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## 1. PREFACE

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Intellectual Property Rights (IPRs) is a topic of high importance in many cases, despite the fact that many people may not always be aware of this. The lawsuit concerning access to AIDS-medicine in South Africa, the Napster file sharing network and copying of CD's are basically all questions about IPRs.

The focus of this paper is whether "The Agreement on Trade Related Aspects of Intellectual Property Rights" (TRIPs) has potential to create technology transfers to the African developing countries in Sub-Saharan and to what extent these transfers can create growth.

There are several reasons for looking at transfers of technology. Firms are on the world market no longer able to compete on cheap labour alone, but need to exploit the comparative advantages that technology can provide them. While the disparities between countries in per capita GDP is high, it is estimated to be even higher in knowledge. The export of high-tech products has risen from 10% in 1980 of world exports to 23% in 1996. A trend that has been driven by the industrializing countries in Asia and not the industrialized ones. It is a great danger that the Sub-Saharan countries will be – if they not already are – left behind in the technological development.

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## 2. INTRODUCTION TO IPRs

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The main reason why we have IPRs is to maximize the level of research for new goods, services and technologies and in this way gain the highest possible level of growth for society. The value of a patent is primarily a trade off between the cost from the monopoly and the new goods that the patents create.

There is today among economists still no agreement about how strong an effect patents actually have on the scale of research. The idea is that the patents give the inventor a possibility to exploit the value of the invention that he otherwise would have had difficulties to profit from. In theory this makes sense, but in real life a patent is not necessarily the only way to benefit from an invention. Before you can sell a new product it needs testing, marketing and so on. The resources needed to gain access to a market alone can prevent firms from entering. Because of this, large firms in some lines of business do not consider patents as important as small firms. For example in the airplane-industry, first-mover advantages and rapid movements down the learning curve is seen as more effective methods to profit from Research & Development (R&D) than patents.

The main cost to society from patents comes as mentioned above from the (monopolistic)

marked power the patent gives the rights-holders. If the firms use their marked power to reduce sales and output in their particular markets to raise the price, it will have an especially hard impact on the developing countries most of which are technology importers. Besides the monopoly one would also expect a "patent race problem". This comes into play because firms use a lot of resources on securing new patents and not actually on research. Almost all technological progress is based on earlier inventions. Patents can stop research within a field and thereby more or less remove the main reason for having patents. This is why it still in economic circles is debated whether it is optimal with a short-term broad patent or a long-term narrow patent<sup>1</sup>.

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### 3. MAIN POINTS IN TRIPS

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The TRIPs Agreement was negotiated in the context of the Uruguay Round of multilateral trade negotiations under GATT. TRIPs is the most comprehensive multilateral agreement that sets detailed minimum standards for protection and enforcement of intellectual property rights. It covers most importantly patents, copyright, trademarks, industrial design, and plant breeders' rights.

There exists a list of exceptions included in TRIPs. The member states are allowed to adopt measures to protect public health and nutrition, to promote socio-economic and technological development, to protect against the abuse of intellectual property rights and excluded patent ability of plants and animals as well as methods for the treatment of humans or animals. In addition the developing countries have a longer period to implement The TRIPs Agreement. It was originally set to 2006, but has been extended to 2012 and it will probably have to be extended even further.

The interpretation of the exceptions is, in large part, up to the member states. In case of a dispute a panel of specially appointed trade experts will issue a report with an interpretation of the Agreement. "The winning" part will then have the right to impose trade sanctions on "the loser". In practise this doesn't help the developing countries. Only very few of them has the capacity to get a case through the WTO system and even if they do, trade sanctions will often hurt themselves more than the industrialized countries.

Article 7 in TRIPs states that TRIPs should contribute to innovation and transfer of technology for the mutual benefit of producers and users. Further articles 66 and 67 say that the developed countries are obliged to provide incentives to their firms and institutions to promote technology transfers to the developing countries and, on request, to provide technical and financial cooperation. But unlike the property rights part TRIPs does not specify the content of these

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<sup>1</sup> *Patentrettens Økonomiske Begrundelse og Funktion* - Riis, Thomas

responsibilities or how they should be implemented. A problem for the developing countries is thus their missing negotiating power within the TRIPs framework.

The exceptions in TRIPs offer quite a lot of operational flexibility. How TRIPs in practice affect the developing countries depends to a high degree on how it is actually implemented. The Brazilian Free Distribution of AIDS Drugs for All programmes is an example that it is possible for the developing countries to exploit the rights given in TRIPs to their own benefit<sup>2</sup>.

TRIPs is far from the only trade agreement on IPRs existing today. In fact it is only the top (or actually the bottom) of the iceberg. "TRIPs plus" is a term used to describe the tendency for some industrialized countries to demand stronger IPR laws in developing countries in exchange for opening their markets. These bilateral agreements often set much higher IPR standards than TRIPs and does not have the exceptions included in TRIPs. This paper does not include other trade agreements than TRIPs in the analysis, but it will be noted if the result may not be valid outside the TRIPs framework<sup>3</sup>.

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#### 4. IMPLEMENTATION OF TRIPs

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Developing countries do not have a tradition for patents, and their legal systems are in many ways not capable of handling a western IPRs system. IP protection is costly, not only to apply, but also in maintenance fees, the monitoring cost of the use of the technology, and finally to defend in case of unauthorized use. The developing countries' lack of technological infrastructure and capital poses a serious problem for them to gain any benefit from the IPRs system.

The IPR standards in TRIPs are not adapted to the developing countries but are instead based on the prevailing rules in the developed countries. This also presents a problem because the size of the market, the innovative capability and a long list of other factors are very different. If the developing countries shall gain any benefit from the TRIPs it is necessary that legal system be geared towards maximizing the profit from IP protection rather than simply serving to avoid complaints by the WTO.

First of all the reforms should target local entrepreneurs and promote the dissemination of domestic and foreign knowledge. Secondly the governments should match their IPRs laws to their

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<sup>2</sup> *The Impact of the Agreement on Trade-Related Aspects of IPRs on Human Rights* - The High Commissioner

<sup>3</sup> *The TRIPs Agreement* - Weeraworawit, Weerawit

own capabilities. The western systems are simply too big to be efficiently controlled by the developing countries<sup>4</sup>.

IPRs interact in complex ways with many other areas of public policy. Under the given circumstances complementary policies and regulations can increase the benefit or minimize adverse implications of an IPRs system.

One possibility for governments to reduce potentially adverse price movements related to IPRs-induced market control is to control prices through reference prices or administrative price ceilings. Such price controls are allowable under the TRIPs Agreement. In practice such policy of course offsets at least some of the incentives for for example research in new drugs. Some countries have therefore tried to set prices so the firms still generate profit for new R&D, but in practice it has been very difficult to set a "correct" price because the firms have tried to overstate their costs.

Another possibility offered by TRIPs is the use of compulsory licensing. This means the use of an IP protected product without the authorization of the titleholder. The IP owner is afterwards payed a license fee for the use of the product. The use of compulsory licenses can in theory play a role in offsetting the high prices due to monopolistic market forces or the increase in cost of research due to overly broad patent protection. As before, however, it also undermines the effects of having a IPRs regime because the IP owners are not guaranteed an adequate profit.

Parallel trading occurs when an IP protected product put on the market by an authorized firm in a foreign country is exported to a country where the same product is also sold by an authorized local firm. It is unclear from the point of the developing countries whether parallel trading brings net benefit to the countries. On the one hand it is expected to increase competition and drive down prices. On the other hand parallel trading prevents the IP owners from discriminating prices across countries and regions. The prices are normally already lowest in the poorest countries so parallel trading could even lead to higher prices in developing countries.

There are thus no golden rules for the implementation of TRIPs in the developing countries, but they have as listed several ways to reduce the negative (and positive) effects that the Agreement might have<sup>5</sup>.

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<sup>4</sup> *Northern Intellectual Property Rights for the South?* - Edwin, E.C. Lai & Qui, Larry D.

<sup>5</sup> *Intellectual Property Rights & Economic Development* - Braga, C.A. Primo, Fink, C. & Sepulveda

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## 5. INTERNATIONAL TRADE FLOWS AND WELFARE

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The existence of the TRIPs Agreement will make it more interesting for companies in industrialized countries to invest in research in for example tropical diseases because the agreement provides them with a tool to control and thereby profit from their inventions. The agreement does however not solve the main problem: The lack of purchasing power in the developing countries, so it will be extremely naive for example to expect any boom in tropical diseases research<sup>6</sup>. But the agreement also gives the firms in the industrialized countries a better control with the use of technology in third world countries, which should promote a higher level of foreign investment. If the developing countries are able to learn from the technology transfers following new investments, it could strengthen the productivity and the competing ability of the local firms and maybe be a catalyst of growth in the developing countries.

A necessary, but not sufficient, condition for any growth effect is a positive significant relationship between patent protection and trade flows. Several studies have tried to find such a relationship. Both Maskus and Penubarti<sup>7</sup> and Braga and Fink<sup>8</sup> found that higher levels of protections have a positive impact on bilateral manufacturing imports into both small and large developing countries.

In theory it is not clear whether stronger IPRs in fact affects bilateral trade flows. A low IPRs protection may reduce export because the IP owner will not risk illegal copies, but a high IPR level may also reduce exports because the greater market power will raise prices. The overall effect is hence theoretically ambiguous.

Even in a very simple static two-country model, the effect of an introduction of IPRs on welfare is not clear. One possibility is that the exporting (developed) country will gain from tighter IPRs because of increased monopoly profits and the importing (developing) country will suffer from higher prices and lower import. This analysis is though only valid if the importing country is able to copy the exporting country's products in the absence of IPRs. If they are not, and many Sub-Saharan countries are not capable of producing high-tech products, both countries may profit from the introduction of IPRs because new products will be available for the importing country. This again of course requires that the exporting country would not sell any products to the importing country before IPRs was introduced.

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<sup>6</sup> *Patents, Appropriate Technology & North-South Trade* - Diwan, I. & Rodrik, D

<sup>7</sup> *How Trade-Related are IPRs ?* - Maskus, K.E. & Penubartu, M

<sup>8</sup> *The Economic Justification for the Grant of IPRs : Patterns of Convergence & Conflicts* - Braga & Fink





R&D in the industrialized countries is an extremely important factor for economic growth. Thus it is estimated that the rate of return to R&D capital is between 18 to 20%<sup>11</sup>. R&D also has a positive spill over effect on other firms. There have been many attempts to estimate the importance of this effect. In agricultural R&D projects the social rate of return has been found to be up to 300% bigger than the private rate of return<sup>12</sup>.

In developing countries there is a tendency to underinvest, which can be explained by several reasons. First of all considerable skill, effort and money is required for R&D. Secondly there must exist a technological infrastructure including laboratories and trained personnel. Thirdly many firms may simply be unaware of the potential returns R&D can generate. In almost all countries – even the poorest – some degree of the infrastructure required to do R&D exists, but often they do not have the links between firms, universities and training institutes to exploit the potential.

It is clearly a task for the government and foreign donors to help to create these links. It would be extremely naive to expect that the free market alone could overcome these obstacles. The creation of consortia of for example firms using the same technology or firms in the same industry is one way to promote contacts between foreign and domestic firms. Even rich countries like Japan use organisations to bring firms together in joint development projects.

Institutional development programs that try to use the presence of foreign investors to upgrade the capabilities of the local firms is another way. These programs have mainly focused on the information deficiencies that prevent local firms from making contact with foreign firms and the fact that the existing skills of the domestic firms need to be updated. On a long-term basis this means creating a stronger educational system and on a short-term basis funds for investment to compete with foreign suppliers. So even in an analysis of a relatively abstract subject like TRIPs “ordinary” aid still plays a very important role. The creation of schools, infrastructure, government institutions and so on is needed, if technology transfers shall have any real impact.

Some of the newly industrialized countries have increasingly been using the opportunity to purchase technology through licensing. Evidence from India shows that the rate of return to technology purchase is about 44% higher than the related to domestic R&D. But other studies indicate that direct purchase of new technology is often not a very effective way to achieve technological learning. First of all it is difficult to make a full transfer of technology because specific

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<sup>10</sup> *IPRs and North-South Trade* - Chin & Grossman or *Welfare Effects of Global Patent Protection* – Deardoff

<sup>11</sup> *R&D, Patents, and Productivity* - Griliches, Z.

<sup>12</sup> *The structure of Canadian inter-industry R&D spillovers and the rates of return to R&D* - Bernstein, J.

tacit knowledge is held only by employees in the selling firms and this is hard to obtain. Secondly it can be a big problem even for a larger firm especially in a developing country to find an appropriate partner on the world market and negotiate a fair licensing contract<sup>13</sup>.

FDIs clearly have a positive effect on capital inflow, foreign exchange earning and employment, and the FDIs serves as a substitute for low levels of domestic savings, but it also has the potential to raise the technological level of the local firms. Traditionally the operations of foreign companies in developing countries have been "enclaves" with little or no connection to the local economy. A great deal of the technology transfers had taken place *within* the big international firms. The local governments have tried to promote the use of local suppliers through import restrictions and regulations on the use of foreign components. Little has been done to promote the growth of the domestic suppliers and the regulations have had no effect on the foreign companies' use of components.

The importance of technology transfer through trade in technologically advanced inputs (machinery, chemicals, software, producer services, and so on) should also be emphasized. There is evidence that such trade is responsible for significant amounts of productivity gains across borders and a crucial part of the technology convergence that has emerged among the Asian economies in recent decades. This suggests that emerging economies have a joint interest in trade liberalization and linking their IPRs systems with those of the developed countries. The resulting gains in productivity spillovers could easily outweigh costs associated with additional market power.

It has been questioned whether FDI actually raises productivity or if FDI only is allocated in countries where some threshold of productivity already exists. Empirical evidence suggests that FDI only has a positive effect if the technology gap between the local and the foreign firms is not too big to begin with. This is not happy news for Sub-Saharan Africa where the industry mainly consists of low-tech firms. A question that will be investigated in greater detail later.

Whether the transfer of capabilities come through for example FDIs or licensing is normally directly related to the existence of IPR laws. In countries with low IPRs the companies prefer technology transfers mainly through joint ventures or FDI to still be able to control the technology. In countries with higher IPRs, licensing is more frequently used. It is however not clear whether a high or low IPRs regime in fact attracts most technology transfers.

It is theoretically possible that a low IPRs regime is optimal. A multinational company may prefer a local presence in a market with weak IPRs in order to defend and increase its market share, if it cannot rely on the IPRs systems as the primary source of market power. A research of

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<sup>13</sup> *A Framework For Enhancing Technological Learning Among Firms* - Luthria, M.

Argentina, Brazil and Turkey points to such behaviour, but no systematic relationship has been determined<sup>14</sup>.

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## 7. SPREAD OF TECHNOLOGY

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It is often assumed that once innovations are developed the dissemination of new technologies will happen more or less automatically, but in practice this is often not the case. The potential users of new technology face uncertain information, learning costs, and other externalities. A project in India experienced problems because the firms were not aware of their own technology needs or the capabilities of the institutions. The scientists did not know how to interact with the industry, and the R&D personnel did not feel motivated to transfer technology to the marketplace. Other potential problems could have been factors such as lack of standardizations, regulatory impediments, weak financial mechanisms and poorly organized inter-firm relationships slowed the pace of technology diffusion.

Evidence from Turkey suggests that it is possible to achieve successful technological development through a matching of similar domestic and foreign firms. Turkey has also through The Technology Development Foundation on a 50-50 basis financed R&D projects in firms chosen after application with high success rates. This approach maybe could be used in Sub-Saharan but it demands a rather well developed infrastructure, money for the foundation and a potential of firms to use it<sup>15</sup>.

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## 8. IPRs AND GROWTH

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To the degree IPRs protection increases the range of internationally traded goods and services, it may also stimulate the development of technological capabilities in developing countries. One study finds that the growth enhancing impact of patent protection to be more pronounced, the more open the economies are<sup>16</sup>.

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<sup>14</sup> *The Role of Intellectual Property Rights in Foreign Direct Investment and Technology Transfer* - Maskus

<sup>15</sup> *Intellectual Property Rights & Economic Development* - Braga, C.A. Primo, Fink, C. & Sepulveda

<sup>16</sup> *The Role of Intellectual Property Rights in Economics* - Gould, D.M. & Gruben, W.C.

From a theoretical perspective, however, the impact of strengthened protection on trade flows is ambiguous. Stronger patents enhance the market power of the foreign firms inducing fewer exports of its patentable product because of a higher price. But at the same time the perceived market size of the foreign firms is enhanced due to reduced abilities of local firms to imitate the protected product. There have been several studies on the effects on different levels of IPRs protections on trade flows. Some of them have found a positive IPR-trade correlation but the result has never been significant for high-tech products<sup>17</sup>.

Surveys in the USA, Germany and Japan have shown that strong IPRs have a positive effect on the decision where to invest but also that it is only one among many variables. The results are also highly dependent on which branch you are looking at.

Lai & Qui<sup>18</sup> have tried to find the optimal level of IPRs protection for the developing countries trying to take into account some of the differences among the countries. They find that given that the market in the developing countries is sufficiently smaller and the innovative capability is sufficiently lower than those of the North, global welfare is lower when the South is forced to adopt the same IPRs standards as the developed countries compared to a situation when the South has no IPRs protection at all.

However, they also find that a lower degree of IPRs in the South compared to the standard in the North will have a positive effect on global welfare. This is because there is a positive externality in strengthening a country's IPRs protection under free trade. This effect comes from the fact that a higher degree of IPRs protection raises the level of innovations (and the product variety) which consumers in all countries benefit from.

Strong IPRs in all forms - patents, trademarks, copyrights, and trade secrets - provide protection for exporting firms against local copying of the product, suggesting that they would increase the market size facing exporters and induce them to sell more. This market-expansion effect is likely to be strongest in countries with large markets (either in absolute size or in terms of per-capita GNP) that have significant technical capabilities for imitating products and technologies. This may reduce the negative effect of the market power, allowing them to charge higher prices, which the IPRs gives the firms. The expansion-effect is most likely not going to be important for most of the developing countries because of their small markets and limited technological abilities.

It is interesting to note that the effect of stronger trademarks seems particularly strong in increasing imports of relatively low-technology goods, such as clothing and other consumer goods,

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<sup>17</sup> *How Trade-Related are IPRs ?* - Maskus, K.E. & Penubartu, M.

<sup>18</sup> *Northern Intellectual Property Rights for the South?* - Lai, E.C. & Qui, Larry D.

because the ease of copying such products under weak trademarks limits foreign firms' incentives to sell them locally. Effectively, stronger trademarks lower the costs of exporting because a firm faces a smaller need to discipline local imitators (through lower prices). This does however not have any real effect on technology transfer.

Foreign direct investment is likely to supplant direct exports of a good where trade and transport costs are high, the fixed costs of building foreign plants is low, local productivity is high relative to wage costs, the size of the host market is large, and the R&D or marketing intensity of the product is substantial. IPRs should take on different levels of importance in different sectors with respect to encouraging FDI. Investment in lower-technology goods and services, such as textiles and apparel, electronic assembly, distribution, and hotels, depends relatively little on the strength of IPRs and relatively much on input costs and market opportunities. On this level there will not be any TRIPs effect.

Investors with a product or technology that is costly to imitate may also pay little attention to local IPRs in their decision making, though the fact that imitation has become markedly easier over time in many sectors points to the rising importance of IPRs. Firms with easily copyable products and technologies, such as pharmaceuticals, chemicals, food additives, and software, are more concerned with the ability of the local IPRs system to deter imitation<sup>19</sup>.

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## 9. A LESS OPTIMISTIC VIEW

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The TRIPs Agreement has been exposed to massive critique and some of it is also relevant. The license fees can for example in the future get to play a very important role. It is estimated that when all the developing countries have introduced TRIPs the cost to license fees will be bigger than the total support given to the third world today. This will primarily affect the Asian economies that have a higher level of technology use, but it will of course also influence the growth potential of the Sub-Saharan countries. No systematic research has never been conducted, and empirical evidence is also extremely limited and so insecure that any definite conclusions would probably not be reached.

To the extent that different levels of IPRs across nations acts as a locational determinant of FDI and technology transfer, the trend toward harmonization of IPRs within the TRIPs agreement will offset such advantages. That is, it will increase the attractiveness of countries that are strengthening their IPRs, but reduce the relative attractiveness of those with strong IPRs already in

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<sup>19</sup> *The Role of Intellectual Property Rights in Foreign Direct Investment and Technology Transfer* - Maskus

existence. This harmonization of global minimum standards presents great opportunities for firms that develop technologies and products because they will no longer have to pay as much attention to localized protection and enforcement problems in safeguarding their proprietary information. In turn, they can focus their R&D programs on those areas with the highest global payoffs. Ultimately it means that IPRs no longer will play much role in determining locational choice. This will probably not have any positive effect on the Sub-Saharan countries, which in most financial circles are known as a high-risk investment area.

As mentioned the introduction of IPRs gives the IP owner a monopoly marked power. It is theoretically possible that the price will get so high that it will become the main limiting factor for the developing countries to acquire new technologies. Moreover a great deal of the actually technology transfers takes place *within* the big international companies. These transfers will only have a marginally positive effect at the technology level in the developing countries. The creation of better links between foreign and domestic firms will probably increase the technological learning, but it is far from certain<sup>20</sup>.

The implications of stronger IPRs for technology transfer are also unambiguous. Technological information is diffused from one firm to another, or from one country to another, through numerous channels. Patents directly facilitate additional information transfer (if not know-how diffusion) by disclosing the details of inventions in application materials. This information then is available for use by local firms to develop follow-on products that do not violate the scope of the original patent. As more countries provide and enforce patents, there should be additional global innovation and patenting, with a positive impact on follow-up innovation. On the other hand, patents could as mentioned also slow down technology diffusion by limiting the use of key technologies through restrictive licensing arrangements. This view of patents has long been held in numerous developing nations.

A maybe even more fundamental critique is stated by Mansfield. According to his survey among major American companies there is only a very weak relationship between FDI and IPRs. One could claim that the developing countries would have raised their level of IP protection themselves if they had seen it as an advantage. Only the pharmaceutical and chemical industries see the level of IP protection as important for foreign investment. Other sectors that are less exposed to reverse engineering, such as machinery and transport, does only put little importance on IPRs. In other words does TRIPs not affect the investment decisions of the low-tech firms, which is an area where the African countries would be able to compete with for example Asia<sup>21</sup>.

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<sup>20</sup> *TRIPs and the WTO An Uneasy Marriage* - Panagariya, Arvind

<sup>21</sup> *IP protection, FDI and Technology Transfers* – Mansfield, E.

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## 10. SUB-SAHARAN COUNTRIES

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TRIPs has, as mentioned, not yet been effectuated in the developing countries and hence no direct empirical evidence exists on its effects. With focus on some of the key empirical data for the Sub-Saharan countries it is however possible to provide a more or less qualified guess of the effects of the Agreement!

The current export from the Sub-Saharan countries mostly consists of oil and other primary commodities:

	1980	1990	1997
Crude petroleum	75,6	61,3	54,7
Non-oil primary commodities	19,7	22,8	26,6
Manufactures	4,0	15,5	18,4
Unclassified	0,7	0,4	0,3

■ *Table: Composition of export from Sub-Saharan Africa 1980-1997<sup>22</sup>.*

So whatever positive or negative technology transfer effect TRIPs will have on these countries, it will most likely, only to a limited degree, affect the already existing firms because of their low-tech production. The lack of an already existing high-tech industry represents a serious problem for creating growth through technology transferring. If the effect is going to be perceptibly positive a "critical mass" of firms is needed for a growth "take off". First of all to avoid a large technological gap between the foreign and domestic firms, but also because an existing industry is needed if international companies shall consider the developing country as an interesting place to invest. India's position in the computer industry is one example.

Africa's export has not been able to follow the pace of the rest of the world and has dropped from a share of 4,6% of world trade in 1980 to only 1,6% in 1999. The great drop in Africa's share of world trade is highly related to the fact that the terms of trade on almost all raw materials have fallen. For vegetable oilseeds it has dropped from 90,0 in 1975 to 36,4 in 2000 and for agricultural raw materials from 97,6 to 36,4. It is estimated that Sub-Saharan export over the last 30 years has

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<sup>22</sup> UNCTAD Database

been nearly four times more volatile than for the industrial countries. This has not only lead to problems in controlling a consistent macro-economic policy, but also made the continent much less attractive for new investments<sup>23</sup>.

The decline in terms of trade with respect to primary products is not the only problem. Also the manufacturing industries' terms of trade have dropped at an average of 2,2% pr year from 1979 to 1994 for the developing countries as a whole. For the LDC's alone the drop has been as high as 5,7% pr year<sup>24</sup>.

The trade ratio (and hence the openness of the economy) is primarily decided by the size of the population and per capita-income. Small rich countries like for example the Netherlands have very high trade ratios. In this light, Africa's ex- and import is not especially unusual, but the growth rates have been so low that the continent has fallen behind. In fact Africa trade on average (but with great internal variation) almost exactly as much as its geography and per-capita income would indicate! This is more interesting than it may appear because it implies that the main solution to Africa's marginalization is not trade promoting policies but "simply" a rise in per capita income. If foreign aid will succeed in the creation of the institutions needed for growth, Africa's economic problems would in the long run to a large extent solve themselves. TRIPs does not have the potential to be a catalyst *of* this process, but it can raise the level of technology transfers and hence have a positive impact on the growth level<sup>25</sup>.

Empirical studies on Africa's low economic growth have reached different conclusions. One study emphasizes the role of ethnic fragmentation and poor institutions<sup>26</sup> while another stressed closed trade policies and geography as the significant growth handicaps for Africa<sup>27</sup>.

Studies with focus directly on the high variance in growth performance in Sub-Saharan have found a number of fundamental explanations: Human resources, macro-economic/fiscal policy, demography and a conditional convergence factor. Trade policies, except from countries with high levels of export taxation, do however not according to these studies play any major role in the medium- or long-run. Movements in trade are only slightly correlated with long term growth, but play an important role in the medium-run (around 10 years).

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<sup>23</sup> *Joint Ministerial Committee ; Leveraging Trade for Development – IMF*

<sup>24</sup> *The Manufactures Terms of Trade - Maizels, Dr. Alf*

<sup>25</sup> *Trade Policy and Economic Performance in Sub-Saharan Africa - Rodrik, A.*

<sup>26</sup> *Africa's Growth Tragedy - Easterly & Levine*

<sup>27</sup> *Sources of Slow Growth In African Economies - Sach & Warner*



The resources used on R&D are much higher in the developed countries. In 1992 USA spent \$167 billion or 2,8% of GDP. The developing countries together only used \$57 million and for most of the Sub-Saharan countries the portion of GDP devoted to R&D was well below 1%. The major spenders among the developing countries were China, India, Brazil and the Asian new industrial countries. The USA is also the main holder of IPRs. The country received in 1995 \$23,2 billion in royalties and license fees. As the table shows the patented research in Africa is only very modest compared to the rest of the world's research<sup>28</sup>.

Region	North America	EU	East Asia & China	Eastern Europe	Australia	Middle East	Rest of Asia	Latin America	Africa
% of total	43,8	38,0	12,6	1,3	2,1	1,0	0,5	0,3	0,4

■ *Table: Patent applications filled 2000 (Total 90.948)<sup>29</sup>.*

The global FDI more than doubled from around 4,6% in 1980 to 10,1% of world gross domestic product in 1995. FDI flows to developing countries was in 1994 around one-third of the world total FDI, but it was primarily concentrated around China, Mexico, Malaysia and Brazil. Sub-Saharan Africa however also experienced a rise:

	1980	1985	1990	1995
World	4,6	6,4	8,3	10,1
Developed countries	4,8	6,0	8,3	9,1
Developing countries	4,3	8,1	8,7	15,4
China	-	1,2	3,6	18,2
Sub-Saharan	3,1	6,8	11,9	16,8

■ *Table: FDI as a percentage of GDP<sup>30</sup>.*

<sup>28</sup> *Trade & Development Report 1998* - The Secretariat of the UN Conference on Trade and Development

<sup>29</sup> *Economic Development In Africa* - UN Conference on Trade and Development

<sup>30</sup> *Intellectual Property Rights & Economic Development* - Braga, C.A. Primo, Fink, C. & Sepulveda

Agriculture (farming, fishing, mining, manufacturing, construction, electricity, water and gas) is relatively more important for the developing countries. This has traditionally been an area where the importance of IPRs has been limited. Until recently the R&D in agriculture has been more or less entirely publicly financed, and the research results have been public domain. The explosion in research on biotechnology such as DNA-strings has opened the market for the private sector. This trend is also going to affect the developing countries because they are using an increasing share of new seeds and farming technologies.

The main lesson from the data is though clear: TRIPs will not be source of great gains or losses for the Sub-Saharan countries. The countries mainly consist of low-tech companies and the level of R&D and FDI is too low to create any radical change. Moreover has IPRs only very modest importance for low-tech industries such as machinery and transport and hence will TRIPs not significantly affect their investment decisions.

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## 11. CONCLUSION

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The relation between technology transfers and IPRs is a complex subject that does not permit many definitive conclusions. Economic analysis suggests that the effects of IPRs protection on bilateral trade flows are theoretically ambiguous. The empirical evidence is moreover not unequivocal, but most researchers have found a positive correlation on an aggregate level.

A list of problems questions whether Sub-Saharan Africa will be able to profit from TRIPs. There is not an existing structure of high-tech firms, the market is too small, and there are no links between the local and foreign firms. None of these problems the TRIPs Agreement will repair, but if the government and foreign donors can help create connections between the firms there is undebatably a potential of technological learning. This possibility would on the other hand also exist without the Agreement and seen in isolation it will probably not have any significant effect on the growth level in the Sub-Saharan countries. A higher level of IP protection on manufactures and similar consumer goods does not seem to have any positive effect on the investment level, and with respect to high-tech firms Africa will still be a "bad" market.

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## USEFUL INTERNET LINKS

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TRIPs Material on the WTO Website

[http://www.wto.org/english/tratop\\_e/trips\\_e/trips\\_e.htm](http://www.wto.org/english/tratop_e/trips_e/trips_e.htm)

World Intellectual Property Organization

<http://www.wipo.org/>

WTO Watch

<http://www.wtowatch.org/>

Trade & Development Centre

<http://www.itd.org/>

Eldis Intellectual Property Rights Resource Centre

<http://www.eldis.org/ipr/>

World Intellectual Property Organization Arbitration & Mediation Centre

<http://arbitr.wipo.int/>

ICTSD - The International Centre for Trade and Sustainable Development

<http://www.ictsd.org/>

National Bureau Of Economic Research

<http://www.nber.org/>

The World Bank

<http://www.worldbank.org>

UNTCAD – United Nations Conference on Trade & Development

<http://www.unctad.org/>

The African Development Bank Group

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