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VALUE FOR MONEY: GETTING EUROPE'S TRADE AND IPR POLICY RIGHT

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EXECUTIVE SUMMARY

- The role of intellectual property rights for the world economy has increased over the past decades. Industrial countries have climbed the value-added chain by sourcing labour-intensive production from emerging countries and investing substantially more human and capital resources into research and innovation. A significant, yet increasing, share of output, value-added and trade builds on innovation. Innovative sectors take up a larger share of the world economy. The amount of resources spent on research and development (R&D) have multiplied over the past decades. Competition has grown tougher as many regulations that previously protected markets and incumbents have been swept away. Technological development has speeded up the pace of imitation in the economy and shortened the life cycle of a product.
- Intellectual property rights are a central piece of trade policy as they foster real market integration. Yet recent EU trade policy has provoked a debate that has displayed the lack of a policy narrative for intellectual property protection. There is much debate over the design of trade or climate change policy, but few contest the basic policy narratives of what those policies aim to achieve. It is different with IPRs. There are only fragments of a narrative in the policy discourse. And those fragments usually do not fit together. Absent a narrative for why IPRs are important, trade policy will not be an effective tool to spur cross-border integration of innovations.
- There are two central parts of the narrative of IPRs. Firstly, IPRs stimulate innovation and investment in research and development. Secondly, IPRs stimulate dissemination of innovative products and functions as a vehicle of overall economic integration.
- All IPRs do not have the same role for the economy. Differentiation of IPRs is hence necessary when udnerstanding their economic value. Differentiation is also necessary for policy formulation and understanding the wider narrative. As a first approximation it seems reasonable to differentiate on the basis of what an IPR is supposed to protect – especially the value the protected IP represents for the overall economy. Patents and trademarks then play in a different economic league than others, especially copyrights and geographical indicators.
- Globalisation has increased the importance of IPRs. Firstly, economic globalisation means that the division of labour – the force of specialisation – has become global. Countries have through the global market process experienced a considerable upgrade in the level of specialisation which for Europe has implied a greater resource concentration to production higher up in the value-added chain.
- Secondly, a strong factor behind the globalisation of European blue chip firms has been the fragmentation of supply chains. A pre-condition for such supply chain globalisation is protection of intellectual property and the assistance by authorities in home countries to uphold intellectual property rights in the event of infringement.
- Thirdly, globalisation has generally increased competition between firms and reduced the natural barriers to market entry. Brand strategy and first-move advantage are today weak protection for those firms needing to recoup investment costs.

1. INTRODUCTION

Few issues in trade and international commercial policy have in the past decade provoked as much contention as intellectual property rights (IPRs). For a policy area so technical in nature, IPRs have

provoked a surprising amount of passion, especially on the part of opponents. There are plenty of groups, surprisingly well-resourced, that vociferously campaign against patents and copyrights. They are also well-represented at meetings and summits of international organisations like the World Intellectual Property Organisation (WIPO), World Trade Organisation (WTO) or the World Health Organisation (WHO).[1] This is a new political context for IPR authorities. Twenty years ago, IPRs were of interest to only a few, most often experts from legal or technical professions. Today they are at the heart of the global economy debate.

Politics aside, it is easy to understand the ascending role of intellectual property rights. It reflects the profound changes in the world economy over the past decades. Industrial countries have climbed the value-added chain by sourcing labour-intensive production from emerging countries and investing substantially more human and capital resources into research and innovation. A significant, yet increasing, share of output, value-added and trade builds on innovation. Innovative sectors take up a larger share of the world economy. The amount of resources spent on research and development (R&D) have multiplied over the past decades. Competition has grown tougher as many regulations that previously protected markets and incumbents have been swept away. Technological development has speeded up the pace of imitation in the economy and shortened the life cycle of a product. Friends and foes of IPRs agree on one thing, it is difficult to disregard how evolving economies and fundamental economic change have put greater emphasis on the exclusive economic rights granted by IPRs. Nor is it an area of dispute that the value of IPRs to individual firms generally is much greater today than in the past.[2]

That is the starting point for this and forthcoming ECIPE papers on the role of IPRs in external trade policy: how policy should evolve to maximise the economic gains from IPR reforms induced by trade and commercial policy negotiations. The paper is motivated by a shift in European trade strategy – a shift similar to those in other central economies in the world. As trade negotiations in the World Trade Organisation look ever more complicated, the EU has ventured into an extensive programme for bilateral trade negotiations, especially with key emerging economies. In practice, bilateral trade deals look to be the only realistic options for new trade agreements in the next few years, if not longer. In such a circumstance it becomes more important than before to ensure that IPR priorities in these negotiations mirror core economic concerns. Furthermore, bilateral negotiations present opportunities to deal differently with IPR concerns than in multilateral talks, and this is why it is motivated to review IPR policy formulation and strategies.

In fact, recent EU trade policy has provoked a debate that has displayed the lack of a policy narrative for intellectual property protection. There is much debate over the design of trade or climate change policy, but few contest the basic policy narratives of what those policies aim to achieve. It is different with IPRs. There are only fragments of a narrative in the policy discourse. And those fragments usually do not fit together.

NARRATIVE AND POLICY FORMULATION

Europe's focus in the past has principally been concerned with multilateral trade negotiations. Consequently most of its interest for an external IPR policy has been channelled in that direction. The typical approach in its bilateral trade negotiations has been based on configuring IPR policy regimes with multilateral agreements – a so-called "generalist" approach.[3] This approach has contrasted somewhat with that of the United States. The US has been more inclined to use bilateral agreements to advance IPR policy regimes beyond multilateral agreements. Furthermore, it has also been more hands-on than the generalist approach of the EU. While Europe has taken a more "purist" view of IPR policy regimes, the US has been more positive in casting a wider net which not only covers

explicit IPR laws but also their wider institutional infrastructure, especially regulatory concerns immediately linked to IPRs and their integrity.

There has been a change underway in Europe's approach for some time. With increasing concerns about especially IPR standards in emerging markets, like China and India, and opposition in the current Doha Round of trade negotiations to making the TRIPS agreement stronger and more effective, Europe is clearly more willing now to put greater emphasis on so-called TRIPS-plus issues and to accommodate other regulatory aspects in its bilateral trade policy. The question, however, is how such an approach should be designed to maximise economic gains? External IPR policy is no different from other areas; inevitably, policymakers will have to make priorities: some IPR concerns will take primacy over others. For instance, in the EU's recent negotiations with Korea, it managed to get improvements in Korea in principally two areas of the broad family of IPRs: an extended product list of geographical indicators and copyright term extension.[4] The problems with patent protection in Korea, not least in the medical field, were however not addressed. Other agreements have sometimes yielded different results, but they have still come in selected areas. This raises the question: on what basis is policy formulated? Or, to be more precise, what is the narrative that guides policy?

EU officials and representatives of governments with whom the EU has negotiated or is negotiating Free Trade Agreements (FTAs), or other bilateral agreements with clear trade and IPR components, give somewhat different accounts of how EU policy is made. Even if the views are not mutually opposing – at least not fundamentally – the nuances are put on different aspects of policy formulation.

One account of EU policy claims that there is no "model IP approach" and that there are no or very few initial priorities made by the EU. This is seen by several experts as the default position – partly for the reason that it is politically difficult to agree among 27 member states what concerns should be in the front seat or the back seat. There is also a cultural component: while US policy traditionally is seen as legalistic and aggressive, Europe typically takes a diplomatic posture with greater emphasis on procedural rules than hard agreements with strict guidance on how policy should be designed and what behaviour is prohibited.

Another view is that a tacit understanding evolves in the absence of an explicit programme with clear priorities. This understanding is partly forced upon policy makers by exogenous factors, chiefly among them the power of lobbying from various outside interests. Some interests are more influential than others; some interests have messages that are more convenient, expedient and considered than others; and some interests have more powerful friends inside the decision-making machinery than others. This is not surprising; it is the *modus operandi* of most policy formulation. What is surprising, however, is that one area appears to come out on top at many, if not most, times of lobbying over IPR policy formulation. That area is geographical indicators.

A third view puts the emphasis on the necessary balancing act of distributing the gains from negotiations between sectors. Gains do not have to be evenly distributed, but political pressures often take negotiations in that direction. As some sectors stand to benefit more than others from specific agenda items – e.g. full elimination of tariffs or a reduction of non-tariff barriers – they may not be the beneficiary from IPR reforms, even if the gains from such reforms would be greater if they targeted their concerns. The other side of the coin is that IPR priorities that deliver little economic value may be given higher priority than reforms that would deliver greater economic value, simply because the IPR section of a negotiation often is seen as a convenient place to balance the distribution of benefits.

There are other factors influencing policy design. Yet they all tend to be slanted in the direction of

shrewd or Machiavellian political economy: they are based on perceived exogenous constraints that guide or correct policy priorities rather than a narrative of what IPRs aim to achieve. This is not a satisfactory basis for policy formulation – especially as bilateral trade negotiations are increasingly with emerging markets where IPR concerns are one of the biggest problems to European firms and represent welfare losses that are far bigger than many central components of a trade agreement. One could understand a stepmotherly treatment of IPRs in negotiations with countries where other problems are of greater economic concern. But for Europe's current and future trade agenda, which inevitably will be geared towards big economies and emerging markets, policy formulation on IPRs should at least be as rigorous as in other areas.

This is not the case today. One of the pressing problems is the flailing understanding of the purpose with intellectual property rights. It affects other areas, too. The integrity of IPRs are increasingly challenged "at home" from e.g. new views on competition policy or the willingness of some governments to save money by not purchasing patented goods and services. It prompts the question: what is intellectual property protection all about?

2. UNDERSTANDING THE ROLE OF INTELLECTUAL PROPERTY RIGHTS

Intellectual property rights are a broad family of various commercial regulations. At the centre are patents and copyrights, but they have cousins, like geographical indicators or industrial design rights, that are related through the prohibition of unauthorised use of intangible assets. Hence, there is a degree of commonality between IPRs. However, they operate differently and are of different economic value. A patent, for example, is a temporary exclusive right while a trademark does not have a time limit. They also protect different types of economic activity – and, hence, tend to be associated with different levels of economic value for societies as well as individual actors. Another difference is that some countries sometimes differ from others in the way they protect an intellectual property. Some countries, for instance, have IPR laws of international standard, but attach little importance to the enforcement of those laws. Put differently, the narrative is not the same for all different IPRs.

This chapter will look at the narrative of IPRs – the composition and the economics of different IPRs – and discuss their rationale. Two aspects are at the centre of the narrative.

A. The degree to which an IPR stimulates innovation and that protection in foreign markets are necessary to stimulation of innovation "at home".

B. The degree to which an IPR stimulates dissemination of innovative products and functions as a vehicle of overall economic integration.

INCENTIVISING INNOVATION

The starting point for every assessment of intellectual property rights should be the extent to which they provide incentives to innovation – or, rather, to what extent they encourage (or discourage) *market-based terms for the pricing of innovations*. This touches upon a central theme for many economic analysts and policy analysts: *the incentive-compatibility problem*.

A common theme in the principal-agent paradigm of social analysis, the incentive-compatibility problem (or constraint) describes situations where it is difficult to get specific agents to act in accordance with an agreement or with a common good, particularly when an individual agent has an interest to deviate from the targeted aim. Such problems are easy to find in all parts of society and illustrate a character that all people possess: self interest.

What does this problem imply for innovation? It is actually rather simple and points to the fundamental question of innovation: who should pay for them? Innovation is expensive and investments in innovation are associated with substantial financial risks. To develop a new medicine or new green energy technology, significant resources have to be invested before an entrepreneur even knows if it is possible to sell a new product to consumers. It has been estimated that the costs of developing a new medicine is around 800 million US dollars.[5] The pharmaceutical sector appears cautious to put a price tag on the total costs for a particular medicine, primarily because it is very difficult to get a reliable estimate of the total cost, but it is clear that substantial resources need to be invested before a new medicine can be taken to the market.[6] The question is: who should make these investments?

For any private, for-profit actor to take a risk, there must be a potential future reward; a reward that enables an innovator to recoup the costs by future sales. In addition, the innovating company needs to make a profit to satisfy shareholders, cover the cost of investments that never yielded a new product, and save for future investments in research and development. This is not a prohibitive problem for some innovators. But for many innovators it is the key problem – in particular for innovators developing products with large costs for development but small variable costs for each and every copy of the product. Chemical and pharmaceutical companies are good examples as they face such a cost structure: high upfront R&D costs, but low variable costs for every single unit of production. If R&D costs are measured in six or nine zeros, the variable cost for every copy of the products is almost zero. This cost pattern is by no means exclusive to chemical and pharmaceutical innovation, it is the commercial reality for many other innovators too, but it has been demonstrated that these two sectors are the most sensitive to variances in the conditions for market pricing.

In other words: innovations and intellectual property are expensive to produce, associated with large fixed and incurred costs that represent the vast part of the total costs, but have low variable costs. This fundamental condition for innovation puts innovative activities in a troublesome position: if the terms of pricing move in the direction of *marginal cost pricing* – the consumer price reflects only the cost for producing an extra copy of a product – it is effectively impossible for many innovators to cover the incurred costs of innovation. If the price of a new medicine soon after market entry is driven down to the marginal cost of the medicine, then the innovator could never recoup the incurred R&D costs. If marginal pricing is expected by companies, very few, if any, will have the propensity to invest in new innovations.

The incentive-compatibility problem will be amplified if a new innovation can easily be copied – at home or in another country – and if the purchaser is less sensitive of product brand. Then the innovator will find one or several other companies free riding on its innovation; that is, using the innovation without having to pay for the cost of developing the product. A competitor can soon have a competing product on the market, effectively making the first mover advantage insufficient as a means of raising revenues that should cover the incurred development costs. In some markets, an imitator can even establish a presence before the innovator has launched its new product. This is a clear risk for small companies facing competition from big companies that already have the production and marketing facilities needed for a rapid product launch.

Hence, the chief economic motivation for exclusive rights granted by core IPRs is to incentivise innovation. This is largely the effect of IPRs, too. It is not surprising that every granted IPR does not foster innovation; it is also important to distinguish between different types of IPRs when gauging their role for innovation. Yet the systemic effects are quite clear. Several empirical studies also confirm that intellectual property rights affect innovation and economic growth positively. There are also studies that point in the other direction – studies that do not necessarily refute root-and-branch

the alleged link between intellectual property rights and economic growth, but at least show how the link can be or is distorted. Also, some studies finds insignificant direct effects on growth from intellectual property rights and quite rightly suggest that other factors, when measured individually, are much more important to long-run economic growth.[7] All this suggests that empirical studies should be interpreted cautiously.[8]

This is an important note. When using large samples of countries and years, it is difficult to quantify, particularly regress, the effects on growth from intellectual property rights – more difficult than quantitatively assessing the effects on growth from *physical* property rights, primarily because the former effect is dependent on several other factors.[9]

It is of course easy to show that countries with strong intellectual property rights have higher growth, and generally are much richer, than countries with weak or non-existing IPRs. The intermediary links are the volume of investments in innovation and technological change[10]; weak protection simply lowers the readiness to invest, in particular for firms with a high share of intellectual capital in the capital stock.[11] Similarly there is ample evidence showing how intellectual property rights, patents in particular, positively stimulate growth in certain sectors. The pharmaceutical industry is probably the most patent-sensitive sector, primarily because fixed costs are high and variable costs low. There is also a substantial time lag between the date a new medicine is approved by authorities and the date when it is introduced on the market, which leaves plenty of room for competitors to place imitations on the market soon after the innovators market entry. In other words, the first mover advantage alone does not mean much for pharmaceutical firms.[12]

But if one is to nuance the general analysis and break down intellectual property rights, the picture gets somewhat blurred. For example, no one can tell the optimal level of intellectual property protection and point exactly to the optimal trade-off between incentives to innovation and what an economist would call extraction of rents.[13] Indeed, it can be difficult (if not impossible) to tell whether a certain reform would result in a certain outcome. It largely depends on other matters and policy choices.

However, of the studies using more sophisticated methods to study the role of intellectual property rights for economic growth, the vast majority conclude that their influence is significant and positive, in particular once other factors are taken into consideration – factors such as trade, investments and regulations. Economists David Gould and William Gruben, for example, found little effect on growth from intellectual property rights, but when IPRs were combined with openness to trade the effects were significant.[14] That is, the growth effect of intellectual property rights is significantly higher in countries pursuing an outward-looking trade policy than in countries preferring a foreign economic policy of the isolationist ilk.

PATENTS AND COPYRIGHTS: ECONOMIC INCENTIVES

There is a problem, though, with many of the large cross-country and cross-sectoral studies of IPRs; not all IPRs have the same economic effect and treating them as though they do is not helpful for policymakers that need to formulate policy and priorities. It is not surprising that protection of trademarks is central to economic activity. Similarly, it is quite clear that patents have a stronger effect on investments in innovation, output and economic growth than other IPRs.[15] In contrast to copyrights, it is difficult to be awarded a patent. There is a financial cost associated with obtaining a patent. A certain degree of novelty has to be proven and accepted by awarding patent authorities. Some scholars rightly complain that patent authorities have been too lenient in testing novelty.[16] Yet such behaviour does not deflate the value of patents. Novelty still has to be proven and in highly competitive sectors an actor that has been awarded a patent needs to be sure of the underlying nov-

elty in order to defend it in court. Hence, few serious studies refute the notion that research-based innovations are stimulated and incentivised by patents, especially in certain sectors. It is common, however, to find critics shining the spotlight on copyrights and challenging the idea that this sort of intellectual protection is necessary to stimulate innovation, especially when represented by artistic and creative activity.[17]

Differentiation of IPRs is hence necessary when estimating their economic value. Differentiation is also necessary for policy formulation and understanding the wider narrative. As a first approximation it seems reasonable to differentiate on the basis of what an IPR is supposed to protect – especially the value the protected IP represents for the overall economy. Patents and trademarks then play in a different economic league than others, especially copyrights and geographical indicators. Within the confines of a single IPR, it also seems reasonable to differentiate on the basis of the sensitivity to exclusive rights; innovation in some sectors is more dependent on exclusive rights than in others.

Differentiation is a necessity for understanding the economic value of IPRs. Yet it is not about assessing, even less about rejecting, the fundamental value of a particular policy. Hence, it is not correct to say that de-prioritised policies are of no economic value, let alone no societal value. This is an important distinction in discussions over copyrights especially. It is arguably correct to make a clear economic distinction between patents and copyrights: the latter do not stimulate innovation in the same order of magnitude as the former. There are also economic problems associated with copyrights – their long duration, for example. Copyrights have a much longer period of exclusivity than patents. Given the primitive system for registration of copyrights, the longer term means copyrights are provoking higher potential transaction costs than patents. Moreover, the long period of exclusivity is difficult to defend from an economic point of view; it is impossible for an artist to discount incomes from the protected property 50, 70 or 100 years into future. A copyright valid for 70 years after the originator has passed away can hardly be defended on the ground that the copyright provides better ways to finance development costs and give incentives to artistic creations.

Copyrights should arguably be reformed. Firstly, there needs to be a better way to differentiate between copyrighted work and the need for protection to recoup investments. Secondly, the period of exclusivity should be shortened. Only a few artistic creations need longer periods of exclusivity than patents. A third observation could also be added: there is no economic motivation for using bilateral trade negotiations to expand the period of exclusivity in other countries.

However, the case for reform is profoundly different from the case for the abolition of copyrights. None of the above suggests that no period of exclusivity can be defended on economic grounds. Separating the two is important because they rest on two opposing accounts of the role played by copyrights in artistic work. These accounts are also important in the analysis of the design of external policy to defend intellectual property rights. Hence we need to dwell a bit deeper into the economics of copyrights in order to better understand what role it could play in external IPR policy and in a policy narrative.

Periods of exclusivity can be argued on economic grounds, and the benefits of long terms, which do exist, are likely to offset parts of the negative economic effects.[18] Extensive exclusivity terms can lower the potential risk of consumption congestions that arise if copyrighted material can freely be used without authorisation. Take Disney as an example: if everyone is free to use Mickey Mouse – if Mickey Mouse is part of the public domain – the interest for this figure can easily be exhausted by the overexposure, and thus lower the total economic value that can be created by Mickey Mouse in the longer run.

Another set of economic arguments in favour of longer periods of exclusivity challenges the oft-used dichotomy between incurred costs of creating an intellectual property and the cost of disseminating it. Let us continue with the example of Mickey Mouse. In order to be an attractive item on the market, there needs to be additional investments in Mickey Mouse. He needs to be marketed and perhaps changed in accordance with new customs and tastes. These expenditures, normally viewed as costs for dissemination, are directly linked to the intellectual property; if these costs are not incurred, the value of the property would diminish. This is true for many copyrighted creations and must be taken into account when analysing the economic utility of copyrights and discussing the optimal duration of exclusivity.[19]

These considerations are generally not part of the copyright critics' armoury. Indeed, many critics shun economic analysis and rather direct the attention to the motives for artistic creations, asserting that economic consideration is hardly of interest at all since artists –painters, musicians, sculptors, actors, or creators of computer games – are driven by creative zeal. In combination with the common practice of cross subsidisation in artistic work[20] – having a 'regular' job beside the artistic work, for example – the alleged lack of economic motives for creation stimulates the idea of copyrights being of no use and having no sizable, let alone measurable, effect on incentives to artistic endeavours.

Such criticism is silly. It is of course true that many artists create regardless of economic reward. But it is also true that many artistic projects require resources, which are not in the hands of the artists, to be able to create, or to reach consumers. Not surprisingly, artists and creators also respond to economic incentives – and disincentives. But hard economic evidence rarely finds its way into the views of principled critics who rather build their case on anecdotes. It has been asserted that artistic creations were plentiful and of high quality long before copyrights were rooted in societies. Mozart composed beautiful music, despite the lack of a real copyright protection; the Grimm brothers wrote their stories without effective protection against copying. In other words: the sheer presence of artistic work before the institution of effective copyrights was rooted proves that the incentive-compatibility problem is not a genuine problem for artistic creations. There might be actors responding to financial incentives in markets of copyrighted products, but they, it is asserted, are often profit-driven economic agents and not artists, responsible only for market creations or take them to consumers. Hence, copyrights benefit the 'middleman' but not the artist.

Yet anecdotal evidence provides little comfort for those sceptical about the conditions for artistic work in a copyright-free world. Firstly, historical examples are of little use when discussing incentives and rewards today. Much is different today from the age of Mozart. The demand for artistic work, for one, has grown along with the size of population and income. The quantity and value of copyrighted property is much larger today and the share of the work being financed by financially independent artists, by patrons or done on commission are much smaller. Technological development has spurred artistic work – but also the ease with which one can imitate. Simply put, the market for artistic work has changed considerably. It is much more commercialised and artists, willingly or not, have generally been forced to expand volume in order to get sufficient revenues.

Secondly, copyrights were of smaller importance before effective methods to copy artistic work had appeared. When Mozart lived you could not duplicate his work on a CD or an LP – not even on a tape. Or, to take another typical copyright sector: a copyright of a book before the invention of the printing press simply did not have any true economic value.[21] Intellectual property rights generally have evolved in largely the same way as physical property rights. As institutions they were of small economic use before society had developed to a point where property rights were central in solving disputes and before you had valuable property. Physical property rights became

economically meaningful after the hunter-gatherer period, post the Neolithic revolution, when people settled down and started to cultivate land. As the extent and value of physical property grew, property rights expanded in scale and scope. It was not a simple linear evolvement; it came by in an evolutionary way where different institutional alternatives competed with each other.

Such an evolutionary taxonomy is largely descriptive of expanding intellectual property rights, too. They largely arise as a function of real economic concerns; when the value of intellectual property becomes considerable, and when proprietors get challenged by imitators, intellectual property protection becomes economically meaningful to individuals and to the society at large.[22] Patents, for example, were used for the first time in the fifteenth century but were not rooted in jurisprudence before the eighteenth century. Even then, patents were not widely used – that happened when the value of patents became instrumental to economic activity and when other natural obstacles to imitation had diminished.[23] This is not to suggest that such considerations have been the only consideration involved in the history of intellectual property rights. Inarguably, other explanations can be found to the many alterations of intellectual property protection. However, viewed in a longer perspective, it is obvious that intellectual property rights have evolved in tune with technological development and the rising societal role of innovations.

Thirdly, copyrighted creations are associated with development costs and are faced with a similar dissonance as in the terms of pricing for research-based innovations (incurred costs/marginal cost); a movement in the direction of marginal cost pricing implies that many artists cannot cover incurred costs and are then less likely to create. This is of course true for copyrighted work in sectors like computer software with significant upfront development costs; but also for artistic work of the traditional ilk. To write a historical book about, say, the Second World War, demands high fixed costs – research, archive studies, travels, editing, fact checking, et cetera – before it is commercially interesting. If such a book was to be in the public domain immediately after publication, very few authors would have the resources needed to justify years of historical research. Very few publishing houses would be willing to publish books.

Fourthly, the notion implies that all creators, unlike the exploiting middlemen, do not respond significantly to economic incentives and financial rewards. Or to put it in economics speak: there are no variations in the supply curve for artistic work; the supply curve is flat.[24] This is a silly supposition. As most other human beings, artists respond to financial incentives and rewards. "No man but a blockhead ever wrote except for money", wrote Dr. Johnson. One does not have to go that far. Not only do artists respond to incentives; they also respond to incentives facing other agents in the supply chain.

Furthermore, proponents of a copyright-free world make the mistake of treating all artistic work as identical as far as incentives are concerned. Individual vagaries and inclinations, for example, or economic concerns such as market segmentation and supply chain differences are not legitimate sources of concern, if they at all exist. There is no room for such differentiations in the copyright critics' refutation of copyrights' economic rationale.[25]

Hence, there is an economics case for copyrights. But it is different from the case for patents, and it is not – by far – as strong. The weaker economics case for copyrights is also reflected in considerations of what role copyrights could have in external IP policy. Many, if not most, countries already offer copyright protection which goes further in period of exclusivity than is motivated by economic analyses. The external arm of copyright policy is therefore weak as far as laws are concerned. There is a legitimate case for advancing enforcement of copyright laws, but ambitions of enforcement are not that easy to build into an agenda for trade negotiations. There is also a difference between patents and copyrights in the role played by foreign markets in upholding the

integrity and value of exclusivity. To understand this difference, we need to have a better idea of the economics of diffusion of new innovations and creations.

3. THE ECONOMICS OF TECHNOLOGY DIFFUSION

The chief economic argument for intellectual property rights is that they help to solve – or at least decrease the significance of – the *incentive-compatibility problem* by giving exclusivity to the holder of a patent or a copyright. In normal speak this means that innovations or artistic work cannot be used freely or without authorisation if it is protected and has been granted legitimately. Therefore, those not in possession of an innovation cannot appropriate or use it unless he or she has an explicit agreement with the holder of the IPR protecting the specific innovation he or she wants to use.

Critics of intellectual property rights often claim that this exclusivity raises the transaction costs and slows down, sometimes significantly, the pace with which an existing technology is disseminated. This supposition is naturally correct in its purest form. If you have to violate the law to use an innovation, then the transactions costs are by definition high. And if it is entirely up to the holder of an intellectual property right to decide the use of the property, then the holder is not likely grant others use of it if it is against the holder's interest.

Exclusivity limits the possibility for others to use an innovation and disseminate it. It impedes an important force of growth: imitation. So critics have got this part of the analysis right. But they usually fail to incorporate the main purpose of intellectual property rights in their analyses: before a new innovation can be diffused it must be invented. As far as it is possible to tell, the world would see much less innovation without proper intellectual property legislation. Neglecting the first step, the development of an innovation, is to take Nirvana as point of departure: assuming a high rate of innovation regardless of the institutional environment for intellectual property is dishonest.

There are other concerns, too, with intellectual property rights. Technological improvements are a key driver of productivity increases in an economy, but the productivity effect arises primarily when agents other than the innovator start using the new technology. The sooner that happens, the better. The more people that start to use the new technology, the wider its effect on the larger economy. In other words: the impact of technological change on productivity is a function of the diffusion of the technology. Herein lies the main concern about intellectual property rights: do they hinder technology diffusion and productivity improvements excessively?

There might be further reasons to be concerned. When the development process is incremental and new innovations to a large extent build on older innovations, intellectual property rights might erode a society's ability to evolve in accordance with the technological development. Patents, and to some extent copyrights, might provide a gap between what can be done and what is allowed, that is artificial and not constituted by true concerns about innovation. And the development process is to a large extent incremental – and has probably become more so in the last decades. Naturally, the question must therefore be: are the inherent processes of innovation, its nature, 'demanding' less of exclusivity and more of 'open source' or public domain type of property control?

Not far from this concern has been the changing pattern in the use of intellectual property rights – the growing number of awarded patents and the strategy of patent blockades, in particular.[26] If innovators not only use the patent system to protect their innovations but also to hinder others' innovations, the system might be exhausted to a degree that severely damages the innovation process.[27]

To what extent do these concerns matter? Are they for real and do they present problems that cannot be solved within the current frame of intellectual property rights? Are there differences between

various IPRs in their effects on diffusion – and what do they imply for external IP policy formulation?

The concerns are in some cases for real, but they are not of the magnitude many critics would like us to believe. Critics especially disregard the nature of markets, commercial considerations in innovation processes, and more generally, the economics of technology diffusion. Indeed, critics 'mis-overestimate', to use a "Bushism", the function of patents in technology diffusion and generally fail to give proper attention to other means by which innovators can control the extent to which information about the innovation is released and disseminated to other interested parties.

THE MODES AND ECONOMICS OF TECHNOLOGY DIFFUSION

What do we really know about the economics of technology diffusion? Not much is the answer. In fact, there are very few empirical studies that have comprehensively studied IPR aspects of dissemination and how it has evolved over time. There are many anecdotes: new products that get blocked because they infringe patents, or lose their economic value because others infringe the patents of the new innovations; too broad patents or patent blocking because patents are too narrow; innovation that gets neglected due to insufficient intellectual protection; hold-up problems due to patent expiry; et cetera. From economic history, there are of course ample stories about various inventions and how they affected society. Yet besides such anecdotes, which generally do not provide the sort of analytical knowledge necessary to answer the question above, there is still much to learn about the nexus of intellectual property rights and technology diffusion. Indeed, there is still much to learn about the processes of innovation and diffusion generally.

However, we are not completely ignorant. Some things are well-documented, if not certain: the input to productivity from technology diffusion has increased in the last decades; the pace with which new innovations become obsolete has increased; patent information is widely used by others than the patent holder; new technology gets replaced faster today than before; and imitators are launching competing products faster than before.

One fundamental, but often neglected, aspect of IPRs and technology diffusion is that exclusivity is not only confined to IPRs, and that some IPRs are principally motivated by getting innovators to fully disclose their innovations. Exclusivity rights, like a patent, are only one way for a company to control its innovations and they have not had any real economic significance until fairly recently in economic history. A much more important "break" on technology diffusion has been first mover advantage and other 'natural' barriers to entry such as network externalities, buyer switching costs, scale economies, and steep learning curves.[28] One can discuss the significance of these factors in slowing down technology diffusion today; increasing labour mobility, technological enhancements, a greater supply of researchers and research innovations from universities, and a rapid increase of the number of firms competing in a given market, among other things, suggest *a priori* that market-based barriers to entry are of much less significance in the modern economy. But in a historical perspective it is perfectly clear that these have constituted the major hinders in spreading new innovations.

FIGURE 1: DIMINISHING FIRST MOVER ADVANTAGE

Source: Agarwal & Gort (2001).

This was confirmed in an interesting study of erosion of first mover advantages in the United States between 1887 and 1986.[29] As shown in Figure 1, which is based on this study, there is today a relatively short time period between the introduction of a new product and the introduction of an imitation. This time lag has declined from 33 years in the late Nineteenth century to approximately three years in the mid-1980s. This erosion of the first mover advantage suggests that the effective period of exclusivity, manifested in one way or the other by what economists call a *quasi-monopoly*, has decreased considerably.

This is a clear indication of the development of technology diffusion. It does not imply that the monopoly instilled by an intellectual property right has become useless. On the contrary, the rise in the use of patents in the last decades is rather a function of falling first mover advantages. If natural barriers to entry no longer provide sufficient possibilities to recoup fixed costs, exclusivity rights become more important. Furthermore, this development shows that the exclusivity period has naturally narrowed as markets have expanded due to increasing possibilities to trade. If an innovator in the late 19th century only had the market in one country to use for covering the incurred costs, it now has a global market, which means these costs can be covered sooner than before. The flip side of the coin, however, is that the ability of companies to recoup investment can be damaged by behaviour in foreign markets. Before we approach this fundamental issue for the narrative of IPRs, we first need to understand the IPR interfaces between markets and the factors that define cross-border diffusion.

PATENT COMMONS

Using exclusivity rights for own production is far from the only use of a patent or copyright. It is increasingly common for patent holders to open them up to others through patent commons. In

other words, a private property protected by a patent is put in the public domain, conditionally or unconditionally.

This may seem a confusing notion – in opposition to the very idea of patents. It is not. It is not out of altruism that companies give away their intellectual property. It usually forms part of a broader commercial strategy: a patent holder assumes that by opening up a patent it will be able to lower its own costs for innovation and product development. Moreover, by using the knowledge of people not faced with the incentive-to-innovation problem (university researchers, open source developers, et cetera)[30], companies can avoid the inherent financial risk in innovation investments, or gain

benefits that would not be possible if the patent was kept exclusive to the holder.

Opening up a patent can be an appealing strategy for R&D intensive companies producing services or complimentary products to applied innovations. This is particularly relevant to firms that enjoy a large and stable market share, and can compete by other means than exclusivity, like the trademark or service operations. Furthermore, commercial considerations can motivate a patent commons strategy even when an innovator has not yet incurred the development costs. What is interesting to the rational economic agent are the marginal costs and benefits. If a calculation suggests that future benefits will not cover incurred costs and future fixed costs for development, it might be more attractive to let others freely use the patented innovation and, in the next step, use their work. Put differently: let bygones be bygones. Rational agents cannot use the rear view mirror as a map for the future. An incurred cost that cannot be recovered – so-called *sunk costs* – is a bad guide to commercial decisions.

Making patents open to the public is a growing phenomenon in a few sectors. Even ardent enthusiasts of patent commons, or similar arrangements, have to concede that the supporting and contextual conditions for such a strategy are very specific and applicable to only a few.[29] Indeed, questions are also being raised about this strategy's effect on technology diffusion. Opening up a patent makes it by definition easier for others to use innovations – the transactions costs are being lowered – but patents are only one of many factors that denominate the transaction costs. Effective technology diffusion requires much more than just authorised use of an innovation.

It is particularly one sector (or, rather, a part of that sector) that has an imprint of patent openings and patent commons – the software sector. Companies such as IBM and Sun Microsystems (now part of Oracle) made headlines a few years ago when they released some of their patent portfolios to the public and other companies seem to follow in their footsteps.[32] However, none of these companies view patent commons as an alternative to their entire patent strategy, only as a complement. For companies spending 5-10 billion US dollars every year on research and development, this strategy can be nothing but a complement used cautiously. But for innovations with already recouped costs, and in need of incremental improvements, the commons strategy can be commercially viable.

Patent commons, or opening up of patents in other ways, can lower the transaction costs for others. Such an alternative use of a patent is interesting for the purpose of our study

because it presents a way for patented property to be transferred to other users in a legal fashion. This is more important than it may sound as it helps to create a secondary market for protected property and facilitates a move towards transaction or market-based business models for patented property. Licensing of intellectual property is another – and more economically significant – example.

LICENSING AGREEMENTS

Many patent holders do not use the innovation in their own production and are not interested in using, or building up, own production facilities. On the contrary, many holders of intellectual property rights generally do not consider their innovations as inputs in their own production; they do not take a "production-oriented" view on their innovation strategies. They rather prefer a "market-based" view on the commercialisation of their intellectual property; if others can drive higher revenues and profits from using an innovation, the rational course of action for a patent holder is to sell the right to use an innovation to others. The contractual form of such a strategy is most often licensing; an innovator or originator charges a fee for authorising others to use its innovation.[33]

Licensing has grown almost exponentially in the past decades. Twenty years ago, the annual re-

ceipts from international licensing were just a little more than 20 billion USD; in 2005 the sum had grown to more than 120 billion USD.[34] Economist William Baumol has in several studies analysed licensing arrangements and confirms that voluntary agreements of technology-sharing are widespread and based on solid economics. Between 1980 and 1998, firms in the United States, Europe and Japan entered into nearly 9 000 strategic technology alliances. Among them is technology cooperation between rivalling companies such as Microsoft and Apple, Maxwell Technologies and Siemens, and Pfizer and ArQule.[35]

Baumol makes two important observations. Firstly, companies should view innovations in the same way as they view "bottleneck inputs". Put differently, innovations are not different from other inputs, neither for companies nor for the market generally.[36] Baumol writes:

> "Innovation is imbued with a mystic aura that has little basis in the logic of the objectives and the behaviour of firms. Innovation, of course, brings us extraordinary new products and new ways of doing things – and so, appropriately, we may view its creators with awe. But, in order to pick apart how innovation figures in the workings of capitalism, we must strip it to its essence: at heart, novel technology is simply another (durable) input to the production process, one that permits better products to be produced or that enables better processes to be used. The proprietary character of the technology means simply that this input can be obtained only from a monopolist supplier. Thus, from the viewpoint of the firm's decision-making and of the market for the technology, such information is no more and no less than what, in other areas, is referred to as 'bottleneck input'."[37]

Secondly, it might be commercially dangerous for a company *not* to share technologies with others, even with its competitors. By licensing new technologies to a competitor, a firm might and often will be reciprocated with similar offers when others have developed new technologies. Companies cooperating in such a network or – to use Baumol's terminology – 'technology-sharing consortium' get important competitive advantages against other companies that only rely on own innovations. This does not mean that the firms in the consortium no longer compete. On the contrary, the price for getting a licence is of course set to deliver higher profits to the licensing company, which stimulates companies to compete for new technologies and innovations. In addition, the innovator will also have a first mover advantage that enables this company to put a new technology on the market before others. The time lag between the innovators market introduction and imitators might be short but still sufficient to give the innovator a competitive advantage and provide revenues that can cover some of the incurred development costs.

Other studies on licensing also provide us with knowledge that is important to understand the commercial motives of it and how intellectual property rights actually facilitate licensing.[36] In fact, exclusive rights are preconditions to licensing. Research shows that the propensity to enter licensing agreements is higher if the contracting parties are technologically close to each other and share some basic market characteristics. Earlier experience of licence agreements do also matter. More important for this study, the strength of the intellectual property regime is a key factor in the propensity to enter licensing agreements.[38]

Needless to say, in the absence of intellectual property rights the market for licences would be small; only innovations that can be protected or hidden by other means would be part of the licence market. But given the existence of IPRs, the strength of them matters and cuts right into companies' commercial considerations.[40] If a licensee does not feel secure that his right will be respected, the propensity to embark on a market-oriented strategy would diminish and innovators would start

to look for other strategies, such as producing the product and 'locking-in' the product by higher entrance barriers to the market.

Lately, many researchers have been particularly interested in the effects of IPRs on licensing to developing countries. A few studies have asserted that strong intellectual property regimes work against the interest of developing countries and other have suggested that a strengthening of intellectual property rights do not at all foster international technology diffusion.[39] Such claims are, however, very controversial. Many, including this author, would consider them false suppositions.

Intellectual property rights are important to developing countries for a variety of reasons. First of all, they are key to the development of domestic firms dependant on intellectual property. This is of course more important to advanced developing countries than to extremely poor countries such as Bangladesh or the Democratic Republic of Congo.

Secondly, weak intellectual property rights negatively affect exports to developing countries.[42] Companies that export to another country must be assured that their products are not copied or misused locally in a way that destroys profit opportunities in other markets. Parallel trade, particularly if it is based on extensive price discrimination, is one of the concerns involved for companies exporting to developing countries.

Thirdly, the presence of intellectual property rights is a precondition for foreign firms to license technology to affiliates or cooperating firms in other countries. A weak or non-existent IPR regime means that developing countries will be saddled with old production technology.[41] True, in some instances licences can be substituted by inward foreign direct investments (FDI), particularly if the host market is sizeable and, *nota bene*, if companies are confident they can control their technology from getting into the hands of other and competing companies. But this is a rare phenomenon. It is more correct to say that intellectual property rights positively affect FDI to developing countries. One of the leading academic economists on intellectual property rights, Keith Maskus, found in a very interesting study of patent strength in 46 countries that foreign direct investments are affected by the quality of patents in developing countries. A one percent rise in the extent of patent protection, *ceteris paribus*, would on average result in the US FDI stock expanding by 0.45 percent.[44] Again, studies such as this should for methodological reasons be interpreted cautiously, but there is no doubt that the effect on FDI from intellectual property rights are positive and significant.

What is the explanation? Before a foreign investment involving valuable patent can take place companies must be ensured their innovation does not get imitated by others. A good standard of IPRs also signals that a country is serious about improving its general business climate and thus serves as a proxy for the overall regulatory standard.

Furthermore, intellectual property rights are one of several determinants of FDI to relatively advanced developing countries that are climbing the technology ladder.[45] Foreign investors are less likely to be sensitive to IPR standards if their trade is based on old technology or standardised, labour-intensive technology. However, for companies in possession of valuable knowledge-based assets, intellectual property rights are preconditions for direct investments as well as licensing. Thus, IPRs are also one (of several) preconditions to technology transfer to developing countries.[46]

Overall, it is easy to see the benefits of strong intellectual property rights for licensing and technology transfers. A study by three economists also reached this conclusion after reviewing the effect on licensing from reforms of IPR regimes.[47] Studying affiliate-level data on multinational firms in the United States after IPR reforms in 16 countries between 1982 and 1999, the authors found clear evidence of increasing royalty payments at the time of the reforms.

This is shown in Figure 2. Royalty payments for technology transferred to an affiliate in the reforming country increases significantly after the reform. The effects are most significant for companies that rely extensively on patents; the sample of firms experienced a royalty payment increase of 30 percent after the reform.

FIGURE 2: INCREASE IN ROYALTY PAYMENTS AFTER REFORM

Explanation: Figure 2 shows the effects of reform on the aggregate royalty payments to aggregate sales ratio (royalty payments/sales) in three different samples. The column on the extreme left shows the effect on the full sample, the next column the effect on affiliates of parents that do not make extensive use of patents in the United States, and the last column on affiliates of parents with extensive use of patents.
Source: Branstetter et al (2005).

Equally important for technology diffusion is the extent to which IPR reforms stimulate filings of patents by non-residents in the reforming country. As Figure 3 shows, past reforms have resulted in substantially increased patent filings by non-residents.

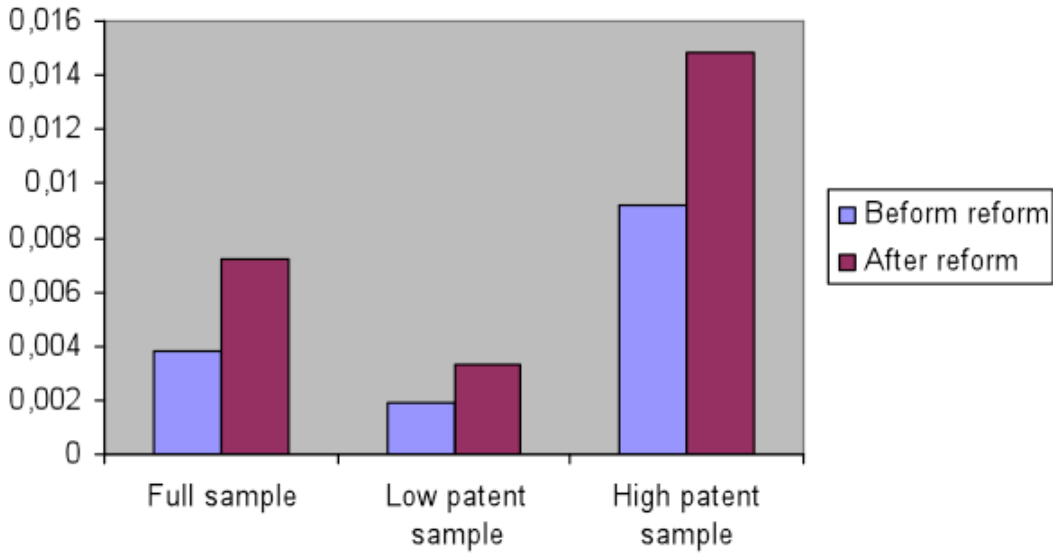
FIGURE 3: INDEX OF THE INCREASE IN PATENT FILINGS AFTER REFORM

Explanation: Figure 3 is an index showing the effect of the reform on patent filings by residents and non-residents.
Source: Branstetter et al (2005).

There are of course several motivations behind a strengthening of the intellectual property rights regime, but the prime one is to get multinational firms to source production facilities and research investments to the reforming country. This study, and several other studies reaching the same conclusion[48], clearly shows that IPR reforms have had positive and significant effects on FDI sourcing in the last decades. Furthermore, technology transfers within multinational firms increase after reforms strengthening intellectual property rights.

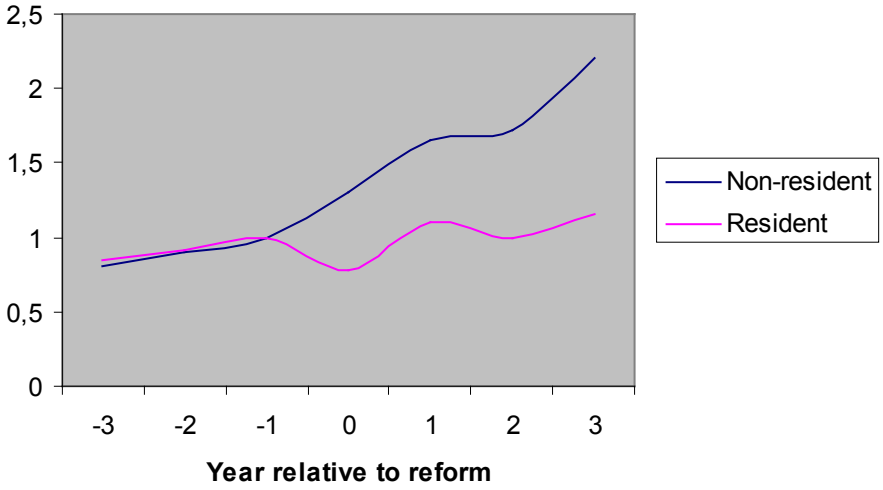
On the basis of these arguments and perspectives, there are three tentative conclusions for the quest for a narrative for external IP policy formulation. The first one is basic: the assumption of some of the IPR critics that technology diffusion would be faster in an IPR-free world is false. In fact, a strong IPR regime is essential to trade and FDI, two of the most important vectors for technology diffusion. Second, there are differences between IPRs in their effects on vectors of diffusion: patents appear to be the central factor. Finally, in order to maximise benefits from external IP policy action, it is important to target areas with great potential for diffusion as it helps the originator/patentee (scale economies and factor proportion advantages) as well as the destination. But the analysis does not stop there. To better understand the economics of diffusion for various IPRs, we also need to look further to alternative ways to protect an innovation.

The above dichotomy between a market-based and a production-oriented strategy is better de-



scribed as a difference between a 'transaction-based strategy' and an 'equity-based strategy'. The former implies licensing while the latter is based on using innovations in own production. The transaction-based strategy has some *prima facie* advantages over the equity-based strategy as far as technology diffusion is concerned. An innovator does not need to incur fixed costs for integrating the innovation in a product and thus has smaller costs that need to be recouped. When choosing the equity-based strategy, the value of the exclusivity rises, but the incentive-compatibility problem also grows bigger.[49]

What do these considerations imply for our analysis of diffusion and external IP policy formula-



tion? Firstly, licences distort the simple analysis of two alternatives – exclusivity or free use – and suggest that exclusivity in many instances does not equal a temporary monopoly that restrains the possibility of others using a new innovation. There is still a transactions cost – the licence fee – but it hardly prohibits others from pursuing their commercial plans. Licences enable commercially viable enterprises to use an innovation in other forms.

Secondly, the alternative to intellectual property rights is not and can never be a totally transaction-based market for new innovations. If costs cannot be recouped on the terms of exclusivity, then innovators must find other ways to cover the incurred development costs. If that is at all possible, it will largely be accomplished by locking-in innovations in products and networks, massive investments in trademarks, and an excessive interest on the part of innovators in market dominance and to compete by means that competition authorities generally dislike. This is an important aspect. Many of the IPR critics suggest that exclusivity rights distort markets and provoke investment strategies and behaviours with low, let alone negative, societal value.[50] Obviously, it is easy to find examples of IPR "abuses" even if the systemic effects are positive. No system is in every respect ideal. But this critique assumes that the alternative to exclusivity rights is a neoclassical Nirvana with instant market clearing, no transaction costs and few if any investments by innovators to protect their innovation from use by others. This is a dishonest supposition. The reality is that those firms who would maintain innovative capacity would have to protect innovations by other strategies, and in most cases it is a strategy that would make the transaction-based model more difficult to operate. For costly innovations, the sheer existence of IPRs helps firms to branch out from equity-based approaches to innovation.

PATENTS AND SECRETS

When a patent is awarded, the innovator has to reveal substantial amounts of information about the innovation. Other interested parties, such as competitors and researchers, thus get essential information about the innovation and can use this knowledge in their own work as long as they do not infringe the patent. The patent grants exclusivity to its holder for 20 years, but the information is free to use from the start. Put in another way, the idea of the patent – the 'social contract' of patents, if you like – is that the exclusivity is exchanged for the new knowledge created being fully disclosed. [51]

It is difficult to overstate the value of this disclosure. In incremental innovation processes, the patented intellectual property becomes a producing device for competitors – an input to their own production. Instead of starting from scratch, an innovator can use the information others have provided to develop new products as long as it does not infringe the patent. In this way, it is more correct to view patents as a friend of incremental development and technology diffusion rather than as a foe.

Indeed, it is even more so if one assesses what innovators would have done in the absence of patents. As should be clear to dispassionate analysts of intellectual property rights, the alternative to patents (or copyrights) is not, and has never been, a totally open market for innovations and new knowledge. Rather, the alternative is an open market for the use of innovations that the innovator cannot protect and that imitators can easily copy. The difference is important. To keep the innovation a secret is, and always has been, a common practice and the proper course of action for many innovators. Undoubtedly, trade secrets would be even more widely used if intellectual property protection was not an option.

This simple observation also affects the way one views cumulative development processes. Critics assume patents hinder incremental development. Apart from disregarding the incentive-compatibility problem in creating a new technology to develop from, this critique is also very speculative in another sense: it does not consider trade secrets as an alternative to patents. It just assumes that new technologies would be freely available if patents did not exist. No one knows to what extent innovations would be kept secrets if patents were abolished or seriously diluted, but we do know that trade secrets are used extensively already today.

Companies combine their patents with trade secrets. If revenues are assumed to be higher if innovations are kept secret, companies have a clear incentive to not disclose information to competitors. And since abolishing patents would lower the profit margin in the patent strategy, the incentives to withhold information about a new innovation would be even stronger than they are today.

Several studies, using different methods, conclude that patents are an important source of information to competitors. In a survey study for the OECD, three economists found that 90 percent of the respondents thought patents held by others to be a vital source of information to their own R&D operations.[52] Indeed, a big majority also considered the information disclosed in patents to be more useful today than before.

The most comprehensive studies of the nexus of patents and technology diffusion are made by economists Adam Jaffe and Manuel Trajtenberg.[53] The novelty of their research is that they use patent citations to assess technological spillovers, primarily in the framework of endogenous growth theory. Studying particularly the time lag between the grant date of a patent and when this specific patent is cited in a new patent filing, they have found some highly interesting results.

Firstly, the rate of knowledge obsolescence has increased substantially over the last century (the share of patents becoming obsolete). In the early twentieth century, the annual rate of knowledge obsolescence stood at 2-3 percent but had risen to 10-12 percent in the late 1980s. This development coincides with a rapid rise in the number of patents filed and granted and gives an indication of the flow of new knowledge; the higher the rate of knowledge obsolescence, the greater the diffusion of new knowledge.[54]

Secondly, diffusion of new knowledge (using patents as proxies for new knowledge) is surprisingly rapid.[55] This result confirms what others have found earlier. In a paper from 1985, Edwin Mansfield studied diffusion of industrial technology and found that 70 percent of product innovations were known and understood by competitors 12 months after the innovation.[56] In later studies, several economists have found the economic life time of patents to be much shorter than the duration of them. Jean Lanjouw, for example, concluded in a study from the late 1990s that over half of computer patents, whether commercialised or not, are worthless within ten years of the application date.[57]

THE ROLE OF COMPETITION IN TECHNOLOGY DIFFUSION

The core essence of a patent is to give the holder exclusivity – a temporary period of a monopoly – to control the use of the particular innovation. In this respect, a patent intends to make the patentee less subject to competition. Naturally, this affects static competition negatively, but it does not mean patents drain a specific market of competition. Intellectual property rights are, in the first place, pivotal to the development of something to compete over, but they facilitate competition in other stages of the innovation-product cycle, too. Again, it is important to understand the entire context of the commercial-regulatory framework to assess the economic effects of IPRs.

Take a small research-intense company, a high-tech start-up for example. To them, patents are imperative to the commercialisation and dissemination of their new innovations. Such firms are not equipped with other tools to restrict market entry. Nor do they possess production facilities that, if the firm chooses an equity-based strategy, can take the innovation quickly to the market. Furthermore, as a small start-up they will probably have insufficient resources to invest in the diffusion of the innovation.

Venture capitalists can assist such firms with financial muscle, but they usually consider the pos-

session of a patent – or the likelihood of getting a patent – as a precondition to investing in a small R&D based company. Venture capitalists do not act differently from others; like other agents, they consider the financial merits rationally and look for opportunities to make a good return on investment. What characterises venture capitalists is that they generally know little about the innovation *per se* but have greater knowledge about markets and production structures. This is why venture capitalists typically place more importance on intellectual property protection than a large multinational firm. Outside suppliers of capital and market knowledge generally do not possess extensive knowledge about possible technical applications of a new technology and how it can be extended to other areas in order to make the most of it. Therefore, the core innovation, and the protection of it, has, at the margin, a greater value to them than innovation that gets the funding from internal company sources. This is also the explanation for why patent intensity has increased in accordance with growing volumes of venture capital.[58]

Now, what does this imply for technology diffusion? It simply means that a competition process open to start-ups and other new firms entering a market, financed by venture capitalists, presupposes intellectual property protection. Such competition from new market entrants may not be possible unless intellectual property can get temporary protection.

There is also a wider perspective on the role of competition in innovation-intense markets. The exclusivity given by an intellectual property right intends to provide innovators with better possibilities to recoup investments in innovations. But does it mean that the holder of an IPR behaves as a traditional monopolist? Does he or she just extract monopoly rents and refrain from further development as long as long as the monopoly is valid? One could of course points to examples of such behaviour. An amusing example can be found in Nick Hornby's best-selling book *About a boy* in which one of the characters (Will, played by Hugh Grant in the movie) lives an untroubled, idle and work-averse life as he receives a steady stream of royalty fees from one of his late father's compositions – *Santa's Super Sleigh*.

Is Will a typical IPR possessor? Hardly. True, in some markets exclusivity rights can foster idleness – particularly in some copyright sectors. But for most holders of intellectual property protection, competition is still stiff and the company must, as all others, continuously concentrate on product development to get competitive advantages.

To better understand the competition process one should separate it into at least two distinct categories. One category is price competition between products that already exist and are available on the market. Needless to say, exclusivity rights mean (not always but as first approximation) less price competition. A second category is competition *to* the market – rather than *at* the market. In order to make profits, companies can never rest from product development and innovation; if they do there is the clear risk of soon being out of the market. In sectors where patents in particular play a big role, the competition process is typically characterised less by price competition than innovation competition. [59]

Austrian economist Joseph Schumpeter stressed the importance of innovation competition in his seminal work *Capitalism, socialism and democracy*.[60] Such competition, he claimed, was more important than price competition; competition should be viewed for its role 'in the perennial gale of creative destruction'. Schumpeter wrote:

> 'As soon as quality competition and sales effort are admitted into the sacred precincts of theory, the price variable is ousted from its dominant position… But in capitalist reality as distinguished from its textbook picture, it is not that kind of competition which counts but the competition from the new commodity, the new technology… -

> competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives. This kind of competition is as much more effective than the other as a bombardment is in comparison with fording the door, and so much more important that it becomes a matter of comparative indifference whether competition in the ordinary sense functions more or less promptly: the powerful lever that in the long run expands output and brings down prices is in any case made of other stuff.'[61]

Neither Schumpeter nor economists that have followed his trail repudiate price competition. But they, as well as many entrepreneurs and innovators, have understood that many markets in the real world differ from textbook notions of perfect competition. Oligopolistic competition is a better description of how many markets work, especially those characterised by rapid innovation.[62] Prices do play a role in such competition, too. But it is not the first violin in this ensemble of competition. IPRs don't change that fact; nor do they define this market structure.

This view is important in order to understand the role of intellectual property rights for competition and technology diffusion. In many markets, firms compete against each other to get as many as possible to use their innovation, technology or standard. Therefore they invest heavily in diffusion. An important corollary of this proposition is that the simple dichotomy between creation and dissemination of an innovation is false. They are integrated and the latter cannot operate properly without the former. Put in another way, innovation is diffusion.

The analysis therefore ends where it started. Intellectual property rights are important to incentivise innovation and as such they are also part of the puzzle of diffusion. This notion may seem overly theoretical, but has in fact become the prevailing market rules in real life. Cross-licensing between competitors has become a main feature of the innovation process and a mode of industrial co-operation amongst the competitors of the highly specialized ICT sector. Through licensing agreements, ICT firms grant each other usage rights as they all need to obtain different yet core functionalities for their products that are part of another company's patent portfolio. Some R&D intensive companies, like Qualcomm in the telecoms sector, almost offer licenses on a wholesale basis, and focus on licensing revenues while leaving the manufacturing and even commercialization of their innovations to others.

Cross-licensing has receded the surge of litigations between hi-tech firms with increasingly complex patents. However, litigations still occur, in particular for new disruptive technologies, as competing (and sometimes even overlapping) patents are seeking to establish ownership over the new technology. For example, firms like Apple, Motorola, HTC and Microsoft have sued and retaliated against each other over alleged patent infringements over smartphone software technologies.[63] Ironically, some anti-IP campaigners have taken the occurrence of cross-licensing and "clearing houses of patents" as the ultimate evidence of patents having lost their commercial value. The opposite is closer to the truth: patents have adapted to the fragmentation and globalization in technological development, and remain effective legal instruments while promoting inclusiveness, and without detrimental effects on dissemination.

4. A MODERN TRADE-AND-IP NARRATIVE

The past chapter has examined the economics of IPRs, and how various IPRs, primarily patents and copyrights, differ from each other. At the centre have been the two core concepts of the IPR

narrative: *incentives to innovation* and *technology diffusion*. They have been central to the IPR narrative for a long time but their relevance has only increased as the European economy has become more globally oriented. In fact, globalisation itself has made appropriate IP protection even more important. Why?

Firstly, economic globalisation means that the division of labour – the force of specialisation – has become global. Countries have through the global market process experienced a considerable upgrade in the level of specialisation which for Europe has implied a greater resource concentration to production higher up in the value-added chain. Such production is to a significant degree dependent on knowledge, R&D and innovation. Hence, Europe's welfare is dependent on regulatory conditions that help to facilitate its move up in the value-added chain. Good regulatory conditions, such as appropriate intellectual property protection, thus help to create jobs, a central plank of Europe's post-crisis strategy.

Secondly, a strong factor behind the globalisation of European blue chip firms has been the fragmentation of supply chains. A pre-condition for such supply chain globalisation is protection of intellectual property and the assistance by authorities in home countries to uphold intellectual property rights in the event of infringement.

Thirdly, globalisation has generally increased competition between firms and reduced the natural barriers to market entry. Brand strategy and first-move advantage are today weak protection for those firms needing to recoup investment costs.

Fourthly, globalisation offers new opportunities to speed up technology diffusion and the pace of real market integration between countries. In fact, one of the central economic benefits of globalisation is a speedy transfer of new innovations and technology to a greater part of the world economy. Yet such transfer can only work properly, and leave a considerable imprint on the overall economy, if innovators have appropriate intellectual property protection.

An IP narrative and policy for a modern economy also need to accommodate the differences between IPRs. Past sections have established a narrative that gives an endogenous basis for determining what is important and what is less important for IP policy. Again, the analysis only takes account of economic aspects, and it does not attempt to substitute all other grounds for decision making. Importantly, an informed decision on the basis of economics also needs more distinct knowledge about the real economic profile of Europe's economy and what type of activity that would benefit the most from external IP actions.[64]

Table 1 summarises some of the previous discussions – and adds a couple of new elements to the analysis. The first substantive column highlights some of the characteristics of IPRs that are of relevance for getting a better understanding of policy formulation. The second column lists some of the key external concerns – that is, concerns over policy and enforcement in other countries outside the European Union.

TABLE 1: PROFILING IPRS AND PRIORITIES

	Relevant aspects	External IP concerns	Sectoral priorities

Patents	-Protect investments in R&D and innovation -Patent sensitivity varies between sectors, but patents protect behaviour that is sensitive to conditions for recouping upfront investment -Global competition between innovators, often on markets characterised by oligopolistic competition to rather than at the market -Global framework for patent registrations -Global framework for secondary market -Facilitate diffusion, also cross-border diffusion -Patented products geared towards producer markets rather than consumer market, why brands do not give much protective support	-Insufficient IP laws in selected emerging economies: especially effective scope and duration of exclusivity -Insufficient IP-regulatory framework in many countries -Insufficient institutional framework (e.g. infringements and appeal rights) in selected emerging economies -Institutional biases against foreign firms in selected emerging markets -Counterfeiting	-Pharmaceuticals -ICT -Chemicals -Biotechnology -Nanotechnology
Copyrights	-Protects a variety of activities, but mostly artistic creations -No system for registration of copyrights -Licensing in selected copyright sectors, but transaction-model is overall a small phenomenon -Long exclusivity periods cannot be defended by economic analysis -Often cheap and easy to imitate -Significant price differences between markets	-Counterfeiting/ piracy	-Software or computer-based innovations that can get copyright but not patent protection -Software with high content of artistic designs

Geographical indicators	-Protect selected areas of food and beverage production -Protect companies on foreign markets -Global system for acknowledging protected goods -Support scale economies but do not give factor proportion benefits (e.g. outsourcing of production). -GI-goods often protected by brands and trademarks	-Price competition	
Trademarks	-Fundamental to economic activity	-Counterfeiting	-Consumer brands with ability to price discriminate between markets -Protection of brands, distinctive designs, names or composition of products and services.

The question now is: is it possible to design policy on the basis of this analysis? Yes and no is the answer. This analysis alone is not a sufficient basis on which to ground policy and priorities, but it guides policymakers in the right direction if the ambition for policy is to reflect core commercial concerns and maximise economic gains through external IP policy. Furthermore, it also puts the light on "endogenous priorities" for external IP policy formulation: what IPR areas need a stronger external IP arm in order to maintain IP integrity and efficiency. A couple of the observations merit longer explanation and commentary.

Firstly, if various IPRs are compared, it is reasonable to put the emphasis in external policy on patents. This is the area where the big policy problems are for European firms. They encounter insufficient IP laws and regulatory frameworks in many countries, especially emerging markets. Adverse conditions for patented IP have negative effects which extend beyond the single material interest of the patentee; trade, FDI and stronger cross-border integration are affected, often to the detriment of other countries. Moreover, the types of economic activity that can receive protection from patents are by nature global, and subject to global competition; this is why adverse conditions in another country impede on the integrity and efficiency of the exclusivity right.

Secondly, the degree of patent sensitivity varies between sectors: some are more dependent than others on the integrity of patents to enable upfront investments in innovation to be recouped. The terms of market pricing are one factor behind the degree of sensitivity: sectors at risk of marginal pricing in the event of ineffective exclusivity are more sensitive than others. Little or no effective opportunity to price discriminate between markets is another factor of particular importance for external IP policy: a combined trend towards global and marginal pricing can instantly disable the integrity, and hence the economic value, of a patent. Sectors that operate in the producer market, or with buyers that are not end consumers, typically have a higher degree of patent sensitivity than sectors that sell directly to consumers. In the latter sector, brand promotion and other strategies to inform consumers about choices can help to protect the integrity of exclusivity. In the latter sector (and perhaps most notably in the service industry), the core intellectual capital (such as brands) is more typically registered as trademarks rather than patents. They are used to inform consumers about choices, or to protect the integrity of exclusivity. In certain cases, e.g. multinational firms that rely on franchising, or design and content-driven industries, market access to external markets becomes hinged upon protection for trademarks or patterns rather than patents. While it is important to secure the legal framework for investments in these sectors, protection for trademark and industrial patterns are relatively conform and near universal amongst the export markets – and

inarguably, the debate around trademark protection is less controversial and faces less opposition in the context of trade.

In sum, the degree of patent sensitivity should guide policymakers in their formulation of policy and priorities. There are different measures on patent sensitivity, and the result appears to differ somewhat over time. Sensitivity can also be stronger or weaker depending on the negotiation partner. However, it appears clear that the sector with greatest patent sensitivity is the pharmaceutical sector; this is also the sector with the highest technology intensity.[65] Other sectors that are patent sensitive are the chemicals, biotechnology and nanotechnology sectors.

Thirdly, it is difficult to find economic justifications to put copyright concerns in the top league of priorities. Copyrights are already much longer than is economically motivated. There is not an efficient system for global registration and transfers of copyrights; a handful of subsectors might have established practices for the secondary market, but overall it is not working well. Furthermore, the chief problem for copyright sectors is not one of IP law; it is rather counterfeiting that disturbs sales. And counterfeiting problems are difficult to address in a bilateral trade negotiation.

Fourthly, geographical indicators, the oft-prioritised area in EU external IPR policy, have a weak (but not non-existent) economic justification. It is difficult to see GIs as something more than a way to avoid price competition. There are costs associated with establishing a geographical brand, like champagne or Parma ham. But the cost is almost indistinguishable from general market promotion of goods and brands, which is necessary regardless of whether geographical location is relevant or not. Furthermore, there are no positive spillovers from extending GIs to other countries, and such a move cannot facilitate relocations on the basis of cost and comparative advantages. This is not to say that there is no legitimate case for GIs; only that the economic underpinning is weak.

Finally, in an endogenous approach, it is difficult not to put the emphasis on patent laws and their broader regulatory context. In comparison with most other IPRs, maintaining and improving the integrity and economic value of patents are directly and positively associated with incentivising valuable economic behaviour – investing in innovation – and speeding up diffusion of innovations. This is not to say that patents work in an ideal fashion: nor is there a disregard for potential costs associated with a strong patent system. However, to the EU economy, patents are fundamental for economic strategy in a way that most other IPRs cannot match.

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ENDNOTES

1. The campaigns, however, appear to have been less effective than is often believed in pushing reforms. Drezner (2007) argues that the many campaigns against the TRIPS agreement in the WTO have accomplished practically nothing.
2. Hall, Thoma & Torrisi (2007); Greenhalgh & Rogers (2007).
3. Pugatch (2007) and Woolcock (2007).
4. See Erixon & Makiyama (2010: forthcoming).
5. Tufts CSDD (2007).
6. Saint-Paul (2005).
7. See for example Gould & Gruben (1996) and Claessens & Laeven (2003).
8. Maskus (2000) reviews some of the empirical studies and discusses different aspects of the role of IPRs for economic growth and development – aspects that stress positive as well as negative roles.
9. Just to give one example: the absence of physical property rights has greater effects on growth, and welfare generally, than the absence of intellectual property rights because the former are more fundamental for economic activity than the latter. A country with effective physical property rights can experience long-run economic growth despite the absence of IPRs, but a country lacking physical property rights will rarely grow even if it has effective intellectual property rights.
10. Kanwar & Evenson (2003).
11. Claessens & Laeven (2003).
12. Cohen, Nelson & Walsh (2000).
13. Of course, this does not mean that people refrain from asserting that they do know the optimal trade-off and can prove it objectively.
14. Gould & Gruben (1996).
15. Greenhalgh & Rogers (2007) offers a good survey of research literature.

16. Maskus (2000); Jaffe & Lerner (2007).
17. Lessig (2005).
18. Posner (2005).
19. However, no empirical study known to this author has looked into this yet.
20. Corrigan & Rogers (2005).
21. Posner (2005).
22. Epstein (2006) and North (1980) discuss an evolutionary view on property rights.
23. Mokyr (1990).
24. Corrigan & Rogers (2005).
25. In a study of the music industry (similar studies of other copyright-intensive industries do not exist), Towse (2003) points out that the distribution of income from copyrights is highly skewed; a small number of superstars get a lot of money while the vast part of copyright holders do not get much at all. This reflects many things: the quality and popularity of the music, for example, but one of the factors defining the income from copyrights is the incurred costs of creating and marketing popular music.
26. Shapiro (2002).
27. Boldrin & Levine (2008).
28. See Lieberman & Montgomery (1988), Katz & Shapiro (1986), and Mueller (1987).
29. Agarwal & Gort (2001).
30. As Lerner & Tirole (2000) points out, such actors are not driven altogether by altruistic motives either. There are usually rewards involved, such as peer recognition and the prospects of a better job in future. Indeed, fame and glory often forms part of the reason for giving away an invention. Mokyr (1990) tells the story about Humphrey Davy who in 1815 invented the mining safety lamp but refused to patent it since his invention was made pro bono publico.However, as Mokyr puts it, “yet he jealously defended his primacy in developing the lamp, and was made a baronet for it”.
31. See for example von Hippel (2005). There are of course many activists pushing the patent commons strategy fervently and professing its universal appeal, but their analyses generally lack empirical support and viable commercial perspectives.
32. The Economist (2005).
33. OECD (2007).
34. OECD (2008).
35. Baumol (2003), p. 85.
36. Aghion & Howit (1998) make the same analysis and view new technological knowledge as ‘disembodied capital good’.
37. Baumol (2003), p. 80.
38. Park & Lippoldt (2005).
39. See for example Vonortas (2003).
40. Lee & Mansfield (1996), for example, shows in a survey study that US multinational firms are reluctant to license new technology even within the company if the IPR protection is not sufficiently strong.The study covers six sectors and shows how IPR regimes gets more important to licences the higher the stage of production. The chemical sector, including pharmaceuticals, is most sensitive to IPR regimes. Mansfield (1995) also concluded that the earlier findings in US firms also apply to German and Japanese industries.
41. See for example Lanjouw (1997) and Grossman & Lai (2005). Chang (2002) and (2008) take the analysis a bit further and suggest that intellectual property rights reform, as well as trade-liberalising reforms, have generally been detrimental to developing countries.
42. See for example Maskus & Penubarti (1995) and Smith (1999). A particularly interesting conclusion of studies over intellectual property rights and trade is that effect is very strong in low-technology trade, such as trade in clothing. An effective trademark regime means companies do not have to worry about

local imitators forcing the exporting company to lower the prices in order to discipline the imitators.

43. Young & Maskus (1998) conclude that weak patent laws deteriorate the incentives to license technology to developing countries. Smarzynska (2002) finds similar results in a study over East and Central Europe. Hoekman & Smarzynska & Javorcik (2006) discuss the importance of technology transfer to developing countries.
44. Maskus (1998).
45. Eaton & Kortum (1996).
46. See for example Lai (1998).
47. Branstetter et al (2005). Lerner (2002) found similar patterns in a study over IPR reforms in 50 countries during 150 years.
48. See for example Lee & Mansfield (1996), Evenson & Kumar (2001) and Chen & Puttitanum (2005).
49. McCalman (2002) quite rightly points to factors that distort a clean choice between transaction or equity (sector, market and product specific factors), but in a study over distribution to other countries he finds that movie companies rapidly increase the use oflicences and that an international standard of intellectual property rights is associated with a high degree of licensing.
50. Boldrin & Levine (2008).
51. As a noun patent stands for “open letters” and as an adjective for “open”.
52. Sheehan et al (2003).
53. Jaffe & Trajtenberg (2002).
54. Basmann et al (2003) confirm this finding in a study also using patent data but in a context of production function analysis. Studying American patent data for the period 1947-1981 they found that patent activity, measured in different ways, positively affected the marginal rate of technology substitution.
55. In the technical model applied by Jaffe & Trajtenberg, diffusion is so rapid that the model performs as if it was instantaneous. Their studies also find many other results important to the economics of innovation. For example, the usefulness of patent information seems to have declined in the last century, primarily due to a sharp decline in the early decades. Also, research productivity has fallen, which is probably explained by the growing research input per patent. The size of patents grew by a factor of 3 between 1900 and 1940, and by 20 percent between 1940 and 1970. Furthermore, research tends to be more narrow, or specialised, and generates fewer spillovers to other parts of the economy. A final conclusion is that foreign spillovers have positively affected US productivity. Hafner (2005) also finds a pattern of productivity effects by foreign patent spillovers in a study of 18 OECD countries. The effect of foreign technology diffusion on labour productivity is most significant in countries outside G-7. Coe & Helpmann also concluded that that trade in technological advanced inputs have very significant effects on productivity and give impetus to technology convergence.
56. Mansfield (1985).
57. Lanjouw (1998). This rate of obsolescence also applies to the computer market generally. Baumol (2002) reports examples of how quickly products highly dependent on innovations can become obsolete. For example, at the time a new computer model appears in retail stores, production of it has ceased. The producer is instead about to put a new model on the market.
58. See, for example, Kortum & Lerner (2000).
59. Baumol (2002).
60. Schumpeter (1911/1992).
61. Schumpeter (1911/1992), p. 84-85.
62. Etro (2004) takes this view further and stresses the importance of competition between aggressive market leaders.
63. ’Motorola targets Apple in lawsuit’, Financial Times, October 7th, 2007
64. This is the subject of the next chapter.
65. OECD (2007); Lippoldt (2006).