



NOTA DI LAVORO

21.2012

**Cross-Border Intellectual
Property Rights:
Contract Enforcement and
Absorptive Capacity**

By **Alireza Naghavi**, Department of
Economics, University of Bologna and
Fondazione Eni Enrico Mattei

Yingyi Tsai, Department of Applied
Economics, National University of
Kaohsiung

Economy and Society

Series Editor: Giuseppe Sammarco

Cross-Border Intellectual Property Rights: Contract Enforcement and Absorptive Capacity

By Alireza Naghavi, Department of Economics, University of Bologna
and Fondazione Eni Enrico Mattei

Yingyi Tsai, Department of Applied Economics, National University of
Kaohsiung

Summary

This paper studies cross-border intellectual property rights (IPR) as a North-South contract using a Nash bargaining approach and distinguishes between the outcome and its actual enforcement. The absorptive capacity of the Southern country to exploit technology transfer plays a key role in the negotiated level of IPRs and its post-treaty enforcement. The optimal level of IPR protection relates positively to absorptive capacity. This provides a rationale for the longer time-frame provided to least developed countries in Article 66 of TRIPS to implement its provisions. In addition, monitoring is only effective in preventing contract violation up to a critical level of absorptive capacity. We relate this to the US Trade Representative “Special 301” report, which flags countries that deny adequate IPR protection as “priority watch list”. While disputes with less developed economies are promptly resolved, emerging economies, where most losses from copyright piracy originates from, continue to remain on the list.

Keywords: Intellectual Property Rights, TRIPS, Nash Bargaining, Contract Enforcement, Development, Absorptive Capacity, Monitoring

JEL Classification: O34 , F13, F53, D78, L10, O33, C70

Alireza Naghavi is grateful for the hospitality of Sinopac Financial Holdings in Taipei, Taiwan, while working on this paper.

Address for correspondence:

Yingyi Tsai
National University of Kaohsiung
Department of Applied Economics
700 Kaohsiung University Road
Nan-Tze 811 Kaohsiung
Taiwan
Phone: +886 7 5919189
Fax: +886 7 216 9365
E-mail : yysai@nuk.edu.tw

Cross-border intellectual property rights: contract enforcement and absorptive capacity*

Alireza Naghavi[†]

Yingyi Tsai[§]

January 2013

Abstract: This paper studies cross-border intellectual property rights (IPR) as a North-South contract using a Nash bargaining approach and distinguishes between the outcome and its actual enforcement. The absorptive capacity of the Southern country to exploit technology transfer plays a key role in the negotiated level of IPRs and its post-treaty enforcement. The optimal level of IPR protection relates positively to absorptive capacity. This provides a rationale for the longer time-frame provided to least developed countries in Article 66 of TRIPS to implement its provisions. In addition, monitoring is only effective in preventing contract violation up to a critical level of absorptive capacity. We relate this to the US Trade Representative “Special 301” report, which flags countries that deny adequate IPR protection as “priority watch list”. While disputes with less developed economies are promptly resolved, emerging economies, where most losses from copyright piracy originates from, continue to remain on the list.

Keywords: Intellectual property rights; TRIPS; Nash Bargaining; contract enforcement; development; absorptive capacity; monitoring

JEL Classification: O34 , F13, F53, D78, L10, O33, C70

* Alireza Naghavi is grateful for the hospitality of Sinopac Financial Holdings in Taipei, Taiwan, while working on this paper.

[†] University of Bologna, Department of Economics, Piazza Scaravilli 2, Bologna 40126, Italy. Phone: +39-209-8873, Fax: +39-209-209-4080, Email : alireza.naghavi@unibo.it.

[§] Corresponding author: National University of Kaohsiung, Department of Applied Economics, 700 Kaohsiung University Road, Nan-Tze 811, Kaohsiung, Taiwan. Phone: +886-7-5919189, Fax: +886-7-216 9365, Email : yytsai@nuk.edu.tw.

Cross-border intellectual property rights: contract enforcement and the absorptive capacity

1. Introduction

Ever since the ratification of the Trade-related Aspects of Intellectual Property Rights (TRIPS) agreement of 1994, discussions regarding the North-South conflict over intellectual property rights (IPR) protection have assumed an even higher degree of importance. Under the auspices of the World Trade Organization (WTO), TRIPS requires, amongst other things, all member countries to provide a minimum level of IPR protection regardless of the origin of the technology. In fact, this development emerges as a consequence of complaints and lobbying undertaken by innovating firms in the North asserting to have lost billions of dollars due to inadequate IPR protection regimes in the South.

This paper is motivated by the important policy issue that concerns an optimal level of cross-border IPR protection agreed to by means of a contract, and its actual enforcement in the South. The paper particularly attempts to differentiate between the pre- and the post-contract periods, and between countries in the South with respect to their absorptive capacity. This sheds light on two unexplored aspects of IPR protection often neglected in the literature: (i) the optimal level of IPR protection obtained through a contract, (ii) the implementation of the agreed level of IPR standards and its relation to the level of development in the South.

Economic literature on IPRs has so far mostly focused on trade and intellectual property (IP) protection in the pre-agreement phase of TRIPS, treating the signing of the treaty as equivalent to the enforcement of IPRs.¹ Evidence, however, shows that

¹ See among others Chin and Grossman (1990), Deardorff (1992), Helpman (1993), Taylor (1993),

in some regions the level of actual IPR enforcement does not coincide with their commitments outlined in TRIPS. Little work exists to our knowledge that investigate the actual post-TRIPS enforcement of IPRs. For example, Javorcik (2004) presents evidence on the effect of IPRs and their actual enforcement on the composition of foreign direct investment in transition countries. Chiang (2004) shows that the efficacy of trade sanctions for alleged IPR cross-border violation is limited to countries that manufacture and export large values of potentially infringing goods. Thorpe (2008) undertakes an analysis to study the implementation of TRIPS in developing countries.

On the theory side, Banerjee (2011) discusses monitoring as a successful enforcement strategy to fight against piracy as long as the costs involved are not too high. Some recent works have introduced the heterogeneity of southern countries with respect to their absorptive capacity when studying the optimal IPR policy. Kim and Lapan (2008) show that more efficient southern countries prefer higher collective IPR protection than less efficient ones. Ghosh and Ishikawa (2011) show the effect of endogenous investments in absorptive capacity on the export/FDI decision of the northern firm and IPRs in the South. To our knowledge, the bargaining aspect of a mutually agreed IPR protection level determined endogenously through a North-South contract has only been discussed in Lai and Qiu (2003) and Cai and Li (2011). Nevertheless, little or no attention has been paid in the above-mentioned literature to the implementation of the agreed-upon level of IPRs in the South and how this varies with the level of development of the Southern country.

We endogenize the choice of cross-border IP protection in the context of negotiations.

Vishwasrao (1994), Zigic (1998, 2000), Yang and Maskus (2001), Glass and Saggi (2002), Grossman and Lai (2004), Mukherjee and Pennings (2004), Connolly and Valderrama (2005), Naghavi (2007), Mukherjee and Ray (2007), and Leahy and Naghavi (2010).

A Nash bargaining game is applied as a solution concept to study the interactions between the North and the South. We show the mutually agreed stringency of IPR obligations relates positively to the absorptive capacity in the South. We then show that the implementation of a cross-border IPR contract in the South depends on the country-specific characteristics in terms of how technologically advanced the country is. Namely, a larger transfer along with looser IPR protection in less advanced countries bring about an improvement in global efficiency. This works in line with the special and differential treatment provided to least developed countries by article 66 of TRIPS, which highlights the transitional arrangements to implement all the provisions of the agreement and encourage technology transfer.

In accordance with recent evidence, our simple model explicitly separates the contracting stage of TRIPS from the post-agreement enforcement period. Our findings suggest that the incentives to deviate from the contract increases with the absorptive capability of the southern signatory. More specifically, information on such violation is revealed from the active involvement of the North in safeguarding its domestic firms' business interests within a broader context of international negotiations to assure compliance by their counterpart. The opportunity cost of a positive reaction by the southern party is higher, the more advanced is the country. We thus observe that disputes between the North and less developed nations are more likely to be resolved than those with the fast-growing newly emerging economies.

The analysis in the present paper offers policy recommendation by showing that an active participation by the northern government in the IP enforcement in the South can only facilitate better implementation of a cross-border IPR contract when the absorptive capacity of its counterpart is not too high. This supports calls for more direct incentive-oriented interventions that aim to improve the legal infrastructure to facilitate the resolution of IPR issues in the relatively more advanced emerging

economies. These steps can include the promotion of technology transfer or aid packages that aim to improve the legal infrastructure in the South.

The paper proceeds as follows. Section 2 gives a background on TRIPS and the contemporaneous “Special 301” unilateral actions by the U.S., followed by stylized facts that motivate our study. In section 3, we set up the basic model and solve for the benchmark case of a cooperative Nash bargaining game to endogenously determine the optimal IP protection level and the equilibrium transfer payment. Section 4 discusses the post-contract stage to study the enforcement of the IPR agreement and explain how this directly depends on the southern country’s absorptive capacity. Section 5 concludes.

2. TRIPS Enforcement, Special 301, and Emerging Economies

The U.S. is a major producer and exporter of copyrighted materials as well as high technology products, and has therefore suffered considerable losses due to inadequate protection of IPRs abroad. The United States Trade Representative (USTR) has responded through a series of actions such as the amendment of the Special 301 provisions of the Trade Act of 1974. This requires USTR to identify as the “priority watch list” foreign countries that deny adequate and effective protection of IPRs, or fair and equitable market access for U.S. persons that rely on IP protection.²

Even after the TRIPS agreement, which requires mechanisms for the enforcement of rights, the USTR has continued to aggressively use Special 301 to encourage nations to improve their IP laws. Special 301 was amended in 1994 to clarify that a country can be found to deny adequate and effective IP protection even

² The USTR has requested and received submissions from U.S. industries suggesting that several nations be included on priority, priority watch, and watch lists. These submissions include many of the nations, which opposed the TRIPS negotiations and putting it into force, such as India and Brazil.

if it is in compliance with its obligations under the TRIPS Agreement.³ In fact, many developing countries continue to object to the fact that national enforcement measures appear in the proposed TRIPS Agreement. It is deemed that the Special 301 has stimulated the successful implementation of TRIPS in achieving higher levels of IP protection in the trading partners of the U.S.⁴ For example, after negotiations initiated under Special 301, Brazil agreed to the immediate implementation of the TRIPS provisions without resorting to the transition period permitted to developing nations (Doane, 1994).

The success of Special 301 makes it a valuable, albeit controversial, instrument which can police compliance with the terms of the TRIPS agreement and encourage other nations to protect U.S. IP interests. The recent cases of success of the Special 301 can be observed in countries such as Taiwan, Indonesia, Philippines, Ukraine, Egypt, Turkey, Lebanon, and Israel. Thus, the Special 301 actions can play an important complementary role to TRIPS in drawing attention to inadequate IPR and encouraging a rapid resolution of the problem.⁵

FIGURE 1 ABOUT HERE

Along with the priority watch list the USTR systematically publishes the estimated trade losses due to copyright piracy. A salient example of the conflicting

³ Interestingly, Javorcik (2004) measures enforcement by accounting for countries that have been flagged by the U.S. Special 301 as those with weak IPR regimes.

⁴ See Bhagwati and Patrick (1990) for the viewpoint of developing countries on Special 301 and how such unilateral action can be accused of impeding TRIPS by using access to the U.S. markets as a lever.

⁵ Further developments on the better monitoring and enforcement of IPR protection are the Prioritizing Resources and Organization for Intellectual Property (PRO-IP) Act of 2008, which makes it tougher for developing countries to benefit from preferential access to the U.S. market or even continue to enjoy access to federal government procurement markets if they are found to be lacking in the enforcement of IPRs.

interests of the North and the South can be seen in Figure 1, which illustrates the estimated business losses claimed in the U.S. in business software due to foreign IP violation for the period of 2000 to 2007. We have selected the countries based on the threat they pose to U.S. industries in terms of IPR violation by including those that have appeared in the priority watch list at least three times in the period under study. The absence of IPR enforcement in the South regardless of being a signatory to the TRIPS agreement can clearly be seen in the figure, especially in the newly emerging economies of BRIC (Brazil, Russia, India, and China).

FIGURE 2 ABOUT HERE

The (accumulated) economic growth in the same set of countries during 2000-2007 is illustrated in Figure 2 as a proxy to rank their economic potential and thus advancements in their stage of development. In addition, the black line above each bar in the figure indicates the years in which a country was listed in the priority watch list. A simultaneous look at Figures 1 and 2 interestingly reveals that countries with the highest growth potential are responsible for most of the losses that arise from copyright piracy, and have had continuous disputes with the U.S. over IP enforcement: see for instance China, Russia, India, and to a lesser degree Argentina and Venezuela.⁶ An observation of the remaining countries also indicates that countries with slower rates of GDP growth have managed to resolve U.S. enforcement concerns more easily and are no longer in the priority watch list: see for instance Philippines, Indonesia, Egypt, Taiwan, and Lebanon.

A closer examination of a selection of countries in Figure 2 reveals perhaps more interesting details that further confirm our premise on the existence of a relation

⁶ Turkey and Ukraine are exceptions, which have managed to resolve their copyright enforcement issues and were removed from priority watch list in 2007.

between IPR enforcement and the stage of development. For instance, Brazil is no longer listed in the priority watch list since 2006, and is at the same time the BRIC country that has experienced a relatively low accumulated GDP growth. Also, Venezuela was only named on the priority watch list from 2004 just when it started having a positive and substantial GDP growth. This development indicates, by and large, that U.S. and its trading partners constantly haggle over IP protection standard, and that the U.S. monitors closely the progress of the actual protection being implemented by its partners. It also shows that the more advanced countries in the South tend to refuse to perfectly enforce IPRs as committed to in TRIPS, regardless of the U.S. monitoring activities.

3. The Cross-border Intellectual Property Protection Contract

3.1 The Basics

We construct a basic model with two countries, North and South. IPR protection is assumed to be complete in the North, while the level in the South is to be determined by means of a contract reached through cooperative Nash bargaining between the two governments. Two firms, an innovator from the North (denoted by firm n) and one imitator from the South (denoted by firm m), produce a homogeneous goods and compete in the output market. To simplify the analysis, we focus on the southern market by assuming segmented markets so that losses from infringement in the South do not spillover to the northern market.⁷ The firms face an inverse demand function in the South of

$$P(Y) = A - Y = A - (y_n + y_m), \quad (1)$$

⁷ This practically takes into consideration the ban on imports of counterfeit products back to the North given full IPR protection there.

where A denotes the size of the market, and Y is the aggregate of the outputs of firm n (y_n) and firm m (y_m).

We start from a situation, where firm n has undertaken an initial (sunk) investment to bring the product into the market. As we are concerned with issues related to copyrights, we have in mind goods such as business and entertainment software, or music records and motion pictures. After the initial invention takes place, the marginal cost of reproduction is assumed to be zero ($C_n = 0$). Firm m can copy and reproduce a fraction of its rival's product. The extent to which the southern firm can imitate depends on the level of IPR in the South. The reproduction unit cost of the southern firm thus reads

$$C_m = \bar{c}(1 - \beta), \quad (2)$$

where \bar{c} ($< A$) represents marginal cost under no imitation, $\beta \in (0, 1)$ the inverse measure of IPR protection in the South.

The payoffs to the two firms are their profits

$$\pi_i = (P(Y) - C_i)y_i, \quad (3)$$

for $i=n,m$, whereas consumer surplus in the South is

$$CS = Y^2 / 2. \quad (4)$$

Southern welfare adds up to

$$W = \pi_m + CS. \quad (5)$$

We begin our analysis by first deriving the equilibrium output levels in the market stage. We then use this to derive the outcome of the contract, which contains the equilibrium IPR protection level in the South. Starting with the second stage Cournot competition yields an output by each firm of⁸

⁸ For the sake of simplicity and without loss of generality, we assume hereafter that $A = 2, \bar{c} = 1$. For a thorough study of the market size effect see Scotchmer (2004).

$$y_n^*(\beta) = 1 - \beta/3 \quad , \quad y_m^*(\beta) = 2\beta/3, \quad (6)$$

which in turn result in profits

$$\pi_n^*(\beta) = y_n^*(\beta)^2 \quad , \quad \pi_m^*(\beta) = y_m^*(\beta)^2. \quad (7)$$

Southern consumer surplus can then be derived and is

$$CS^*(\beta) = (1 + \beta/3)^2 / 2. \quad (8)$$

3.2 The bargaining game

We now look at the first stage, where the value of β is endogenously determined through negotiations. More precisely, we envisage two governments, G_n and G_m , representing the innovating firm n and the South, respectively.⁹ They negotiate over the agreement set (β, T) before the two firms compete in output, where $T \in (0,1)$ represents a share of northern profits transferred to the South. We think of this as a form of contribution through legitimate (legal) technology transfer to the South as required by article 66.2 of the TRIPS agreement of the WTO.¹⁰ We further define $\zeta \in [0, 1]$ as the absorptive capacity of the South in terms of skills to take advantage of the promotion and dissemination of Northern technology.¹¹ If an agreement is reached, the payoffs to the governments are given by

⁹ The government is introduced as an agent able to negotiate on behalf of its domestic firm in trade disputes; see Spencer and Brander (1983) for the case of government's pre-commitment in subsidies.

¹⁰ More precisely, Article 7 ("Objectives") reads "the protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations."

¹¹ Alternatively, see Scotchmer (2004) on how public sponsorship accounts for cross-border spillover of innovation as an alternative to IP protection when institutions are capable of harmonizing public spending.

$$U_n(\beta, \zeta, T) \equiv (1-T)\pi_n^*(\beta), \quad U_m(\beta, \zeta, T) \equiv W^*(\beta) + \zeta T\pi_n^*(\beta), \quad (9)$$

With the value of β interpreted as a copyright parameter, this setting characterizes the situation, where G_n makes a reciprocal compensation, $T\pi_n^*(\beta)$, to G_m for its efforts in policing domestic infringement of foreign IP. With the South only being able to absorb a share ζ of these returns, the bargaining outcome in equilibrium $\beta \equiv \beta^*(T, \zeta)$ should represent an 'agreed' level of copyright enforcement to be implemented in the South. A low value of β^* could imply better legal infrastructure for administering enforcement policies, more intensive counterfeit and piracy investigation, or the penalization of unauthorized IP use. $\beta^* = 0$ represents the most stringent IPR regime with zero imitation, and intermediate values of β^* imply incomplete enforcement of copyright laws; $\beta^* = 1$ means no protection for foreign IP so that firm n 's product can be freely copied and reproduced. The Nash bargaining solution (NBS henceforth) is used to characterize the bargaining outcome. In the NBS, the negotiated outcome, (U_n^*, U_m^*) , is the solution to:

$$\underset{(U_n, U_m)}{\text{Max}} (U_n - d_n)(U_m - d_m) \quad \text{s.t.} \quad (U_n, U_m) \in \Omega, \quad U_n \geq d_n \text{ and } U_m \geq d_m \quad (10)$$

where $(U_n - d_n)(U_m - d_m)$ is the Nash product, and $d = (d_n, d_m)$ represents the reservation utility of each side of the bargain. To capture a situation resembling the negotiations at the time of the TRIPS agreement, in the following we assume no trade would take place between the two parties if an agreement is not reached ($d_n = d_m = 0$). This allows us to analyze the most basic setup with zero outside option for both parties. Under our assumption of segmented markets, this simply states that the northern firm does not serve the Southern market upon failure of an agreement, while retaining its profits elsewhere. This also blocks the southern firm's access to the production technology, preventing it from entering the market. The next section will

look into the possibility of a positive outside option for the Southern firm subsequent to the agreement and therefore after gaining access to the production technology.

We now solve Equation (10) using (5)-(9) to characterize the efficient level of IPR protection, β^* , in the NBS:

Proposition 1. *When the North and the South agree on mutually accepted standards of global IPR protection, the Nash bargaining outcome is*

$$\beta^* = \frac{3(4\zeta T + 3 \pm \sqrt{9 - 48\zeta T})}{2(2\zeta T + 9)}. \quad (11)$$

Proof: See Appendix.

Notice that the smaller root in Equation (11) leads to a minimum solution of Nash product. We therefore replace the larger root, which ensures that the SOC are satisfied, back into in Equation (9) and use the “split the difference” rule to obtain the amount of transfer, T^* :

Corollary 1. *If the governments equally share the surplus from the NBS, the transfer to the South is*

$$T^* \pi_n^*(\beta^*) = \frac{\pi_n^*(\beta^*) - W^*(\beta^*)}{2} \Rightarrow T^* = \frac{5\sqrt{16\zeta^2 + 9} - 16\zeta - 9}{24(1 - \zeta)^2}. \quad (12)$$

FIGURE 3 ABOUT HERE

Corollary 1 states that the transfer in the NBS is decreasing in absorptive capacity of the South, i.e. $\partial T^* / \partial \zeta < 0$. Replacing (12) back into (11) shows that the agreed protection level is increasing in absorptive capacity, i.e. $\partial \beta^*(T^*) / \partial \zeta < 0$. Moreover, the globally efficient IP protection level is $\beta = 1$ (no protection) for $\zeta = 0$ and $\beta = 0.86$ (weak protection) for $\zeta = 1$.

Our results uncover that a larger transfer along with looser IPR protection in less

advanced countries bring about an improvement in global efficiency. More precisely, the global optimal level of IPR protection in a country increases with its level of development.¹² This can be thought of as the special and differential treatment provided to least developed countries by article 66 of TRIPS, which highlights the transitional arrangements to implement all the provisions of the agreement and encourage technology transfer. Figure 3 depicts the contract on IPR global standards and transfers agreed to through the Nash bargaining process, which we apply in the next section as the commitment by TRIPS.

Next, we must compare the Nash product under the obtained IPR level $\beta^*(T^*)$ with that under full protection $\beta=0$, to find the optimal solution. The Nash product in this case turns to

$$U_n U_m(\beta = 0) = (1 - T)\left(\zeta T + \frac{1}{2}\right), \quad (13)$$

which results in a split the difference transfer equivalent to $T^* = \frac{1}{4}$. The comparison is performed in the Appendix and confirm that the IPR regime from (11) and (12) indeed maximizes the Nash bargaining problem except for very high levels of absorptive capacity $\zeta \approx 1$, in which case $\beta=0$ is the optimal solution. This result has important implications suggesting that strong cross-border IPR protection is optimal if the reference country has reached the later stages of development to absorb and make use of transfers from the North. For this to be true, IPR protection must be accompanied by rather large transfers from the North as a form of compensation.

Yet, the evidence from Section 2 illustrated that the most developed emerging

¹² It is worth noting that our results differ from the outcome obtained in Cai and Li (2011), in which bargaining led to two corner solutions. In particular, the southern government's value for a quid pro quo payment changed its objective function from maximizing domestic social welfare (no IPR protection) to maximizing joint benefits (full IPR protection).

economies are reluctant in enforcing the agreed IPR regulation. We must therefore also consider the case of $U_n U_m (\beta = 1)$, which is a corner solution for β^* when $T=0$ and is further dealt with in Section 4 as a no agreement case with zero transfer and no IPR protection.

4. Post-agreement Monitoring and the Enforcement of IPRs

4.1 Post-TRIPS execution efforts

We now move to the post-agreement phase with all WTO members committed to an international level of IPR protection through TRIPS. Nevertheless, there remains concerns that some governments initially conform to international IP regulations to attract northern firms, yet fail to perform once foreign investments are already in place (Markusen, 2001). We therefore differentiate the negotiations leading up to the signing of the treaty from the dynamics of bargaining that determine implementation in its aftermath.

It is worth emphasizing that we use a wider concept of bargaining less common in literature due to the divorce of compliance from bargaining, that includes for example explicit threats of sanction even after the conclusion of successful negotiations. Jonsson and Tallberg (1998) refer to this as “compliance bargaining”, where detection methods such as a monitoring system to discover and deter non-compliance are used. In the light of incomplete compliance by the southern government to the agreed level of IPR protection, we now show the role of monitoring in the successful enforcement of the treaty obligations. This can be done by adding a stage, after the contract and before output, in which the North monitors enforcement efforts in the South. The Northern government’s activities in policing IP

violations entail a damage of $\lambda \geq 0$ to the South.¹³ This step determines the actual IPR enforcement in the South prior to the market stage.

In the presence of monitoring and enforcement, the two governments can only reach the previously agreed level of IPR protection subject to individual rationality and incentive compatibility constraints. Individual rationality requires the payoff to the North and the South to be strictly positive. Incentive compatibility implies that the payoff to the two governments are higher with monitoring and enforcement than they would be if the treaty is neglected. More precisely, recall that in the case of noncompliance, IPRs are not protected in the South ($\beta = 1$).¹⁴ Therefore, incentive compatibility requires conditions

$$\pi_n^*(\beta^*) \geq \pi_n^*(1), \quad W_m^*(\beta^*) \geq W_m^*(1) - \lambda, \quad (14)$$

to hold. Note that transfers are sunk as they are already made after the conclusion of the agreement based on what the northern firm is expected to earn from the contract; therefore $\zeta T^* \pi_n^*(\beta^*)$ appears negatively (positively) on both sides of the first (second) inequality in (14) and cancel out. Replacing $\beta = \beta^*$ from (11) and (12) and $\beta = 1$ into Equations (5)-(8) it is easy to see that in the absence of monitoring ($\lambda = 0$), these conditions hold for all $\zeta > 0$.

4.2 Absorptive capacity and compliance

We next examine the second-best enforcement mechanism necessary for the South to fulfill its IPR commitment. Monitoring by G_n serves as a form of threat to induce the enforcement of β^* in the South. The North carries out cross-border

¹³ We simply model this as a lump-sum cost to the South, while in a broader context it can be thought of as a punitive tariff or denial of market access.

¹⁴ Recall that both southern profits and consumer surplus are increasing in β at all times.

inspection of its IP interests, and the absorptive capacity of a southern country is the main determinant of the resulting IPR enforcement.

Looking back at welfare in Equation (14) and solving for the threshold $\lambda(\zeta)$ above which the South complies we find:

Proposition 2. *When monitoring by the North entails a cost λ for the South in the case of non-compliance, there exists a threshold*

$$\lambda^* = \frac{405 + 432\zeta T^* - 224\zeta^2 T^{*2} - 15(8\zeta T^* + 9)\sqrt{9 - 48\zeta T^*}}{12(2\zeta T^* + 9)^2} \quad (15)$$

above which the monitoring mechanism induces enforcement. This value is increasing in southern absorptive capacity as $\partial\lambda^/\partial\zeta > 0$.*¹⁵

Proof: Follows directly from (9) and (14).

Proposition 2 states that the incentive compatibility constraint of countries with higher absorptive capacities are harder to satisfy. This implies that a country with higher absorptive capacity can better exploit a lax IPR regime. In other words, the opportunity cost of IPR protection in the South is higher the more advanced is the economy. The Proposition offers an explanation as to why countries at a later stage of development are more reluctant in accepting internationally recognized IP laws regardless of additional monitoring measures.

FIGURE 4 ABOUT HERE

Figure 4 illustrates, for a given λ , the threshold level of absorptive capacity above which the South does not comply to TRIPS. The positive slope of λ highlights that the argument in Lall (2003), that incentives to protect patents increase

¹⁵ The expression has been written in terms of T^* from Equation (12) for the sake of exposition.

as a country develops and builds its own base for innovation, does not necessary hold when dealing with copyright protection.

5. Concluding Remarks

Data on the IPR protection has brought growing doubts about the actual enforcement of the TRIPS agreement, especially in some of the more advanced newly emerging economies. Our study distinguishes TRIPS (the negotiation and its outcome), here treated as a cross-border IPR contract by means of Nash bargaining, from its actual enforcement by the signatories. We introduce the North-South IPR treaty as an outcome of a bargaining process in a cross-border IP protection contract. The findings demonstrate how the optimal IPR protection level obtained through cooperative Nash bargaining varies with the absorptive capacity of a country, reflecting concessions granted to least developing nations in terms of a transition period to adapt to the global set of standards.

The analysis further shows that the implementation of a cross-border IPR contract in the South depends on country-specific characteristics and is more likely to occur for less technologically advanced southern countries. In particular, it provides an explanation why some developing countries do not appear on the Special 301 watch list, or others manage to promptly settle copyright disputes with the U.S. Likewise, it rationalizes why issues with countries that are endowed with better absorptive capacities tend to remain unresolved regardless of the use of Special 301 as a monitoring device.

This is in line with evidence showing that the emerging economies with fast episodes of growth in recent years such as China, Russia, and India, are those that are

associated with substantial trade losses due to copyright piracy, and precisely the countries that are continuously posted in the USTR priority watch list for inadequate IPR enforcement. Our explanation for this stylized fact suggests that these set of countries face a higher opportunity cost of enforcement. They thus find it more favorable to neglect their TRIPS obligation after the agreement phase, in a period when they enjoy high rates of growth. Moreover, threats that arise from monitoring activities are not sufficient for the fulfillment of TRIPS in countries with high absorptive capacities. Other forms of incentive-creating mechanisms besides measures that create a cost for the South may be called for to encourage the implementation of TRIPS in the fast-growing emerging economies.

References

Banerjee, D.S., 2011. On the sufficiency of regulatory enforcement in combating piracy, *Journal of Regulatory Economics*, forthcoming.

Bhagwati, J., and Patrick, H.T., 1990. *Aggressive unilateralism: America's 301 trade policy and the world trading system*, London: Harvester Wheatsheaf.

Cai, D., and Li., J., 2011. Quid pro quo and the enforcement of intellectual property rights protection: A bargaining approach, *Journal of International Trade and Economic Development*, forthcoming.

Chiang, E.P., 1994. Determinants of cross-border intellectual property rights enforcement: The role of trade sanctions, *Southern Economic Journal*, 71, 424-440.

Chin, J., and Grossman, G.M., 1990. Intellectual property rights and North-South trade. In R. Jones and A. O. Krueger (ed.), *The Political Economy of International Trade*. Cambridge, Mass.: Basil Blackwell.

Connolly, M., and Valderrama, D., 2005. Implications of intellectual property rights for dynamic gains from trade, *American Economic Review*, 95, 318-322.

Deardorff, A.V., 1992. Welfare effects of global patent protection, *Economica*, 59, 35-51.

Doane, M., 1994. TRIPS and international intellectual property protection in an age of advancing technology, *American University Journal of International Law and Policy*, 9, 465-497.

Ghosh, A., and Ishikawa, J., 2011. IPR protection and absorptive capacity in North-South trade, mimeo.

Glass, A.J., and Saggi, K., 2002. Intellectual property rights and foreign direct investment, *Journal of International Economics*, 56, 387- 410.

Grossman, G.M., and Lai, E.L.-C., 2004. International protection of intellectual property, *American Economic Review*, 94, 1635-1653.

Javorcik, B.S. 2004. The composition of foreign direct investment and protection of intellectual property rights: Evidence from transition economies, *European Economic Review*, 48, 39-62.

- Jonsson, C., and Tallberg, J., 1998. Compliance and post-agreement bargaining, *European Journal of International Relations*, 4, 371-408.
- Kim, J.-E., and Lapan, H.E., 2008. Heterogeneity of southern countries and southern intellectual property rights policy, *Canadian Journal of Economics*, 41, 894-925.
- Lai, E.L.-C., and Qiu, L.D., 2003. The Northern intellectual property rights standard for the South?, *Journal of International Economics*, 59, 183-209.
- Lall, Sanjaya, 2003. Indicators of the Relative Importance of IPRs in Developing Countries, *Research Policy*, 32, 1657-1680.
- Leahy, D., and Naghavi, A., 2010. Intellectual property rights and entry into a foreign market: FDI vs. Joint Ventures, *Review of International Economics*, 18, 633-649.
- Markusen, J., 2001. Contracts, Intellectual property rights, and multinational investment in developing countries, *Journal of International Economics*, 53, 189-204.
- Mukherjee, A., and Pennings, E., 2004. Imitation, patent protection and welfare, *Oxford Economic Papers*, 56, 715-733.
- Mukherjee, A., and Ray, A., 2007. Patents, imitation and welfare, *Economics of Innovation and New Technology*, 16, 227-236.
- Naghavi, A., 2007. Strategic intellectual property rights policy and North-South technology transfer, *Review of World Economics*, 143, 55-78.
- Office of the United States Trade Representative, <http://www.ustr.org>.
- Scotchmer, S, 2004. The Political Economy of Intellectual Property Treaties, *Journal of Law, Economics, and Organization*, 20, 415-437.
- Spencer, B.J. and Brander, J.A., 1983. International R&D rivalry and industrial strategy, *Review of Economic Studies*, 50, 707-722.
- Taylor, M.S., 1993. TRIPS, trade, and technology transfer. *Canadian Journal of Economics* 26, 625-637.
- Thorpe, P., 2002. Implementation of the TRIPS agreement by developing countries, Study Paper 7, Commission on Intellectual Property Rights.
- UNITED STATES INTERNATIONAL TRADE COMMISSION, 1988, *Foreign Protection of intellectual Property Rights and the Effect on U.S. Industry and Trade*.

Washington DC: Government Printing Office.

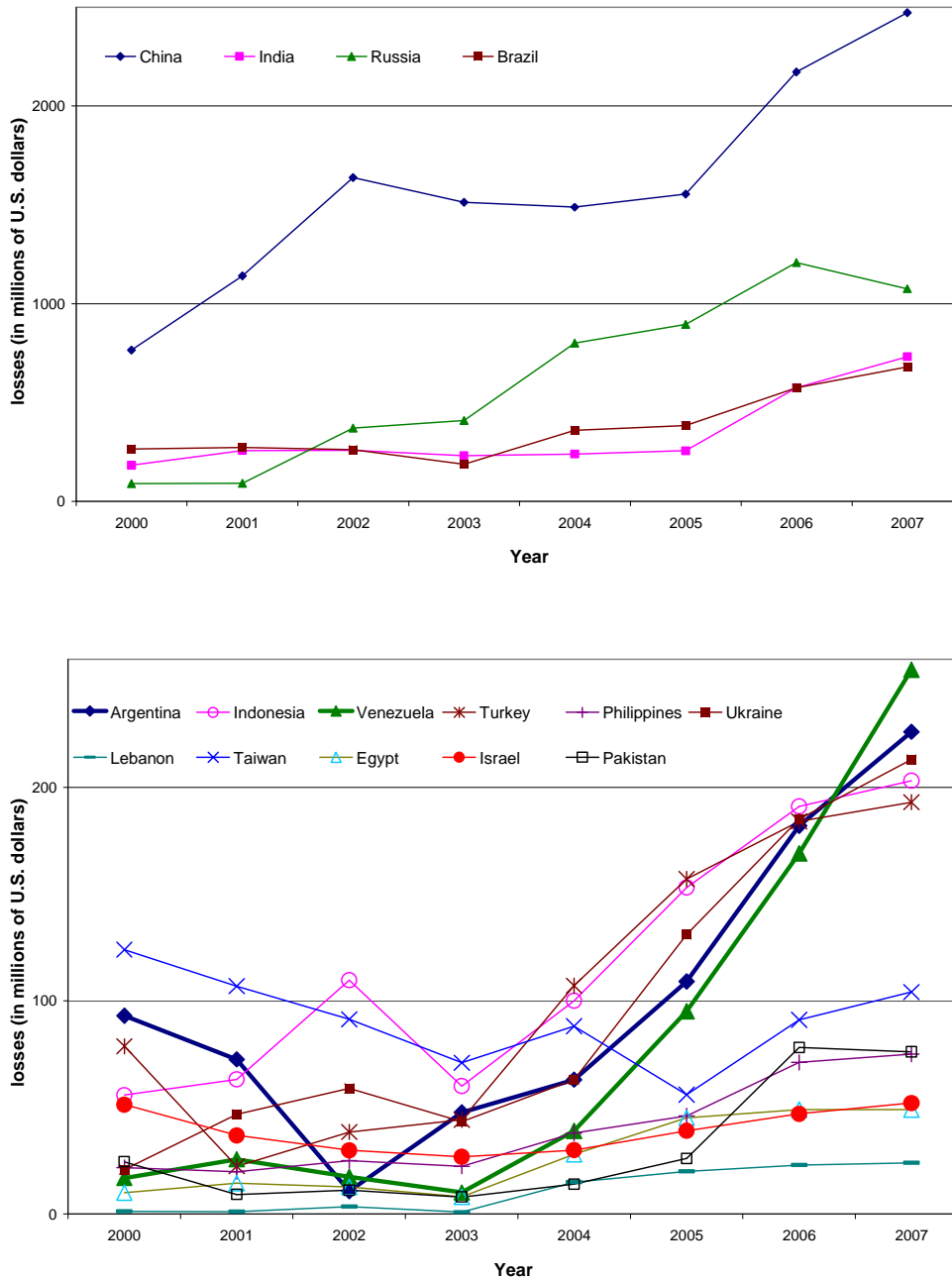
Vishwasrao, S., 1994. Intellectual property rights and the mode of technology transfer, *Journal of Development Economics*, 44, 381-402.

Yang, G., and Maskus, K.E., 2001. Intellectual property rights, licensing, and innovation in an endogenous product-cycle model, *Journal of International Economics*, 53: 169-187.

Zigic, K., 1998. Intellectual property rights violation and spillovers in North-South trade, *European Economic Review*, 42, 1779-1799.

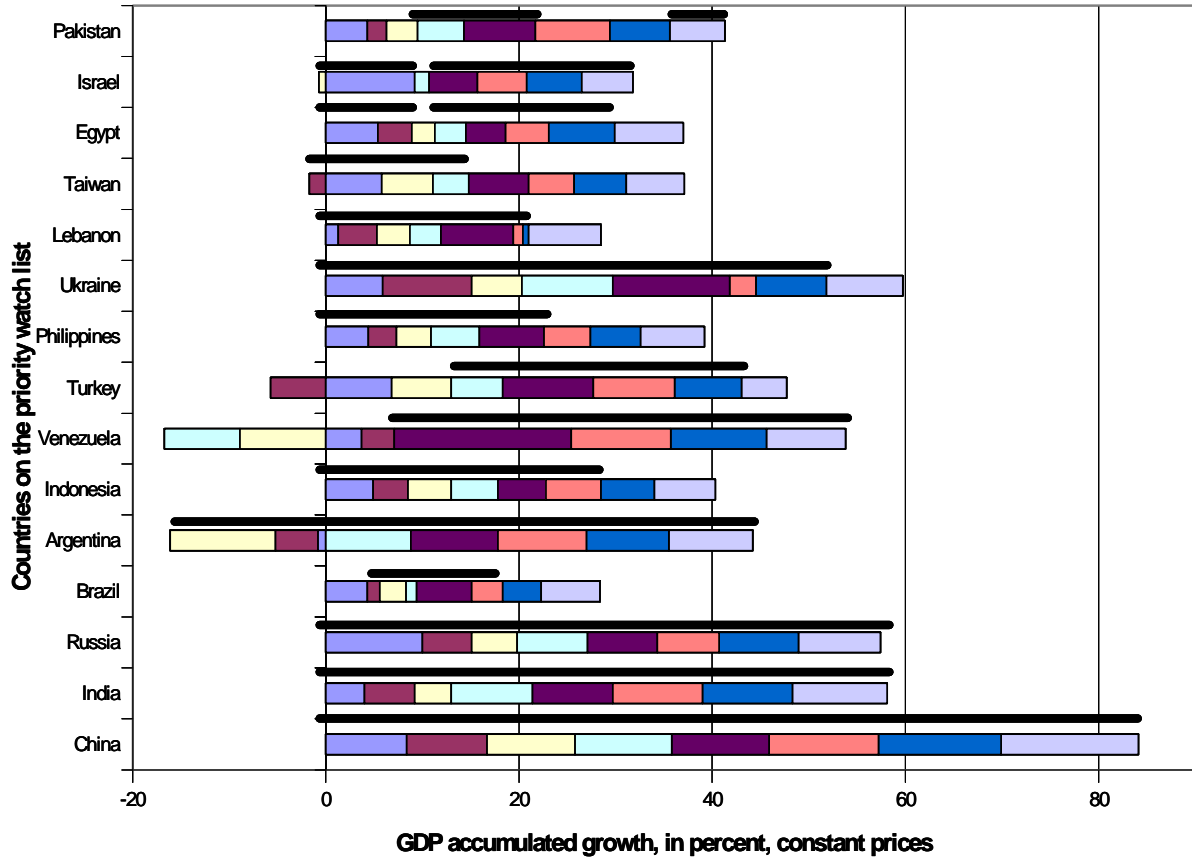
Zigic, K., 2000. Strategic trade policy, intellectual property rights protection, and North-South trade, *Journal of Development Economics*, 61, 27-60.

Figure 1: Estimated trade losses due to copyright piracy



Source: United States Trade Representative Special 301 report in collaboration with the International Intellectual Property Alliance

Figure 2: Economic growth and appearances on the “priority watch list” 2000-2007



Source: World Bank World Development Indicators (Asian Development Bank for GDP growth figures in Taiwan) and the United States Trade Representative Special 301 report in collaboration with the International Intellectual Property Alliance

Figure 3: IPR contract and absorptive capacity

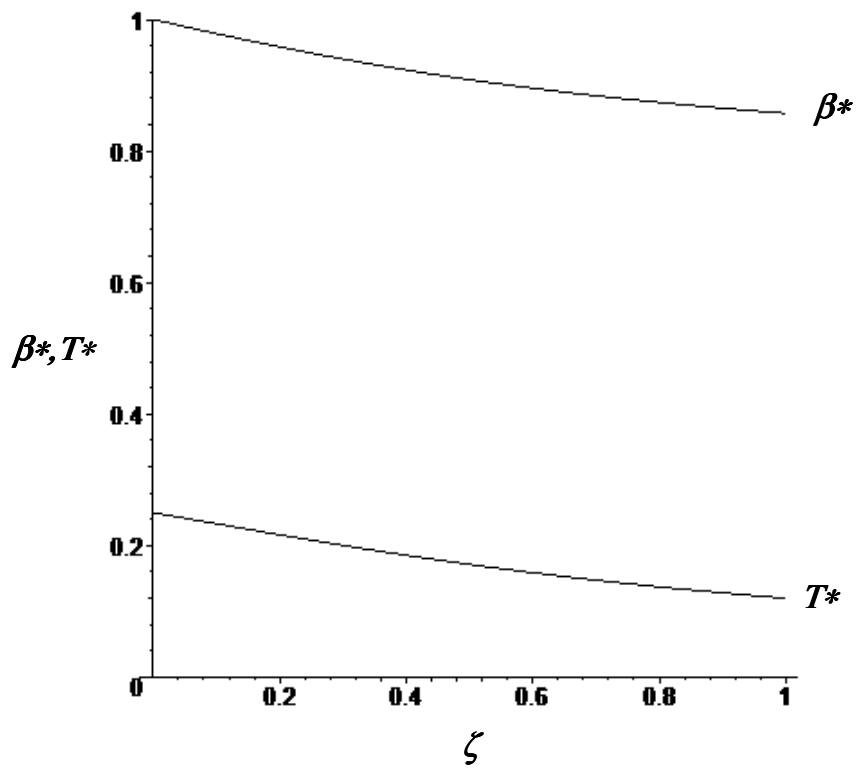
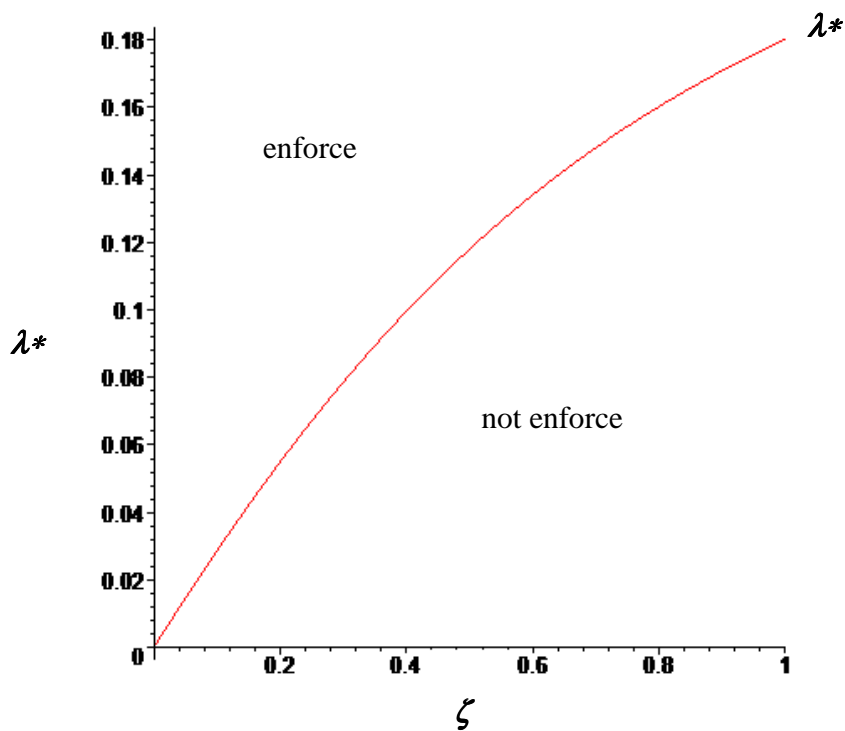


Figure 4: IPR enforcement in the South



NOTE DI LAVORO DELLA FONDAZIONE ENI ENRICO MATTEI

Fondazione Eni Enrico Mattei Working Paper Series

Our Note di Lavoro are available on the Internet at the following addresses:

<http://www.feem.it/getpage.aspx?id=73&sez=Publications&padre=20&tab=1>
http://papers.ssrn.com/sol3/JELJOUR_Results.cfm?form_name=journalbrowse&journal_id=266659
<http://ideas.repec.org/s/fem/femwpa.html>
<http://www.econis.eu/LNG=EN/FAM?PPN=505954494>
<http://ageconsearch.umn.edu/handle/35978>
<http://www.bepress.com/feem/>

NOTE DI LAVORO PUBLISHED IN 2012

CCSD	1.2012	Valentina Bosetti, Michela Catenacci, Giulia Fiorese and Elena Verdolini: The Future Prospect of PV and CSP Solar Technologies: An Expert Elicitation Survey
CCSD	2.2012	Francesco Bosello, Fabio Eboli and Roberta Pierfederici: Assessing the Economic Impacts of Climate Change. An Updated CGE Point of View
CCSD	3.2012	Simone Borghesi, Giulio Cainelli and Massimiliano Mozzanti: Brown Sunsets and Green Dawns in the Industrial Sector: Environmental Innovations, Firm Behavior and the European Emission Trading
CCSD	4.2012	Stergios Athanassoglou and Valentina Bosetti: Modeling Ambiguity in Expert Elicitation Surveys: Theory and Application to Solar Technology R&D
CCSD	5.2012	William Brock, Gustav Engstrom and Anastasios Xepapadeas: Energy Balance Climate Models and the Spatial Structure of Optimal Mitigation Policies
CCSD	6.2012	Gabriel Chan, Robert Stavins, Robert Stowe and Richard Sweeney: The SO₂ Allowance Trading System and the Clean Air Act Amendments of 1990: Reflections on Twenty Years of Policy Innovation
ERM	7.2012	Claudio Morana: Oil Price Dynamics, Macro-Finance Interactions and the Role of Financial Speculation
ES	8.2012	Gérard Mondello: The Equivalence of Strict Liability and Negligence Rule: A « Trompe l'œil » Perspective
CCSD	9.2012	Eva Schmid, Brigitte Knopf and Nico Bauer: REMIND-D: A Hybrid Energy-Economy Model of Germany
CCSD	10.2012	Nadia Ameli and Daniel M. Kammen: The Linkage Between Income Distribution and Clean Energy Investments: Addressing Financing Cost
CCSD	11.2012	Valentina Bosetti and Thomas Longden: Light Duty Vehicle Transportation and Global Climate Policy: The Importance of Electric Drive Vehicles
ERM	12.2012	Giorgio Gualberti, Morgan Bazilian, Erik Haites and Maria da Graça Carvalho: Development Finance for Universal Energy Access
CCSD	13.2012	Ines Österle: Fossil Fuel Extraction and Climate Policy: A Review of the Green Paradox with Endogenous Resource Exploration
ES	14.2012	Marco Alderighi, Marcella Nicolini and Claudio A. Piga: Combined Effects of Load Factors and Booking Time on Fares: Insights from the Yield Management of a Low-Cost Airline
ERM	15.2012	Lion Hirth: The Market Value of Variable Renewables
CCSD	16.2012	F. Souty, T. Brunelle, P. Dumas, B. Dorin, P. Ciais and R. Crassous: The Nexus Land-Use Model, an Approach Articulating Biophysical Potentials and Economic Dynamics to Model Competition for Land-Uses
CCSD	17.2012	Erik Ansink, Michael Gengenbach and Hans-Peter Weikard: River Sharing and Water Trade
CCSD	18.2012	Carlo Carraro, Enrica De Cian and Massimo Tavoni: Human Capital, Innovation, and Climate Policy: An Integrated Assessment
CCSD	19.2012	Melania Michetti and Ramiro Parrado: Improving Land-use modelling within CGE to assess Forest-based Mitigation Potential and Costs
CCSD	20.2012	William Brock, Gustav Engstrom and Anastasios Xepapadeas: Energy Balance Climate Models, Damage Reservoirs and the Time Profile of Climate Change Policy
ES	21.2012	Alireza Naghavi and Yingyi Tsai: Cross-Border Intellectual Property Rights: Contract Enforcement and Absorptive Capacity