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TRADING KNOWLEDGE IN A GLOBAL INFORMATION SOCIETY

The Southern Dimension of TRIPS and GATS

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The Patent Policy Trilemma[1]

Patents provide private rights of exclusion over knowledge. They can serve as incentives to the generation and commercialisation of new knowledge, yet by converting knowledge into private goods, the use of which is controlled by owners, patents can also impose barriers to the dissemination of knowledge. Given the important role that patent policies play in the distribution of private rights of exclusion over knowledge, and the vital role that access to and use of knowledge plays in development, studying patent policies is of crucial significance for development.. To appreciate patents as a policy variable, it is important to appreciate that the private rights of exclusion conferred by patents are national: having a patent in one country does not give rights over the knowledge in another country, which means that patents must be obtained in each country where protection is sought. It is possible that some knowledge may be privately owned in one country but in the public domain in another one.

Notwithstanding the considerable degree of harmonisation of national patent systems that has been introduced by the World Trade Organization's Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), it is widely recognised that one area where countries retain potentially important levers of policy discretion regards the administration of national patent offices (Commission on Intellectual Property Rights 2002; UCTAD-ICTSD 2005; Drahos 2010). In particular, how countries go about operationalising and applying the key patentability criteria of 'novelty' and 'inventive step', through both patent office guidelines and examination procedures, remains a feasible source of cross-national variation in patent policies – one that can affect the balance between private rights and the public domain. Yet, despite the near-universal recognition of both the potential importance of patent examination as a remaining

policy instrument and the possibilities for variation in examination practices, minimal attention has been paid to analysing the topic in the context of developing countries.

In this article I analyse the challenges that developing countries face in taking advantage of these opportunities for policy innovation. I focus on the intrinsic trade-offs between three objectives that characterise patent policy: (1) the quest for *examination speed* to increase legal certainty and reduce application backlogs; (2) the desire to achieve high standards of *examination quality* to minimise the granting of non-deserving patents; (3) the *preservation of resources* to minimise, among other things, the opportunity costs of having highly-qualified, scientifically-trained professionals dedicated to examining others' (largely foreigners') patent applications rather than engaging directly in their own productive and scientific activities.

Policymaking always entails trade-offs; a measure that accomplishes one goal may undermine (or complicate) the achievement of another goal. The notion of 'policy trilemmas' allows us to conceptualise the trade-offs in situations where policymakers have three desirable – but conflicting – objectives. In this paper I treat the desire to accomplish the three policy objectives indicated above – speed, quality, and resource preservation – as a trilemma: only two of the three objectives can be maximised simultaneously. Of course, the trade-offs between doing things quickly, doing things well, and doing things at minimal expense apply to many policy areas; politics entails making trade-offs and choosing which objectives to prioritise. The patent policy trilemma discussed here, then, is a specific example of a more general policy challenge.[2] I show that most responses to the trilemma typically subordinate patent quality to examination speed and resource preservation. In contrast, I suggest that quality should be the highest priority, and that perhaps resource preservation is the objective to de-emphasise.

In the next section I explain in more detail the significance of each of the three objectives, and why the importance of each is particularly acute in the case of developing countries. A key contribution of the article is to show that each objective presents particular challenges in developing (i.e. resource poor) countries. This discussion allows me to present the trilemma, showing how efforts to achieve any two objectives come at the expense of the third. I then consider responses, both national and interna-

tional, and draw attention to different responses' approaches to the issue of patent quality. In the concluding section, I consider how an appreciation of the importance of preserving the public domain and knowledge commons – and regarding examination practices that focus on patent quality as a means for doing so – may lead to a reconsideration of the trade-offs.

To be sure, references to resource-poor developing countries, in general, are overly simplistic, as developing countries differ significantly in their degrees of resource scarcity and the particular challenges they face in introducing new patent systems. However, the generalisation, in addition to being practical in facilitating discussion, is not entirely flawed in an analytical sense. All developing countries introducing new patent systems in the wake of TRIPS face a general set of challenges and trade-offs; the subsequent similarities of the trade-offs faced by all developing countries are as interesting as the differences between countries. In the text below, then, I continue to rely on this broad category of 'developing countries', but I also discuss differences among developing countries where relevant.

1. Objectives and trade-offs in patent policy

Fast prosecution of patents, i.e. minimising the time from when an application is filed to when a decision (granting or rejection) is made, is important for both legal and political reasons. Legally, it creates juridical certainty by removing questions of whether the knowledge is privately owned or in the public domain. Applicants want to know whether they own the knowledge or not, so they can proceed with investment and licensing decisions. Potential users want to know if the knowledge is privately owned or not, so they can make their own investment and market decisions (for example, whether to launch potentially infringing products on the market, risking litigation, or whether to negotiate licensing agreements). Politically, governments may seek to reduce the considerable external pressures that many are subject to on account of application backlogs. Countries are routinely criticised for not examining patent applications quickly enough. This is a recurrent theme in the United States Trade Representative's (USTR) annual Special 301 reports, for example, as the USTR tends to regard slow patent examination as an implicit evasion of international

obligations. The pressures do not just come from foreign governments: long examination times and the existence of backlogs are also invoked by patent owners as grounds to request extensions of existing terms.

Countries have an interest in the quality of patents granted. Assuring that patents are granted only for inventions that genuinely deserve protection, that the claims in a patent are not overly broad, and that applicants disclose sufficient information on how their inventions work, are all goals of public policy.[3] Patents are exceptionally strong instruments, in that they provide actors with private rights of exclusion and convert public goods (knowledge) into monopolised private goods (property). On account of the distortions introduced by such strong instruments, the exclusive rights conferred by patents are limited – and one important limitation is that the claimed inventions need to satisfy a set of criteria prior to the knowledge being converted into private property. To put it simply, high (low) quality in patent grants protects (threatens) the public domain and knowledge commons. The importance of patent quality is universally recognised: the U.S. Federal Trade Commission emphasises that patent offices "must protect the public against the issuance of invalid patents that add unnecessary costs and may confer market power" (Federal Trade Commission 2003: 14); in the same vein, the former Chief Executive of the UK Patent Office writes, "[p]atent offices recognise that bad patents have an adverse and unjustifiable effect on competition and hence the public good" (Marchant 2012: 63).

An important qualification here would be for a country that uses patent grants as a signal to attract DFI. In such an instance the definition of 'quality' would change, in that quality might become equated with quantity. Yet even then, the country might have concerns about overly broad claims; or at some point, once the investment arrives and the effects of low-quality patents are felt, it will develop such concerns. In a sense, using patent grants as a signaling device does not eliminate the concern with patent quality so much as postpone it.

To be sure, low-quality patents, once granted, can be challenged and later invalidated, and the availability of this recourse may reduce the imperative of assuring quality at the point of patent examination. Yet invalidating patents is costly and time-consuming. Moreover, eliminating low-quality patents introduces collective action challenges, as the

costs are borne by the challengers alone but the benefits are shared by all (since successful challenge of a patent puts the knowledge in the public domain). The ex post elimination of low-quality patents through challenges thus relies on the existence and operation of complex institutional arrangements. Though such arrangements are known to be effective in some countries and some sectors, such as the pharmaceutical sector in the USA (Hemphill/Sampat 2012), the lessons are not widely generalisable. In fact, while Hemphill and Sampat (2012) demonstrate the effectiveness of the ex post system for dealing with pharmaceutical patents in the US, the mechanism they analyse operates only in the case of pharmaceuticals. Meanwhile, a number of studies point to the problems posed by poor quality patents in other sectors and lament the absence of such mechanisms to deal with them, even in the USA (Bessen/Meurer 2008; Jaffe/Lerner 2006).

Few if any developing countries benefit from ex post mechanisms to deal with low-quality patents. This is an area where the similarities between developing countries are greater than the differences. It is not just smaller and poorer countries that cannot rely on ex post measures; even the largest developing countries will struggle to put such arrangements into place. Indeed, precisely because ex post mechanisms for eliminating low-quality patents are difficult to construct and implement in resource-poor settings, and even where in place may be less effective (Sampat et al. 2012), the objective of assuring patent quality takes on amplified significance in developing countries. Nor is it sufficient to rely on compulsory licenses to deal with poor-quality patents, as such measures only provide temporary relief; the patents remain in effect, excluding all actors, other than the recipient of the compulsory license, from using the protected knowledge.

The direct and binary trade-offs between the speed of patent prosecution and quality of patent grants are straightforward. Countries can reduce backlogs of patent applications by granting patents with cursory examination (or even no examination, such as is the case with registration systems). Doing so reduces quality, however, since many patents that, with more rigorous examination would have been denied or had their claims narrowed, will be granted. Conversely, countries can take steps to assure the quality of all patents granted, both rigorously checking for novelty

and inventiveness along with assuring that applicants have made sufficient disclosure, but that entails more time spent on each individual application and thus comes at the expense of speed.

The 'solutions' to the speed-quality trade-offs would appear to be as straightforward as the dilemmas themselves: increase productivity and hire more examiners. That is, with training of personnel, the introduction of technologies, and improved infrastructure facilities, countries may increase productivity by helping individual examiners increase their output without reducing quality (e.g. technology that simplifies search for prior art can allow examiners to complete more steps in the same amount of time). And more examiners can be hired with increased resource allocation. With more examiners working with better technology, more patent applications can be examined in the same amount of time. In Brazil, for example, increased resource allocations, along with managerial and administrative reforms, have yielded reductions in examination times. By investing to modernise patent office infrastructure, introducing automation procedures for routine tasks, reorganising technical sectors to improve the division of labor,[4] removing abandoned applications from the work backlog, and recruiting more examiners, examination time has been reduced from an average of 11.6 years in 2006 to 5.4 years in 2011; and Brazil aims to reduce the average time to four years by 2015 (MDIC 2012).

While such steps can allow countries to increase speed without affecting quality, doing so only generates a trade-off with a third national policy objective, namely the preservation and optimal deployment of resources. To understand the importance and relevance of this third objective, it is essential to keep in mind that, while patents are not new in developing countries, until recently many developing countries excluded many important technological classes from patentability. For example, until required to do so by TRIPS, few developing countries granted patents in areas such as pharmaceuticals, chemicals, food and agricultural products. And even where patents were formally available, the rights of exclusion tended to be weak and of short duration. With the introduction of new patent regimes that include both broader scope of patentable subject matter and stronger rights of exclusion, the number of patent applications received by patent offices in most developing countries has increased astronomically (WIPO 2011a).

The surge in applications – often in new and highly technical areas – raises significant challenges. Examining patent applications is complex work, not something that can be done by the layman. Good patent examiners are highly skilled and well-trained professionals with technical knowledge, normally with engineering and science backgrounds. Given that such skills are, almost by definition, in relatively short supply in developing countries, an obvious question regards the opportunity costs of deploying 'the best and brightest' as patent examiners. Does it make sense for developing countries' engineers and scientists to work as patent examiners rather than being engaged in the generation and production of knowledge and knowledge-intensive products? While I emphasise the human resource dimension here, to the extent that responses to the large number of applications include the introduction of new technologies and infrastructure, the challenges discussed regard resources more generally.

Again, the case of Brazil illustrates the dilemma: the country's objective of continuously increasing examination speed cannot be met without significant staff increases; administrative, managerial, technological, and infrastructure fixes can only increase productivity to a certain extent. To be sure, increasing the number of examiners is explicitly indicated as a goal in the national development strategy: the government intends to increase the number of examiners by 139% by 2015 (MDIC 2012). Yet Brazil's national development strategy also prioritises increasing the level of innovative activity that takes place within industrial firms, and every engineer and scientist that is working for INPI as a patent examiner is one less engineer and scientist available to local industry.

I am hardly the first to make this observation. The World Bank (2001) questions this allocation of scarce human resources in developing countries. Most trenchantly, Peter Drahos (2010), in his book on patent offices, expresses similar concerns. In noting the highly qualified examiners employed by the patent office in South Korea, for example, Drahos (2010: 238) writes that "[w]hether having so much highly qualified scientific talent locked up in patent examination work is a good innovation strategy is a question worth asking". Drahos answers his own question, concluding that "deploying scarce scientific resources into the rent-seeking machinery of the patent system cannot be part of a productive economic growth strategy, especially not one that takes seriously the idea that produc-

tive human capital is at the core of economic growth" (ibid.: 262). Indeed, Drahos quotes a New Zealand examiner's observation that staffing the patent offices "sucks scientific expertise out of the system" (ibid.).

Note that the focus is on optimal deployment of resources, and not on resource expenditure per se. That is, we are concerned with *opportunity* costs, rather than costs per se. The distinction is important because application, examination, and renewal fees charged by patent offices can make patent systems self-financing. The infrastructure, technologies, equipment, and salaries of the examiners and managers can be covered by the fees charged to users of the system. The concern, however, is with human resources not being used in more developmentally propitious ways. What if, instead of vetting applications for others' proposed technological developments, these talented engineers and scientists were engaged in designing, developing, and adapting new technologies?

Before proceeding, it is worth considering if the opportunity costs might present themselves differently in poorer rather than less poor developing countries. In countries with larger pools of well-qualified, scientific labour, for example, might the costs of diverting some of these people's resources toward patent examination be less acute? That is, it may be that Brazil and India can afford this allocation of human resources more than Honduras and Malawi can. Yet countries such as Brazil and India also have significant innovation gaps, and they also have more innovation potential. We do not, generally, expect innovation to take off in ultra poor countries, but we do expect (or hope) to witness more innovation in middle-income developing countries, i.e. those with more scientific talent. In fact, on account of innovation imperatives and innovation potentials, the opportunity costs of deploying human resources in patent examination may be *greater* in middle-income countries.[5]

Introducing a concern with how resources are deployed allows us to think of patent policy in terms of a trilemma. Figure 1 illustrates the trade-offs, with each combination indicated by an angle of the triangle. The two lines that meet at each angle constitute the objectives emphasised, with the opposite side of the triangle indicating the less emphasised objective. Combination (A), rapid examination with preservation of resources, jeopardises quality, as examiners will end up approving applications of dubious merit. Combination (B), high-quality examination and preserva-

tion of resources, mitigates against the objective of increasing speed, as the length of time in examination of each application will tend to be increased. Combination (C), rapid examination of high quality, necessitates significant consumption of resources (human and otherwise).

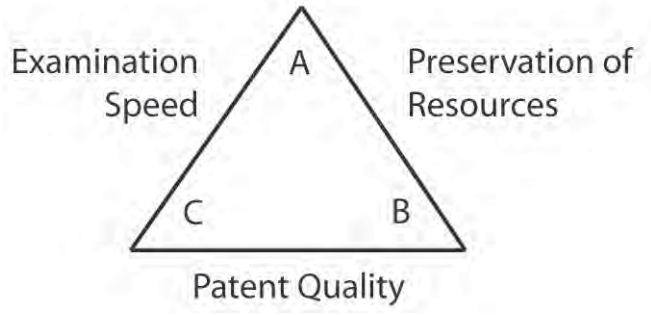

Figure 1: Speed, Quality, and Resources
Source: own elaboration

Many creative options exist for countries to attempt to overcome the trilemma. For example, a country may allow applicants with multiple applications to prioritise – and change the examination order – of their own applications. The result of such a measure is to reduce backlogs and thus increase the effective speed of examination by moving 'important' applications further up the queue, with importance being designated by the applicants themselves. In Argentina, for example, the patent office has allowed this on multiple occasions in specifically designated time periods. When I discussed the trilemma with the Director of Patents at Argentina's patent office (September 2011), he repeatedly emphasised re-prioritisation as the measure that his office most relies upon. And the response has been positive: though the USTR's annual Special 301 reports consistently criticise Argentina's overall IP policies, the USTR also praises this particular practice. Re-prioritisation, thus, constitutes a low-cost way to increase the speed of patent examination (and perhaps quality as well, to the extent that applicants' assessment of importance might be correlated with the quality of these applications), and it does so in a resource-preserving way by assuring that resources are not exhausted on less important patents. Yet while such administrative measures are feasible, alone they are likely to be inadequate; revising the order of examination does not overcome the trade-offs, it just

postpones them. After all, applications jumped over in the queue are not abandoned, but will need to be examined eventually; and in the meantime more applications are received.

Another solution is to allow for robust pre-grant opposition. Virtually all countries allow some sort of opposition, by which 'third parties' (i.e. neither the applicant nor the state) can provide input. Opposition systems vary according to multiple dimensions, including who has the right to provide input, and the timing of procedures relative to the publication of application for or granting of the patent (Amin et al. 2009). A robust pre-grant opposition system, as India has now (and as Japan had in the 1960s–1980s), may allow a wide range of actors from civil society to provide information that becomes part of the legal examination process. Such arrangements can improve the quality of granted patents without necessarily affecting speed or imposing new costs on the state. Yet even pre-grant opposition systems present opportunity costs: talented human resources are being deployed in patent examination, albeit indirectly, rather than engaging in their own innovative and productive activities (similar points can be made about 'crowd-sourcing' and peer-to-peer examination strategies).

Most 'solutions' to the trilemma simply reinforce the trade-offs: there is no getting around the fundamental inability to simultaneously maximise examination speed, patent quality, and resource preservation. Indeed, the only way to avoid the trilemma is to avoid the patent system altogether, and that is not an option for any country that is a participant in the global economy and is or seeks to be a member of the WTO. Countries must choose how to respond to the trilemma and decide which objectives to prioritise. The following section considers some responses at the national and collective levels.

2. International responses to the trilemma

A simple response to the trilemma is to rely on the work done by other countries' patent offices. For example, a country may preserve resources by deferring to the examinations made elsewhere. Prominent steps in this regard consist of cooperation agreements and 'patent prosecution highways'

(PPH). The former refer to agreements (often informal) to exchange information and experiences, the latter refer to formal bilateral accords whereby pairs of countries agree to expedite examination of applications already reviewed by the other. Mexico, for example, has a PPH with the USA and another with Japan (Brazil and the USA initiated, but did not conclude, negotiations for a PPH). These sorts of arrangements can contribute to speed without further expenditure of resources (after all, what the country is doing is attempting to benefit from other countries' resource deployment), but the likelihood of importing inappropriate examination procedures and thus sacrificing quality is high. Consider the Mexico-US PPH, which states explicitly that the objectives are to increase the speed by which Mexico grants patents (IMPI 2011). The agreement essentially conflates speed and quality, as if the way to increase the quality of Mexico's patent examination system is to increase the speed of granting patents.

Developing countries also may obtain technical assistance, which allows them to increase the speed of patent examination without further resource expenditure. Indeed, the 'trilateral' patent offices (USPTO, EPO, JPO) have extensive technical assistance and outreach programs that aim to train examiners and to help developing countries' patent offices deal with the large number of applications they receive. Yet technical assistance is not neutral (May 2004; Matthews/Munoz-Tellez 2006; Drahos 2010); trilateral offices transfer technology, skills, and practices geared to increase examination speed in countries with different conditions and needs than the receiving country. Technical assistance programmes tend to equip and train examiners in developing countries to view, evaluate and assess patents through the same lenses and according to the same criteria as done in developed countries, even though substantive patent laws in combination with national needs and capabilities might suggest that the same patent applications should be viewed and assessed differently. As Drahos (2010) puts it, technical assistance is not geared toward helping recipient countries best develop and implement patent systems to correspond to their own distinct needs but rather to achieve 'invisible harmonization' among national patent systems.

The principal problem with these bilateral cooperation mechanisms (e.g. PPH, technical assistance) is that they export examination practices from countries where patent quality is of less concern to countries where patent quality is of greater concern. In the USA, for example, where elab-

orate ex post arrangements to eliminate low quality patents are in place and function (at least in pharmaceuticals, if not in all sectors, as discussed above), the concern with patent quality may be less acute. However, in developing countries, which generally lack such arrangements, assuring patent quality is that much more imperative. To put it simply, the prevailing North-South cooperative approaches coordinate examination practices and effective definitions of quality between countries where ex post invalidation of granted patents works (or can be expected to work) and countries where ex post invalidation of granted patents does not work.[6]

An alternative form of international cooperation, one that might suffer less from the problems of relying on developed countries' guidance, practices, and technical assistance, is more 'south-south cooperation' on patents. Such cooperation among countries that share a concern with patent quality could, potentially, militate against the problems discussed in the previous paragraphs. That is, countries can work together to assure that patents granted are of high quality, without incurring such high opportunity costs of each country using its own human resources. For all the benefits of examination sovereignty as a policy instrument, there is, after all, a great deal of redundancy in having the same applications assessed by different examiners in each country.

The key for such cooperation to be different from the form of international cooperation discussed above, is that the emphasis must be, explicitly, on patent quality. They must constitute alternative regulatory networks that examine patent applications in accordance with local needs and standards. Latin America offers *potential* instances of this that merit consideration. Brazil's patent office, for example, has an Academy of Intellectual Property and Innovation that holds training courses throughout the region for examiners of various South American and Central American countries. The extent to which these courses are spreading practices to raise quality as opposed to exporting developed-country style standards is unclear and worthy of additional research. After all, Brazil's INPI's own examination practices are changing and, in many dimensions, becoming more harmonised with those of the USPTO and EPO (Shadlen 2011).

Another incipient development from the same region regards the establishment of Prosur, a cooperative agreement between nine South American countries (Argentina, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru,

Suriname and Uruguay). Prosur, which was agreed and launched as a pilot project in 2011, aims "to develop a common platform that allows the integration, exchange of information and system compatibility for the nine participating countries" (WIPO 2011b; Barroso 2011). This technological platform was developed collaboratively by the Brazilian and Argentinean patent offices, and the programme has been launched. Again, the key question of Prosur will regard the sorts of patent examination practices that the programme advances. One can imagine a scenario where Prosur participants, all sharing a concern with quality and thus with minimising the granting of patents on minor innovations that do not entail significant advances to the state of knowledge, may pool resources and share the results of their examiners' searches for prior art, their evaluation and scrutiny of inventive step, and the technical reports. In doing so they might converge in establishing de facto standards that raise quality above the levels they could achieve on their own. Alternatively, one can also imagine a scenario where Prosur members share information to simply speed the granting of patents; in such a scenario south-south cooperation could operate much like north-south (and north-north) cooperation. Thus, more research is required to discern what this incipient form of collaboration consists of and in what (if any) ways collaboration affects national examination practices.

More ambitiously, another approach might be technical assistance from India (and other 'non-traditional donors') to counter the sort of EPO/USPTO socialisation that observers have criticised. This would entail not just sharing information and training locals, but actual provision of resources (i.e. funding examiners) to improve the quality and speed of patent examination. Such technical assistance would have the most relevance in the area of pharmaceuticals, where the Indian examination system has been geared to emphasise quality – and in particular to minimise the granting on patents on incremental pharmaceutical innovations (Kapczynski 2009; Sampat et al. 2012). The ability of Indian pharmaceutical firms to take advantage of such outputs outside of India depends on the patents that are not granted in India not being granted in potential export markets either. Thus, the Indian pharmaceutical industry may have an interest in improving patent quality abroad and harmonising India's arguably 'pro-competitive' standards. Of course, the Indian system itself does not appear to work as well in practice as it does on paper (Sampat et

al. 2012; Sampat/Amin 2013), so the first priority of the Indian government (and local pharmaceutical firms) may be to invest in improving local practices. But as a next step, given the importance of the sector to the national economy, it is not unreasonable to imagine that the Indian government could be prompted to engage in technical assistance of this sort.

3. Conclusion: protecting the public domain

The only way to avoid the patent policy trilemma is to stay out of the patent system. Doing so preserves resources and allows scientists and engineers to discover and invent and build, it eliminates concerns about speed, and it also reduces the number of low-quality patents granted. Yet even that may be misleading, in that the absence of a patent system might undermine quality in another sense – not a problem of too many poor-quality patents, but rather one of too few high-quality patents. Is that a problem? Those who argue against the patent system in its entirety (Palombi 2012) would say no; those who see a role for properly-gauged patent systems in developing countries, and regard the challenge as achieving balance between the relative rights and obligations of owners and users, would maintain that this way of avoiding the trilemma has its drawbacks too. Though this debate cannot be resolved here, even if we were to conclude that 'too few high-quality patents' is not a problem to be worried about and subsequently advocate withdrawal from the patent systems, it is simply not feasible on account of TRIPS; the costs of withdrawal would be too high. The international political economy requires developing countries to join the global patent system if they want to be part of the international trade system, and participation in the global patent system imposes the unavoidable trilemma.

So how to proceed? I suggest that the key issue should be assuring patent quality, and that policy in this area should be informed by a concern with minimising the granting of patents that should be blocked. In regulatory terminology, this amounts to minimising 'false negatives'. False negatives refer to instances where an instrument designed to combat a certain activity is not invoked because the activity is regarded as not possessing the relevant attributes to make it subject to the policy instrument. To minimise false negatives in patent policy means to ensure that examina-

tion criteria that could be deployed to prevent the granting of low quality patents are not inappropriately suspended. Of course, making sure that non-deserving applications are rejected and that deserving applications are granted with appropriate claims (i.e. assuring quality) requires resources. Perhaps the problem in developing countries is not that governments allocate too many resources to the patent system, but that they do not allocate enough. Identifying the 'optimal' level of resource allocation is impossible, but depending on the goal to be achieved the optimal amount may not be the least amount either.

Ultimately, the issue comes down not simply to the level of resource allocation but rather the ends to which the allocated resources are put. If patent offices are more concerned about examination speed than quality, then allocating more resources toward examiners and infrastructure simply leads to more patents (some of dubious quality) being issued more quickly. However, if patent offices serve not as enablers of poor-quality patents but rather barriers against poor-quality patents, then allocating more resources in this way may contribute to preserving the public domain and the knowledge commons. In the latter scenario, increased resource allocation to patent offices may constitute a developmentally beneficial use of resources. As Boyle (2008) suggests, we must take seriously the contributions to economic and social activity that are derived from the public domain, as difficult as it is to measure.

Here an analogy to the military can be made. There are opportunity costs to spending resources on armaments and having bright and well-trained engineers and managers running the military rather than building things and managing companies. Most countries justify such resource allocations on the ground that national defence is a public good; deploying resources for national defence is regarded as a proper use of resources. Debates centre on how resources are deployed: where armies do not protect national defense but rather serve as instruments of repression, the public goods rationale for increased expenditures is much weaker. Can we perhaps then look at the public domain and patent offices through a similar lens, and thus justify the deployment of scarce, skilled human resources in this way too?

If we come to regard preserving the public domain as genuinely worthwhile and valuable, then we may accept the sacrifice of resource preserva-

tion as the appropriate aspect to select. Given the impossibility of achieving all three objectives and the importance of patent quality, not just in a negative sense of avoiding the detrimental effects of low quality patents but also in a positive sense of exploiting the benefits of a rich public domain, it may be advisable to dedicate more resources to patent offices (i.e. subordinate resource preservation) in order to increase speed and quality. Once we come to appreciate the value of the public domain and knowledge commons, then this use of resources seems less problematic. If significant resources are exhausted to reject low-quality applications, this might be good for development. To put it most directly, and again drawing inspiration from Boyle (2008), the engineers and scientists that examine patents can be contributing to – not detracting from – the public interest by protecting the public domain and expanding the knowledge commons. Again, some will maintain that this remains less developmentally-beneficial than staying out of the patent system altogether; this can be debated. However, given the overriding constraint imposed by the international political economy, this may be the least worst response to the patent policy trilemma.

In the final regard, these are not just philosophical but empirical questions: are the resources allocated toward patent examination improving speed *and quality*? Does diverting resources (human, and also financial) from potentially productive activities contribute to *preserving* (rather than eroding) the public domain and *extending* (rather than diminishing) the knowledge commons? There is a case to be made for allocating scarce resources to generate public goods, but the question is whether this happens or not. These are exceptionally difficult things to measure, and it is worth thinking about how to do so.

1 I am grateful to the participants at the authors' workshop, the editors of the special issue, and two anonymous reviewers, for comments and suggestions.

2 This is a multi-objective optimisation problem. Given the lack of data available I am treating this conceptually rather than empirically, focusing on the logics of each objective and the trade-offs between them, and providing some illustrations. I draw inspiration from two prominent conceptual applications of the 'trilemma' along these lines: Cohen (1993) on monetary policy, and Rodrik (2000) on international economic integration.

3 The 'claims' refer to the specific aspects of the invention that are protected in a patent (Merges/Nelson 1990). Ordover (1991) discusses the role of narrowing claims in Japan's post-war technology policy and economic development.

4 The Brazilian patent office had six divisions in 2005, but under Jorge Avila's reorganization this number increased to 20. The intent is to rely on specialisation to increase speed.
5 Middle-income countries also typically receive a larger number of applications, which means more people need to be employed as examiners.
6 The implication throughout this article is that developed countries care less about the quality of granted patents because they have more effective ex post systems for dealing with the ensuing problems that low quality patents create, or at least they have greater abilities to construct such systems. That may be overly generous. Developed countries may also exhibit less concern about quality, de facto, because their patent policies may be captured by powerful actors that benefit from the granting of low-quality patents.

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Abstracts

Patents affect the terms on which knowledge is owned and used, and how knowledge is owned and used is crucially important for development. In this article I analyse the trade offs that countries face in pursuing three objectives in governing the ownership and use of knowledge: the desires to (1) examine patent applications quickly, (2) assure high quality in patents granted, and (3) preserve resources. I present the three objectives as a 'trilemma', whereby only two of three can be maximised simultaneously. I examine diverse national and international responses to the trilemma, and I make the case for emphasising high quality of patent examination as the most important objective. The article thus advances a case for developing countries to invest resources – individually and collectively – in improving patent quality.

Patente bestimmen die Eigentums- und Nutzungsmodalitäten von Wissen und nehmen damit entscheidend Einfluss auf die Entwicklung von Ländern. In diesem Artikel wird argumentiert, dass Länder bei der Regulierung dieser Eigentums- und Nutzungsmodalitäten zwischen drei antagonistischen Zielen abwägen müssen: Erstens einem zeitsparenden Patentprüfverfahren, zweitens einer hohen Qualität der gewährten Patente und drittens einem ressourcensparenden Patentprüfverfahren. Die Trade-offs werden in Form eines „Trilemmas" präsentiert, bei dem höchstens zwei der drei Ziele gleichzeitig erreicht werden können. Der Artikel untersucht unterschiedliche nationale und internationale Antworten auf das Trilemma und hebt die Patentqualität als wichtigstes Ziel hervor.

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