variable bias, which seriously afflicts cross-country regressions. The other variables are added to the index of the strength of patent rights in the regression to explain the variance in PFDI inflows act as control variables, without which the index of patent rights might pick up the effects of other policies or economic events on PFDI.

The data on PFDI inflows comes from the World Development Indicators (2006), and is measured as the net PFDI inflows. The net PFDI are the net inflows of investment to acquire a lasting management interest (10% or more of voting stock) in an enterprise other than that of the investor. This is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments.

Data on Real GDP per capita growth rate and real GDP per capita were obtained from World Economic Outlook (2000) and Global Development Network Growth Database. Data on inflation, openness, population, and secondary school enrollment were obtained from the Global Development Network Growth Database. The risk variable is the composite risk measure from the International Country Risk Guide (ICRG) of the Political Risk Services Group that is made up of three measures: political, financial, and economic risk. It is rated on a scale of zero to 100, with zero meaning high risk and 100 referring to the lowest risk. The log transformation of INF, SEC, and RISK variables were used to reduce heteroscedasticity problems.

The strength of intellectual property rights protection (IPR) is measured by the Ginarte-Park index of patent rights, which is based on five categories of patent laws: (1) extent of coverage, (2) membership in international patent agreements, (3) provisions for loss of protection, (4) enforcement mechanism, and (5) duration of protection. Each of these categories (per country, per time period) is scored on a value ranging from 0 to 1, and the unweighted sum of these five values constitutes the overall value of the patent rights index. The index therefore ranges from 0 to 5, with higher numbers indicating stronger protection. The average PFDI and IPRs for the countries in the study sample over the period 1985 -2003 are listed in Table 1

Table 1: **Average PFDI and Patent Protection Index, 1985-2003**

COUNTRIES	PFDI	GINARTE-PARK INDEX OF PATENT RIGHTS
Angola	5.02	0.86
Benin	1.64	2.86
Botswana	2.47	1.99
Burkina Faso	0.30	2.40
Burundi	0.52	2.94
Cameroon	0.83	2.65
Central African Republic	0.26	2.65
Chad	4.09	2.80

COUNTRIES	PFDI	GINARTE-PARK INDEX OF PATENT RIGHTS
Congo, DR	0.41	2.86
Congo Rep.	3.11	2.69
Cote d'Ivoire	1.25	2.69
Ethiopia	0.61	0.25
Gabon	-1.38	2.80
Ghana	1.34	3.02
Kenya	0.68	2.64
Madagascar	0.79	2.06
Malawi	0.36	3.32
Mali	2.09	2.74
Mauritania	1.65	2.74
Mauritius	2.25	3.01
Mozambique	1.52	0.00
Niger	0.51	2.57
Nigeria	2.46	3.13
Rwanda	0.44	2.89
Senegal	0.68	2.74
Sierra Leone	2.07	2.64
South Africa	0.18	3.69
Sudan	0.80	3.52
Swaziland	4.24	2.52
Tanzania	2.38	2.90
Togo	1.54	2.57
Uganda	2.46	2.74
Zambia	3.75	3.52
Zimbabwe	0.47	2.99

The TRIPS agreement which sets minimum standards for IPRs protection was concluded in April 1994 and entered into force on January 1, 1995. Consequently, we divided the time period of our study (1985 – 2003) into two; before 1995 and after 1995. Thus, we dummied the post TRIPS era as 1, and zero for the pre-TRIPS era. To examine the effect of IPRs in the post-TRIPS era, we use the interaction or cross product of the IPRs and TRIPS dummy (IPR*TRIPS) as one of our regressors. The coefficient on this variable shows the effect of IPRs in the post-TRIPS era compared to the pre-TRIPS era. A positive significant coefficient of the IPR*TRIPS variable indicates that IPRs contributed to higher PFDI inflows than in the pre-TRIPS era and a negative significant coefficient explains otherwise.

Results

Table 2 presents the results of IPR-PFDI regressions. The results show that openness, population, risk or institutional infrastructure, and IPRs have significant effects on PFDI in various model specifications. The most robust finding of the study is the significant effects of IPRs as seen in almost all the model specifications (Columns 2, 3, and 4). Overall, the model explains about 40% – 64% of the variation in the data. The study's findings therefore support the assertion that strengthening IPRs is an effective policy tool for countries seeking to attract PFDI into their economies. This finding is particularly important in the post-TRIPS era when national governments in small countries do have fewer policy options. However, strengthening the IPRs system could play a signaling role to investors that the host country is not only interested in attracting PFDI but also offer strong protection to their investments.

In Columns 3 and 4, we tested for the possibility of diminishing returns of strengthening IPRs or a nonlinear relationship between IPRs and PFDI by including the power term or the square of the IPR variable. The results show that there is indeed diminishing return of IPRs protection as indicated by the significant coefficients of IPR and IPRSQ (positive and negative respectively). This shows that strengthening IPRs system is associated with an initial increased flow of PFDI, however, after a certain optimal level, further increases in patent protection offered to patent owners leads to a negative effect on PFDI inflows. Thus, there is an inverted U-shaped relationship between IPR and PFDI. This might be explained by the fact that after a certain level of patent protection is reached, firms become confident that their KBA can be safely

Table 2: IPR -PFDI Regressions

	1	2	3	4
ARG	-0.005	0.078	0.049	0.048
	(0.069)	(0.124)	(0.103)	(0.105)
GCAP	-5.469	-9.244	-5.994	-5.880
	(6.147.)	(10.248.)	(8.542.)	(8.680.)
OPEN	0.048*	-0.018	-0.001	-0.000
	(0.025)	(0.041)	(0.034)	(0.035)
INFLA	0.458	-0.323	-1.825***	-1.845**
	(0.580)	(0.721)	(0.678)	(0.678)
POP	0.000**	0.000**	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
SEC		-0.003	0.007	0.006
		(0.080)	(0.067)	(0.068)
RISK	17.932*		9.054	9.234
		(10.335)	(8.788)	(8.994)
IPR		10.526***	23.322***	25.523***
		(2.738)	(3.527)	(3.901)
IPRSQ			-3.510***	-3.563***
			(0.739)	(0.858)
IPR*TRIPS				0.116
				(0.919)
Constant	12.987	-27.797	-25.906	-26.758
	(19.377)	(29.884)	(24.833)	(25.978)
N	125	83	83	83
R^2-adjusted	0.16	0.23	0.47	0.45

*Significant at the 10% level. **Significant at the 5% level. ***Significant at the 1% level.

protected from imitation, and therefore may shift to licensing of delivery of their goods and services rather than direct local production. Another possibility for the diminishing returns of IPR is that, beyond a certain level, firms seek to use their market power to exploit or dominate their markets (e.g., produce little and sell at higher price to maximize their profits) rather than expand the size of their market to achieve both economies of scale and scope.

We also examined whether the TRIPS agreement has contributed to PFDI inflows far and beyond that of the pre-TRIPs era and the result is reported in Column 4. The IPR*TRIPS variable is positive but not significantly correlated with PFDI. This suggests that IPRs contribution to PFDI inflows after 1995 is not significantly different from the pre - TRIPs era (before 1995). This finding supports the argument that strengthening IPRs alone is not sufficient in and by itself to facilitate PFDI inflows.

The positive significant effect of the population variable (Columns 1 and 2) also shows that market size is an important element in the MNEs investment decisions. The finding on population supports Seyoum's (1996) results that population is an important determinant of PFDI inflows. This finding might also mean that MNEs are more interested in market expansion rather than dominating their markets or exploiting their markets through their market power as advocated by the anti-WTO agents. The investment climate variable (RISK) is positive and significant (Column 2) indicating that the overall investment climate or institutional environment of the host country matters in the decision making process of MNEs.

Inflation is not significantly related to PFDI in Columns 1 and 2. However, when we control for nonlinearities between IPRs and PFDI, the results show that inflation is negative and significantly correlated with PFDI. This is not surprising because foreign investors view high inflationary levels as an indication of macroeconomic instability and may be reluctant to invest in those situations. The policy implications of our study are discussed next.

Policy Implications and Concluding Remarks

The findings of the study indicate that over the past two decades, IPRs, market size and business climate have been key determinants of PFDI in SSA. These results have important implications for firms seeking to invest in the region and policymakers in SSA.

First, although strong patent protection is an important variable for PFDI decisions, it needs to

be complemented by other considerations, including increased market access, growth rate of the economy, and the overall investment climate. Thus, from a policymaking perspective, IPRs must be seen as an important component of the general country conditions, including macroeconomic stability, production incentives, investment regulations, and above all an effective infrastructure for enforcing the new intellectual property laws.

Second, strengthening IPRs benefits not only the patent owners, who are mostly foreigners, but also the host county in terms of PFDI. Obviously, the bigger challenge is not in just attracting PFDI, but more importantly, how to utilize it in generating the growth that is needed in the region to help reduce poverty and income disparities. It must be noted that PFDI's growth enhancing effect is possible only when it stimulates domestic capacity of the host country. Consequently, policymakers seeking to strengthen their IPRs system must also emphasize PFDI that generates externalities to the local economy. As noted by Agosin and Mayer (2000), PFDI has been more productive in Asia than in other regions of the developing world because Asian governments actively implemented policies that discriminated in favor of foreign investment that have positive effects on domestic investment. The implication is that PFDI may be more useful when the host country is able to control, regulate, and direct PFDI into sectors that generate externalities to the overall economy (Rhagavan, 2000).

Third, the diminishing returns property of strengthening of IPRs on PFDI suggests that policymakers must recognize the benefits and costs associated with IPRs and seek to balance the interests of patent owners and users of intellectual property. The challenge therefore is how to design and implement the optimal IPRs strategy that will promote the market expansion (serving more markets) of MNEs rather than making the IPRs too strong such that it grants producers excessive market power to exploit their markets. As discussed earlier, excessive patent protection and the excessive monopoly power will result in loss of consumer welfare, because producers will be more interested in maximizing their profits through under-production and selling at a higher price.

Fourth, an important component of any program to attract high-quality PFDI and promote technology transfer is the development of a competent indigenous technological capacity. The ability to absorb new technologies can also influence the flow of PFDI into a country. This means that countries, in the region must invest in education and training, which will help to enhance the absorptive capacity of domestic firms to improve their productivity and the effectiveness of the IPRs system. Additionally, the effectiveness of the IPRs system is dependent on not only how it impacts the market structure but also innovation and technology transfer. Accordingly, a practical guide for SSA countries is the promotion and development of local and national innovation systems by supporting R& D, removing disincentives for applied R & D and its commercialization, and taking greater advantage of access to technical information that exists within the global information infrastructure (Maskus, 1998).

The literature we reviewed and our findings from this study provide some important directions for future research. First, future research should seek to identify the optimal level of IPRs for SSA countries to guide policymakers as to how they can derive the maximum benefits from strengthening their IPRs system. Second, strengthening IPRs promote PFDI inflows and innovation, which are necessary ingredients for growth, and therefore more research needs to be done to asses the welfare effects of PFDI.

In concluding, we argue that although there appears to be strong reasons why least developed countries, like those in SSA, should not strengthen their IPRs (e.g., low level of R & D), the evidence of

this study indicates that SSA countries benefit from strengthening their IPRs system through increased inflow of PFDI. As a result, while it is true that lower IPRs in the context of developing countries facilitate imitation of foreign technologies, developing countries can also strengthen their IPRs in order to increase PFDI and innovation by domestic firms. Finally, strengthening the IPRs system must form part of a coherent strategy and broad set of policies that maximize the potential for PFDI inflows, promote innovation, and overall economic growth in SSA.

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