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Does Parallel Trade Freedom Harm Consumers in Small Markets?

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Abstract

Countries can freely decide whether to permit or ban parallel trade. Article 6 of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement) – being the only provision in the various international agreements on intellectual property rights that deals with the treatment of parallel trade – preserves the territorial privilege for regulating parallel trade. In a parallel trade model with two heterogeneous countries in terms of market size, we address the question as to whether parallel trade freedom is beneficial or detrimental from a consumer's perspective. In particular, the model suggests that parallel trade freedom is detrimental to consumers in the country with the smaller market as less of a certain product is sold at a higher price. However, parallel trade freedom is likely to be beneficial to consumers in the country with the larger market. We also find that the smaller country, in terms of market size, will remain unserved under parallel trade freedom if the second country is sufficiently attractive in terms of market size.

Keywords: parallel trade, economic analysis of intellectual property rights
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1 Introduction[1]

Parallel trade occurs if goods that are legitimately produced under the protection of a copyright, trademark, or patent are placed into circulation in one country and then imported into a second country without the permission of the owner of the intellectual property rights attached to the product in the second country. For instance, it is permissible for a trading firm to purchase quantities of prescription drugs in Greece and import them into Sweden without the approval of the local distributor that owns the licensed patent rights.[2]

Parallel imported products are not counterfeited or pirated but are legitimate products. However, they may not carry the original producer's warranty and may be packaged differently. Moreover, parallel importing firms ordinarily purchase a product in one country at a price that is lower than the price at which the product is sold in the second country (arbitrage between markets).

In particular, the regulation of parallel trade in the field of pharmaceuticals has become a critical issue in the global trading system, as the welfare effects of parallel imports of pharmaceuticals are generally ambiguous.[3] In particular, there is tension between two major objectives of public policy. On the one hand, a major, long-term public policy objective is to stimulate the innovation and development of new medicines by awarding pharmaceutical producers with a patent on new medicines. In particular, pharmaceutical producers benefit from the higher prices of medicines protected by a patent, and they are, therefore, able to cover high R&D costs. On the other hand, public policy should also ensure broad access to affordable existing medicines in the short-term. Hence, there is a trade-off between access to affordable medicines in the short-term and higher (monopolistic) drug prices that stimulate R&D in the long-term.

[1] *We wish to thank Hans-Bernd Schäfer, Thomas Eger, Keith E. Maskus, Eberhard Feess, Nathalie Jorzik, Jan Peter Sasse, and conference and seminar participants in Hamburg and Zagreb for their valuable comments. Any remaining errors are our own.*

[2] *See Maskus (2001: 1).*

[3] *See Müller-Langer (2009: 168). See also Maskus and Chen (2004) and Danzon and Towes (2003).*

The research-intensive pharmaceutical sector relies heavily on patents.[4] Advocates of strong patent rights for new pharmaceutical products support a global policy of banning parallel trade.[5] For instance, representatives of the pharmaceutical industry argue that if parallel importation of pharmaceuticals were allowed, it would slow down the development of new pharmaceuticals.

However, policy-makers in many developing countries support an open regime of parallel trade. They place a larger emphasis on the affordability of pharmaceuticals than on promoting R&D abroad. For instance, they argue that it is important to be able to purchase pharmaceuticals from the cheapest sources possible. Of course, the vast majority of new inventions in the world have been and are generated by the pharmaceutical companies in developed countries.[6] For instance, the big, multinational pharmaceutical companies, in terms of world market sales, are all based either in Europe or in the U.S., as Table 1 shows.

Table 1 **Pharmaceutical Sales in 2004**

Company	Pharmaceutical sales, in US$ billions (2004)	Based in
Pfizer	55.1	U.S.A.
GlaxoSmithKline	32.8	U.K., U.S.A.
Sanofi-Aventis	27.4	France
Johnson&Johnson	24.7	U.S.A.
Merck	23.9	U.S.A.
Novartis	22.9	Switzerland
AstraZeneca	21.7	U.K.
Roche	17.8	Switzerland
Bristol-Myers Squibb	15.6	U.S.A.
Wyeth	14.3	U.S.A.
Abbott Laboratories	14.3	U.S.A.
Eli Lilly	12.7	U.S.A.
Schering-Plough	6.9	U.S.A.
Bayer	6.4	Germany

Sources: IMS Health, www.pharmacy.org and Thomson Datastream.

[4] *See Ganslandt and Maskus (2004: 1037).*

[5] *For instance, see Barfield and Groombridge (1998).*

[6] *See Sykes (2002: 47).*

The opposition to restricting parallel trade in most developing countries reflects concerns that domestic prices for pharmaceuticals would actually be higher under price discrimination. However, as we will see in the following sections, it is questionable whether this is a valid argument from an economic point of view. In economic parlance, parallel trade of pharmaceutical products limits the scope for third-degree price discrimination of a monopolistic pharmaceuticals producer.[7] In third-degree price discrimination, a monopolistic pharmaceuticals producer sells output to different people or to segmented markets at different prices, but individuals in the same segmented market or group pay the same price per unit of output.[8] If the average income and price elasticities of demand differ across segmented markets, optimal prices for a monopolist are likely to be different in those locations. In general, the monopolist will charge relatively high prices in markets with low price elasticity of demand, typically in highly developed countries; and relatively low prices in markets with high price elasticity of demand, typically in developing countries. Parallel trade limits the scope for third-degree price discrimination in the sense that the price in a low-income country with a high price elasticity of demand is likely to increase as a result of parallel trade, whereas the price in a high-income country with a low price elasticity of demand is likely to fall.[9]

In Section 2, we outline the legal framework regarding parallel trade. In particular, we focus on Article 6 of the Agreement on Trade-Related Aspects of Intellectual Property Rights (henceforth, TRIPS Agreement) and on the regime of regional exhaustion in the EU.

Section 3 gives an overview of the two main strands of the existing formal literature on parallel trade. The first strand of formal papers analyzes the determinants of parallel trade. The second strand involves the dynamic effects of parallel trade on the decision to invest in R&D for new products.

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[7] *Throughout the analysis we assume that a patent on a new pharmaceutical product gives the manufacturing firm that holds the patent a temporary monopoly.*

[8] *See Robinson (1933), Schmalensee (1981), Varian (1985) and Hausman and MacKie-Mason (1988) for an analysis of the effect on social welfare of third-degree price discrimination.*

[9] *See Ganslandt, Maskus and Wong (2005: 216). See also Sykes (2002: 63) and Scherer (1980: 316).*

In Section 4, we first analyze the question of how the manufacturer would choose prices for maximizing profits if parallel trade were prohibited. Then, we provide an analysis of uniform pricing under the threat of parallel trade. The paper concludes with some ideas for further research.

2 Legal Framework Regarding Parallel Trade

The ability of an owner of intellectual property rights to exclude parallel trade stems from the importing country's treatment of the exhaustion of intellectual property rights. On the one hand, under a regime of national exhaustion, intellectual property rights end upon first sale within a country, and right-holders are awarded the right to prevent parallel trade from other countries. Hence, right-owners retain full rights for distributing their goods either themselves or through authorized dealers; this also includes the right to exclude imports.[10] On the other hand, a regime of international exhaustion makes parallel trade from other countries legal, as rights are exhausted upon first sale anywhere. Countries permitting parallel trade do not provide rightful owners with full rights for distributing their goods themselves, effectively invalidating any right to control the import of goods in circulation abroad. A third option is regional or community exhaustion. Under a regime of regional or community exhaustion, rights are exhausted upon first sale within any member country of the community and parallel trade is allowed within the community. However, parallel trade from a non-member country is prohibited.

In the remainder of the section, we first describe the treatment of the principle of the exhaustion of intellectual property rights within the WTO framework focusing on Article 6 of the TRIPS Agreement. The second part gives a description of the treatment of parallel trade in the EU. Finally, the third part elaborates on the different national legal frameworks regarding parallel trade, i.e. in the United States, Japan, Australia, and New Zealand.

[10] *See Maskus (2000a: 208).*

2.1 Parallel Trade and the WTO

In general, countries are free to determine their preferred exhaustion regime for each form of intellectual property rights. Put differently, countries can freely decide on whether to allow or ban parallel trade, as long as they are not bound by an international agreement. However, no international convention or multilateral agreement on intellectual property rights has so far mandated a particular regime of exhaustion of intellectual property rights.[11]

The only provision in the various multilateral agreements of the WTO that explicitly addresses the treatment of parallel trade is Article 6 of the TRIPS Agreement. In particular, American negotiators in the Uruguay Round tried to incorporate a global standard of national exhaustion into the TRIPS Agreement in order to ban parallel trade aimed at protecting innovative industries, such as the pharmaceutical industry, as well as other industries, such as the music and film industries. However, it was impossible to reach such an agreement with regard to a global standard of national exhaustion, because the views on the net benefits of parallel trade were too divergent. For instance, some WTO members such as Switzerland and the U.S.A. tried to include the principle of national exhaustion in the Agreement, while other countries such as Australia, India, and New Zealand defended the principle of international exhaustion.[12] Therefore, Article 6 of the TRIPS Agreement simply prescribes that:

"For the purposes of dispute settlement under this Agreement, subject to the provisions of Articles 3 and 4, nothing in this Agreement shall be used to address the issue of the exhaustion of intellectual property rights."

Hence, it seems that the compromise reached in Article 6 is simply to exclude the treatment of parallel trade from the dispute settlement and to preserve the territorial privilege for regulating parallel trade.[13] Furthermore, Paragraph 5(d) of

[11] *See Fink (2005: 173).*

[12] *See Gervais (2003: 11). See also Chard and Mellor (1989).*

[13] *See Gervais (2003: 11). See also Maskus (2001: 4) and Yusuf and Moncayo von Hase (1992). However, after failing to include the principle of national exhaustion in the TRIPS Agreement, the U.S. then exchanged commitments on limiting parallel trade with Singapore in the U.S.-Singapore Free Trade Agreement, which came into force in 2004; and with Australia in the U.S.-Australia Free Trade Agreement, which came into force in 2005. For instance, the International Intellectual Property Alliance provides a detailed list regarding the current status of U.S. negotiations on Free Trade Agreements with several other countries on http://www.iipa.com./fta_issues.html (accessed December 8, 2008).*

the Declaration on the TRIPS Agreement and Public Health (hereafter "Doha Declaration") affirmed this interpretation. In particular, it prescribes that:

"The effect of the provisions in the TRIPS Agreement that are relevant to the exhaustion of intellectual property rights is to leave each Member free to establish its own regime for such exhaustion without challenge, subject to the MFN and national treatment provisions of Articles 3 and 4." [14]

Indeed, the flexibility to allow parallel trade was crucially important for many developing countries, as they perceived parallel trade to be an effective antidote to concerns about potential price increases for pharmaceuticals, due to strengthened patent protection in the course of the ratification and implementation of the TRIPS Agreement.[15] Furthermore, many developing countries were in favor of permitting parallel trade, arguing that it would allow licensees in developing countries to obtain export markets for high-technology products, such as pharmaceuticals.[16]

2.2 Parallel Trade in the EU

The European Union applies a regime of regional exhaustion to all fields of intellectual property within the Community.[17] Put differently, exhaustion applies upon first sale anywhere in the EU. In particular, the ECJ has held that the free circulation of goods within the common market takes precedence over the protection of intellectual property rights.[18] For instance, in the initial case for patents, *Merck vs. Stephar*, the ECJ came to the conclusion that a holder of a patent who decides to market his product in two EU countries cannot prevent parallel

[14] *The full text is available at http://www.wto.org/English/tratop_e/dda_e/dohaexplained_e.htm (accessed December 8, 2008). See also Garrison (2006: 53).*

[15] *See Maskus (2001: 11) and Maskus (2000a: 209). See also Watal (2001).*

[16] *See Szymanski and Valletti (2005: 714). See also Abbott (1998) who supported the developing countries' point of view, arguing that a restriction on parallel trade was an unjustified inhibition of free trade.*

[17] *Hereinafter the following references to cases are to those of the ECJ if not stated otherwise. See Case C-15/74* Centrafarm BV and Others vs. Sterling Drug Inc., and *Case C-355/96* Silhouette International Schmiedt GmbH & Co. KG vs. Hartlauer Handelsgesellschaft mbH. *See also Barnard (2004: 162) and Maskus (2000b: 1272).*

[18] *See Ganslandt and Maskus (2004: 1038).*

trade between the two countries, i.e. by bringing summary proceedings against the parallel-importing firm for patent infringement, despite differences in patent protection in those countries.[19] Furthermore, the primacy of the free circulation of goods within the common market over patent protection has been upheld by the ECJ's ruling in *Merck vs. Primecrown*. In particular, the ECJ held that the existence of differential national price regulations in pharmaceuticals in the EU does not justify the prevention of parallel trade – i.e. by taking action against the infringement of a patent – from EU countries with lower (regulated) prices to EU countries with higher (less regulated) prices.[20] Indeed, varying national regulatory practices that result in differences in prices for the same pharmaceutical product across EU countries are a major cause for arbitrage, as parallel-importing firms are able to buy pharmaceutical products from wholesalers in countries with low prices such as Portugal, Spain or Greece and resell them in countries with high prices such as Germany, Sweden, or the U.K..[21] Recent evidence regarding parallel trade of pharmaceutical products within the EU shows that parallel trade is a considerable business activity. For instance, the York Health Economics Consortium (2003) estimated that the U.K. market for parallel-traded pharmaceutical products represented around £1,300 million (€2,000 million) in 2002. Furthermore, the consortium estimated that parallel-traded pharmaceuticals accounted for around 10 percent of the total drug bill in Denmark in 2002.[22]

Nevertheless, exhaustion in the EU has important limitations. Most importantly, the ECJ concluded in *EMI vs. CBS and in Silhouette vs. Hartlauer* that exhaustion does not extend to countries outside the common market.[23] Hence, the ECJ established a regime of regional exhaustion or "Community exhaustion" but

[19] *See Case C-187/80* Merck & Co. Inc. vs. Stephar B.V. and Petrus Stephanus Exler. See also the initial cases for trademarks, *Case C-56/64* Etablissements Consten S.A. and Grundigverkaufs-GmbH. vs. E.E.C. Commission*, and for copyrights, Case C-78/70* Deutsche Grammophon Gesellschaft mbH. vs. Metro-SB-Grossmärkte GmbH & Co. K.G*. See also Ganslandt and Maskus (2004: 1038).*

[20] *See Joined Cases C-267-268/95* Merck & Co. Inc. and Others vs. Primecrown Limited and Others. *See also Case C-15/74* Centrafarm BV and others vs. Sterling Drug Inc. *See also Wagener, Eger and Fritz (2006: 230) and Danzon (1998).*

[21] *See Kanavos and Costa-i-Font (2005: 755).*

[22] *See also Valletti and Szymanski (2006: 501).*

[23] *See Case C-51/75* EMI Records Limited vs. CBS United Kingdom Limited. *See Case C-355/96* Silhouette International Schmiedt GmbH & Co. KG vs. Hartlauer Handelsgesellschaft mbH.

rejected the principle of international exhaustion.[24] Furthermore, the ECJ established in *Pharmon vs. Hoechst* that regional exhaustion does not extend to products that are marketed in a member state under a compulsory license.[25]

Another important issue with regard to potential restrictions for parallel trade within the common market is the question of whether supply quotas for foreign wholesalers imposed by original manufacturers are illegal under Article 81 of the EC Treaty. Most importantly, the ECJ concluded in *Bundesverband der Arzneimittel-Importeure and Commission of the European Communities vs. Bayer* that unilateral supply quota systems are not necessarily prohibited under Article 81 of the EC Treaty, as long as they do not constitute a contractual agreement prohibiting parallel trade.[26] Put differently, unilateral restraints on sales from an original manufacturer to foreign wholesalers are not necessarily illegal under Article 81 of the EC Treaty. However, any contractual agreement explicitly prohibiting parallel trade within the common market would be void under Article 81 of the EC Treaty.

To sum up, on the one hand, the EU system basically allows parallel trade within its territory, despite differences in national intellectual property regimes and national price regulations, as long as the product has not been marketed in a member state under a compulsory license. On the other hand, parallel trade from outside the EU is not allowed under the EU system, so that IPR owners can invoke their rights and prevent competition from parallel trade.

2.3 National Legal Frameworks Regarding Parallel Trade

Exhaustion policies vary widely between developed and developing countries and even among developed countries themselves, as the following summary shows.[27]

[24] *See also Szymanski and Valletti (2005: 712).*

[25] *See Case C-19/84* Pharmon B.V. vs. Hoechst AG. *See Maskus (2000b:1272).*

[26] *See Joined Cases C-2/01 P and C-3/01 P* Bundesverband der Arzneimittel-Importeure e.V. and Commission of the European Communities vs. Bayer AG. *See also Smits (2006: 65).*

[27] *See Maskus (2000a: 209). See also Fink (2005: 173), Maskus and Chen (2005, Table 8.1: 193) and Maskus (2001: 3).*

Let us first consider national policies with regard to parallel trade in some high-income countries such as the United States, Japan, Australia, and New Zealand.

The U.S. has a mixed policy on parallel trade. Within its territory, the country employs what is known as the "first-sale doctrine", under which rights of the seller or manufacturer are exhausted when a good has been first placed on the national market outside the vertical distribution chain.[28] Hence, price discrimination against American consumers is ruled out, as U.S. firms cannot prevent consumers from reselling goods anywhere within the United States.

With regard to parallel trade in trademarked goods, the U.S. applies a "common-control exception", affirmed by the U.S. Supreme Court.[29] This rule allows trademark owners to block parallel trade, i.e. by using statutory provisions relating to the exclusion of imports, except when the foreign and U.S. trademark owners are in a parent-subsidiary relationship or when both the U.S. and foreign trademark owners are owned by the same entity. Furthermore, the trademark owner's ability to block parallel trade rests on his ability to demonstrate that the imported product is not identical in quality to the original product and that it could cause consumer confusion. One may argue that these principles suggest that parallel imports of pharmaceutical products are permitted, as they are identical to the original product; however, U.S. law explicitly prohibits the re-importation of pharmaceutical products unless the drug is imported by the original manufacturer of the drug (21 U.S.C. 381 (d)).[30]

Due to the large differences in prices for prescription drugs between the U.S. and Canada, parallel trade in pharmaceuticals became an important issue in the 2004 U.S. presidential elections, as many states encouraged American consumers to buy from parallel-trading internet pharmacies, despite the dubious legality of parallel

[28] *See U.S. Supreme Court case* Bobbs-Merrill Co. vs. Straus*, 210 U.S. 339 (1908). The "first sale doctrine" was later codified in section 109(a) of the Copyright Act of 1976. See also Szymanski and Valletti (2005: 712) and Maskus and Chen (2004: 553).*

[29] *See U.S. Supreme Court case K Mart Corporation vs. Cartier, 486 U.S. 281 (1987). See also Palia and Keown (1991: 49), Maskus and Chen (2004: 553) and Kanavos et al. (2004: 36).*

[30] *See the Prescription Drug Marketing Act of 1987. See Valletti and Szymanski (2006: 500).*

trade in pharmaceuticals under federal law.[31] For instance, Graham and Robson (2000) estimated that brand-name drugs are significantly cheaper in Canada than in the U.S. at both the wholesale and retail level.[32] Indeed, parallel trade has become a considerable business activity, as recent IMS estimates suggest. For instance, compared to 2002, the value of U.S. re-importation of prescription drugs from Canada increased by 134 percent to US$1.100 million in 2003.[33]

Other high-income countries such as Japan, Australia, and New Zealand are substantially more open to parallel trade than the U.S. In Japan, parallel trade in trademarked and patented goods is allowed with two exceptions.[34] First, parallel trade is not allowed in the case in which the original sale of the product was subject to foreign price regulation. Second, parallel trade can be explicitly barred by contractual provisions. Another high-income country that has a far more liberal view on parallel trade is Australia.[35] Furthermore, New Zealand applies a system of international exhaustion with respect to copyright.[36] However, the Copyright Amendment Act 2003 reintroduced a partial ban on the parallel importation of films.

As the summary of exhaustion regimes of various developing and least-developed countries in Table 2 shows, the exhaustion regimes and, thus, the restraints on parallel trade vary widely in the developing world. A large number of countries, such as Argentina, India, and South Africa, apply a regime of international

[31] *See Szymanski and Valletti (2005: 713).*

[32] *See also the 1998 U.S. House of Representatives Minority Staff International Report that compared the international prices of prescription drugs. In particular, the report concluded that prices for pharmaceutical products in Maine were 70 percent higher than in Canada and 102 percent higher than in Mexico.*

[33] *See http://open.imshealth.com (accessed December 8, 2008).*

[34] *For instance, see* BBS Kraftfahrzeugtechnik AG. vs. K.K. Racimex Japan, K.K. Jap Auto Products *(Japanese Supreme Court decision from July 1, 1997).*

[35] *For instance, see the Australian Copyright Amendment (Parallel Importation) Bill 2002 to the Copyright Act 1968, available at http://www.aph.gov.au/LIBRARY/Pubs/bd/2001-02/02bd133.htm (accessed December 8, 2008).*

[36] *See Copyright (Removal of the Prohibition on Parallel Importing) Amendment Act 1998. See also Copyright (Parallel Importation of Films and Onus of Proof) Amendment Act 2003, available at the New Zealand Ministry of Economic Development homepage, http://www.med.govt.nz/ (accessed December 8, 2008). See also Fink (2005: 174).*

exhaustion.[37] More specifically, Argentina and South Africa have enacted laws permitting parallel trade in pharmaceuticals.[38] However, just to name a few, countries such as Brazil, Mexico, and Nigeria adopt a regime of national exhaustion of IPRs and, thus, allow the right-holder to prevent parallel trade.[39]

Table 2 **Summary of Exhaustion Regimes in 28 Developing and Least-Developed Countries**

Country	Exhaustion regime
Argentina	International exhaustion
Barbados	National exhaustion
Belize	National exhaustion
Bolivia	International exhaustion
Botswana	National exhaustion
Brazil	National exhaustion
Colombia	International exhaustion
Costa Rica	International exhaustion
Dominican Republic	International exhaustion
Guatemala	International exhaustion
Honduras	International exhaustion
India	International exhaustion
Madagascar	National exhaustion
Malaysia	International exhaustion
Mexico	National exhaustion
Morocco	National exhaustion
Namibia	National exhaustion
Nicaragua	International exhaustion
Nigeria	National exhaustion
Peru	International exhaustion
Philippines	National exhaustion
Republic of Korea	International exhaustion
South Africa	International exhaustion
Sri Lanka	International exhaustion
Suriname	National exhaustion
Tunisia	International exhaustion
Uruguay	International exhaustion
Venezuela	International exhaustion

Source: WIPO (based on notifications made by Members to the WTO), Kanavos et al. (2004), Maskus and Chen (2002), Thorpe (2002), and Garrison (2006).

[37] *See Kanavos et al. (2004: 39).*

[38] *See Section 15C of the South African Medicines and Related Substances Control Amendment Act, 1997.*

[39] *See the analysis of the intellectual property laws on over 70 developing and least-developed countries undertaken by Thorpe (2002).*

To summarize, exhaustion regimes and, thus, the restraints on parallel trade vary widely between developed and developing countries and even amongst developed countries. Furthermore, these differences in exhaustion regimes and the corresponding divergent views on the net benefits of parallel trade have created a fierce debate in recent years.

3 Literature on Parallel Trade and R&D for Pharmaceuticals

Before proceeding with the model, we will give an overview of the two main strands of the existing formal literature on parallel trade.[40] First, the vast majority of formal papers applying game-theoretic tools analyzes the determinants of parallel trade, i.e. price discrimination by monopolistic manufacturers, vertical price control by multinational enterprises, or national price regulations. The second and limited strand of literature involves the dynamic effects of parallel trade on the decision to invest in R&D for new products, which is certainly a crucially important issue for the research-intensive pharmaceutical industry.

3.1 The Determinants of Parallel Trade

Maskus (2000a; 2000b) provides an excellent overview of the economic theories on the causes of parallel trade and the main arguments in favor of banning parallel trade.

First, in many circumstances efficient international distribution of goods and services requires multinational enterprises that typically build markets through exclusive territorial dealership rights, in order to vertically control the operations of their official licensees. Nevertheless, in foreign markets it may be difficult to enforce private contractual provisions prohibiting sales outside the authorized

[40] *For an overview of less formal policy-oriented reviews on parallel trade see Szymanski and Valletti (2005: 715). See Tarr (1985), Danzon (1998), Darbà and Rovira (1998), NERA et al. (1999), and OECD (2002).*

distribution chain so that parallel trade may occur.[41] In particular, Maskus and Chen (2004) elaborate on this idea and offer a sophisticated theory of parallel trade in the context of vertical price controls.[42] They analyze the nature of contractual relationships between a domestic manufacturer and a foreign, independent and exclusive distributor through which the manufacturer sells his product abroad in order to determine the optimal level of parallel trade. In particular, the manufacturer offers the distributor a two-part wholesale tariff consisting of a wholesale price and a franchise fee. The analysis suggests that the possibility of parallel trade affects the manufacturer's pricing decision when fixing the wholesale price it charges the foreign distributor. Furthermore, the threat of parallel trade may reduce vertical pricing efficiency and, thus, reduce social welfare. Maskus and Chen (2004) conclude that the effect of parallel trade on global welfare is not unambiguous. In fact, they show that global welfare is U-shaped with respect to the cost of engaging in parallel trade, i.e. transportation costs. First, suppose that parallel trade costs are very low, i.e. transportation costs tend toward zero. In this case, Maskus and Chen (2004) conclude that the manufacturer cannot deter parallel trade in equilibrium by raising the wholesale price and, thus, that a welfare-reducing distortion in the vertical pricing scheme is not created. Put differently, parallel trade has good welfare properties if trade costs are sufficiently low, as it reallocates goods between the two countries without creating welfare-reducing distortions in the vertical pricing scheme. However, consider now the other extreme case, that parallel trade costs are so high that parallel trade is not feasible. In this case, the authors conclude that parallel trade is not a real threat and that the manufacturer sets an efficient wholesale price. If, however, trade costs are neither too low nor too high, the manufacturer can deter parallel trade by raising the wholesale price and, thus, reduce vertical pricing efficiency. Finally, the authors suggest that the optimal policy regarding parallel trade shall either reduce any existing trade barriers and, thus, trade costs as much as possible or raise trade costs as much as possible. The optimal policy should not leave trade costs at some intermediate value.[43]

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[41] *See Maskus (2000b: 1277). See also Maskus and Chen (2002).*

[42] *See also Gallini and Hollis (1999) who explore the nature of the contractual relationships between trademark or copyright owners and authorized distributors that may employ trademark and copyright law to prevent parallel trade.*

[43] *See Maskus and Chen (2004: 561).*

A second determinant for parallel trade is that parallel importing firms have the incentive to free ride on investments in marketing as well as on the before- and after-sales services of official licensees and authorized distributors.[44] For instance, assume that an authorized distributor in the territorial market A invests in marketing and sales activities that are associated with the sale of a certain product in market A. Consequently, the distributor in market A will charge a markup in addition to the procurement cost so that he can earn a return on those investments. Furthermore, suppose that the marketing and sales activities mentioned above are substantially cheaper in the territorial market B, or that they are not even provided by the authorized distributor in territorial market B. In this case, parallel importing firms that purchase the product in market B and resell the product in market A free ride on the investments in marketing and sales services made by the official distributor in market A.[45]

Third, in some industries such as the pharmaceutical industry, national governments intervene in private markets by regulating prices in order to achieve particular social objectives, i.e. to make medicines affordable for low-income consumers and to limit public health budgets. As these government interventions result in significant international price differences, there is a potential for arbitrage between markets, as parallel importing firms may purchase a certain product in more regulated (lower-price) markets and resell the product in less regulated (higher-price) markets.[46] In a recent paper, Jelovac and Bordoy (2005) identify international differences between the regulatory regimes in the pharmaceuticals area as a main determinant of international price discrimination.[47] In particular, the authors explore the welfare implications of permitting parallel trade of pharmaceutical products in a model in which countries may differ along two dimensions. First, countries may be different in terms of governmental health insurance reimbursement policies, as is reflected in the patient's level of co-payment for buying a pharmaceutical product. Second, countries may differ in terms of drug needs, as is reflected in the distribution of the valuations for the

[44] *See also Chard and Mellor (1989) and Barfield and Groombridge (1998).*

[45] *See Maskus (2000b: 1275), Maskus (2000a: 212), and Fink (2005: 176).*

[46] *See also Danzon (1997).*

[47] *See also Szymanski and Valletti (2005: 715).*

pharmaceutical product among their population. In particular, Jelovac and Bordoy (2005) show that parallel trade increases total welfare when countries share the same health system and only differ in the distribution of the valuations for the pharmaceutical product among their population. In this case, parallel trade leads to an efficient re-allocation of consumption from consumers with a relatively low valuation of the pharmaceutical product in the exporting country towards consumers with a relatively high valuation of that product in the importing country. If, however, the countries only differ in terms of their health insurance reimbursement policies, parallel trade decreases total welfare, as it re-allocates drug consumption from consumers with relatively high valuation of the pharmaceutical product towards consumers with relatively low valuation of that drug. However, Jelovac and Bordoy (2005) do not consider the dynamic effects of parallel trade on R&D for new pharmaceutical products.

In another recent paper, Ganslandt and Maskus (2004) also take into account international differences between the regulatory regimes in the pharmaceuticals area. The authors focus in particular on the econometric analysis of the price impact of parallel trade in pharmaceutical products within the European Union. Interestingly, despite the importance of parallel trade from a welfare perspective, their analysis is the first systematic economic investigation into the price impacts of parallel trade in pharmaceuticals. In particular, Ganslandt and Maskus (2004) explore the effect of the entry of parallel traders on the prices of pharmaceutical producers in Sweden from 1994 to 1999. Prior to Sweden's entry into the European Union on January 1, 1995, parallel trade in pharmaceuticals was prohibited. However, after its entry Sweden had to adopt the EU-wide principle of exhaustion of patent distribution rights and, thus, permitted parallel trade. Therefore, the Swedish market provides a natural example for testing and estimating the effect of the exogenous shock to the patented pharmaceutical market, due the introduction of parallel trade. Ganslandt and Maskus (2004) find that the prices of pharmaceutical products subject to competition from parallel trade fell relative to other pharmaceutical products in the period from 1994 to 1999. In particular, the authors conclude that parallel trade significantly reduced prices, by 12-19 percent, relative to other pharmaceutical products not subject to competition from parallel trade. Arguably, parallel trade represents a significant form of competition in Sweden.

Finally, Richardson (2002) analyzes a two-stage game in which welfare-maximizing national governments simultaneously choose whether to permit or prohibit parallel trade in the first stage. In the second stage, a monopolistic manufacturer of a homogenous good sets a price for that good in each country. By assumption, welfare in the country in which the monopolist is located is given by the sum of the domestic consumer surplus and the global profits of the monopolist. However, welfare in all other countries is simply domestic consumer surplus. The author shows that it is a global Nash equilibrium for all countries to permit parallel trade, resulting in a globally uniform price for the product. The idea behind this result is the following. On the one hand, the countries that prefer to permit parallel trade are those countries that would be discriminated against if parallel trade were prohibited, i.e. countries with a high-price market and with a relatively low price elasticity of demand. Those countries can prevent price discrimination by permitting parallel trade. On the other hand, those countries that might favor discrimination, i.e. countries with a low-price market and with a relatively high price elasticity of demand, cannot enforce price discrimination on a global scale when countries with a high-price market permit parallel trade. Finally, he examines more realistic settings, taking tariffs and lobbying by producers into account in order to analyze the question as to why barriers to parallel trade can actually be observed in practice. However, Richardson (2002) does not take into consideration the dynamic effects of parallel trade on the monopolist's decision to invest in R&D for new products.

3.2 Dynamic Effects of Parallel Trade on the Investment in R&D

As previously mentioned, the question as to how much a monopolistic manufacturer is willing to invest in R&D for new products is clearly of crucial importance to the research-intensive pharmaceutical industry. However, the literature on this issue is rather limited. To the best of our knowledge, Valletti and Szymanski (2006), Szymanski and Valletti (2005), Valletti (2006), Rey (2003), and Li and Maskus (2006) are few exceptions who look at the dynamic aspects of parallel trade in the context of R&D for new medicines.

In particular, this issue has been addressed in a recent paper by Valletti and Szymanski (2006) who have extended the well-known analysis of Malueg and Schwartz (1994) by endogenizing the quality of the good sold. More specifically, Valletti and Szymanski (2006) consider a model of product innovation in which a higher investment in R&D enables the manufacturer to discover products with higher quality. In particular, Valletti and Szymanski (2006) analyze a two-stage game in which a manufacturer chooses the quality of the product sold in the first stage and then chooses prices in the second stage. Furthermore, Valletti and Szymanski (2006) discuss the following basic trade-off between the positive *ex post* welfare properties of parallel trade and the negative *ex ante* impact of parallel trade on aggregate welfare, respectively. In the second stage of the game, taking the level of product quality as fixed, a uniform pricing regime induced by parallel trade *ex post* results in higher aggregate welfare as long as demand dispersion across markets is sufficiently low. However, in the first stage of the game, the threat of parallel trade reduces *ex ante* the incentive to invest and, thus, results in lower product quality.

In a recent paper, Szymanski and Valletti (2005) analyze the policy implications of parallel trade in a model of vertical product differentiation with endogenous product quality. However, Szymanski and Valletti (2005) also take into account the possibility that national governments may impose price caps as well as compulsory licences on patented products. Szymanski and Valletti (2005) conclude that parallel trade destroys the incentives to invest in R&D for new products if the national government of a foreign country issues a compulsory license on the patented product and unilaterally sets a fixed price equal to marginal cost to be paid to the patent holder. If, however, the manufacturer has the option to either supply a high-quality product or a low-quality product to the foreign country and the foreign government offers the manufacturer a binding contract to issue a compulsory license at a capped price only for the low-quality product, then parallel trade has no effect on investment incentives.[48]

In another recent game-theoretic article, Valletti (2006) analyzes the question of how a uniform pricing regime induced by parallel trade *ex ante* affects the

[48] *See Szymanski and Valletti (2005: 735).*

incentives of a monopolistic manufacturer of pharmaceuticals to invest in R&D for new pharmaceutical products where the level of investment affects the quality of the new pharmaceutical product. Valletti (2006) assumes that the markets in which the manufacturer sells his products differ in terms of the marginal cost of manufacturing and delivering the product as well as in consumer demand in terms of the maximum willingness-to-pay of consumers. However, in his analysis of the incentives to invest in R&D, Valletti (2006) concludes that two trade-offs arise. On the one hand, when differential pricing is demand-based, uniform pricing induced by parallel trade has good *ex post* welfare properties but bad *ex ante* properties in terms of lower incentives to invest in R&D in order to obtain a better-quality product. On the other hand, when differential pricing is cost-based, uniform pricing induced by parallel trade has bad *ex post* welfare properties but good *ex ante* properties in terms of higher incentives to invest in R&D in order to obtain a better-quality product.

Rey (2003) provides another formal analysis that looks at the dynamic aspects of parallel trade. As in most countries pharmaceutical products are not directly purchased by consumers but by national governments at a regulated price. Rey (2003) analyzes the relationship between pharmaceutical companies and national governments in a game where two national governments *H* and *L* contribute towards spurring investment through regulated prices. On the one hand, government *H* has a high willingness to pay and places strong emphasis on high levels of R&D for new medicines. On the other hand, government *L* has a low willingness to pay and places less emphasis on high levels of R&D for new medicines. In particular, the author shows that, once parallel trade is permitted, there is an equilibrium where government *H* reduces its contribution to R&D and sets a lower price, while government *L* maintains the same policy as in the absence of parallel trade. Put differently, in this equilibrium parallel trade leads to a uniform alignment on the lowest level of R&D, which adversely affects both countries due to reduced incentives to invest in R&D for new medicines.

Finally, in a recent article Li and Maskus (2006) extend the model set out by Maskus and Chen (2004), as mentioned above, to a framework with endogenous investment in process innovation. In particular, Li and Maskus (2006) analyze the impact of parallel trade on cost-reducing R&D in a vertical-pricing model in which

a manufacturer invests in cost-reducing R&D and sells its product in another market through a distributor. They show that the distortions associated with parallel trade reduce the monopolist's incentive to invest in cost-reducing R&D.

4 Parallel Trade and Pricing Strategies

Consider a model with two countries A and B. Demand for a specific pharmaceutical product in country A is

$$D_A(p_A) = \xi a - bp_A \tag{1}$$

with $\xi > 1$. p_A denotes the price in country A. The pharmaceutical product is produced by a monopolistic manufacturing firm that holds a patent on the medicine in both countries. For simplicity, we assume that the marginal costs of production c are equal to zero in both countries. This is a common assumption in models that deal with the strategic decisions of pharmaceutical companies, as the marginal cost of production are negligibly small compared to the cost of research and development. Demand for the pharmaceutical product in country B is

$$D_B(p_B) = a - bp_B . \tag{2}$$

ξ is a measure for the homogeneity of the two countries. If ξ tends towards 1, the two countries are virtually homogenous. Put differently, the higher the ξ, the more heterogeneous are the two countries in terms of market size.

In the following sections we first analyze the question as to how the manufacturer would choose prices for maximizing profits if he directly served customers in both countries and parallel trade were prohibited. This section is then followed by an analysis of uniform pricing under the threat of parallel trade.

4.1 Third-Degree Price Discrimination in the Absence of Parallel Trade

We assume that the manufacturer is given the right to prevent parallel trade and that he can engage in third-degree price discrimination. The manufacturing firm maximizes profits generated in country A according to

$$\max_{p_A}(\xi a - bp_A)p_A, \tag{3}$$

which gives the following first order condition

$$\xi a - 2bp_A = 0. \tag{4}$$

The profit maximizing (monopolistic) price is consequently

$$p_A^* = \frac{\xi a}{2b}. \tag{5}$$

Furthermore, the manufacturing firm maximizes profits generated in country B according to

$$\max_{p_B}(a - bp_B)p_B, \tag{6}$$

which gives the following first order condition

$$a - 2bp_B = 0. \tag{7}$$

The profit maximizing price is consequently

$$p_B^* = \frac{a}{2b}. \tag{8}$$

By looking at (5) and (8), it becomes apparent that in the case of national exhaustion and price discrimination, the manufacturing firm will set a price p_A^* in country A that exceeds the price p_B^* in country B, as the price elasticity of demand in country A is lower than that in country B, seeing as $\xi > 1$. By inserting (5) into (1) we have

$$D_A(p_A^*) = \xi a - b\left(\frac{\xi a}{2b}\right) = \frac{\xi a}{2} \cdot \tag{9}$$

Moreover, by inserting (8) into (2) we obtain

$$D_B(p_B^*) = a - b\left(\frac{a}{2b}\right) = \frac{a}{2} \cdot \tag{10}$$

Correspondingly, total profit $\Pi(p_A^*, p_B^*)$, defined as the sum of the profit generated in country A, $\Pi_A(p_A^*)$, and the profit generated in country B, $\Pi_B(p_B^*)$, is given by

$$\Pi(p_A^*, p_B^*) = \Pi_A(p_A^*) + \Pi_B(p_B^*) = \frac{\xi a}{2b}\frac{\xi a}{2} + \frac{a}{2b}\frac{a}{2}$$

$$\Leftrightarrow \Pi(p_A^*, p_B^*) = \frac{(\xi a)^2 + a^2}{4b} \cdot \tag{11}$$

Interestingly, we can see from (11) that the total profit of the monopolist increases if ξ increases. Put differently, the higher the market size in country A for a given a and b, the higher is the monopolist's total profit under a regime of national exhaustion and price discrimination. Comparing (5) to (8), we find that the difference between the profit-maximizing price in country A and the profit-maximizing price in country B increases if countries are increasingly heterogeneous in terms of market size.

4.2 Uniform Pricing under the Threat of Parallel Trade

In this section we shall show that the following proposition holds.

Proposition 1: *The market in country B will remain unserved under parallel trade freedom if the attractiveness of country A in terms of market size is sufficiently high.*

In the presence of parallel trade, the manufacturer will charge a uniform price in order to prevent the occurrence of parallel trade in the first place.[49]

In this case, the total profit of the manufacturer is given by

[49] *See also Schmalensee (1981) and Varian (1985).*

$$\bar{\Pi} = a\bar{p} - b\bar{p}^2 + \xi a\bar{p} - b\bar{p}^2 \quad . \tag{12}$$

We obtain:

$$\frac{\partial \bar{\Pi}}{\partial \bar{p}} = a - 2b\bar{p} + \xi a - 2b\bar{p} = 0$$

$$\Leftrightarrow \bar{p}^* = \frac{a}{4b}(1+\xi) . \tag{13}$$

By inserting (13) into both (1) as well as (2), we obtain $\bar{q}_A^* = \frac{a}{4}(3\xi - 1)$ and $\bar{q}_B^* = \frac{a}{4}(3 - \xi)$ respectively. $\bar{q}_A^*$ is always positive as $\xi > 1$. Note, however, that $\bar{q}_B^*$ is only positive as long as $\xi < 3$. Intuitively, if country A is very attractive in terms of market size as compared to country B, i.e. $\xi \geq 3$, it would be optimal for the manufacturer to set a uniform price that is so high that the market in country B remains unserved. Stated differently, if country A is sufficiently attractive in terms of market size, parallel trade freedom may result in the collapse of the entire market in country B (Proposition 1). Consequently, the legal authorities in country B may have an incentive to set a price ceiling in country B or to impose a fine on the manufacturer for refusal to supply in order to protect domestic consumers.

Nevertheless, in the following we will show that $p_B^* < \bar{p}^* < p_A^*$. First, we show that $p_B^* < \bar{p}^*$ as $\xi > 1$ [see (8) and (13)].

$$\begin{aligned} & p_B^* = \frac{a}{2b} < \bar{p}^* = \frac{a}{4b}(1+\xi) \\ & \Leftrightarrow 2 < 1 + \xi \\ & \Leftrightarrow 1 < \xi \quad \square \end{aligned} \tag{14}$$

Second, we show that $\bar{p}^* < p_A^*$ as $\xi > 1$ [see (5) and (13)].

$$\begin{aligned} & \bar{p}^* = \frac{a}{4b}(1+\xi) < p_A^* = \frac{\xi a}{2b} \\ & \Leftrightarrow 1 + \xi < 2\xi \\ & \Leftrightarrow 1 < \xi \quad \square \end{aligned} \tag{15}$$

Furthermore, by comparing the quantities sold in country *A* and *B* under both uniform pricing and cross-country price discrimination, we find that the quantity sold in country *A* under uniform pricing exceeds the quantity sold under price

discrimination, $\bar{q}_A^* > q_A^*$. We also find that the quantity sold in country B is lower under uniform pricing than under price discrimination, $\bar{q}_B^* < q_B^*$.[50] These findings suggest that the following proposition holds.

Proposition 2: *Uniform pricing associated with parallel trade freedom is*

(i) beneficial to consumers in country A, as more of the good is sold at a lower price;

(ii) and is detrimental to consumers in country B, as less of the product is sold at a higher price.

The logic behind this result is the following. The potential and credible threat of competition from parallel trade reduces the market power of the manufacturer in country *A* to the benefit of the local consumers. However, in order to deter the occurrence of parallel trade, the manufacturer strategically sets a higher price in country *B*. Furthermore, the relatively high price elasticity of demand in country B (as compared to country *A*) impairs the detrimental effect of the price increase on consumer surplus in country *B*.

To sum up, parallel trade freedom – if volumes available for parallel trade are unlimited – induces the manufacturer to strategically set a uniform price in country *A* and *B* in order to deter parallel trade. The uniform price under the threat of parallel trade is lower than the price set in country *A* under price discrimination and higher than the price set in country *B* under price discrimination, respectively. Furthermore, uniform pricing associated with parallel trade freedom leads to a higher quantity sold in country *A* as compared to the outcome under cross-country price discrimination. However, less is sold in country *B* under parallel trade freedom and uniform pricing as compared to the outcome under price discrimination. Parallel trade freedom may even result in the collapse of the entire market in country *B* if country *A* is sufficiently attractive in terms of market size. Finally, parallel trade freedom is likely to have a negative impact on consumers in country *B* and a positive impact on consumers in country *A*.

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[50] *In order to see that this is true, note that* $\bar{q}_A^* = \frac{a}{4}(3\xi - 1) > q_A^* = \frac{a}{4}(2\xi)$ *and that* $\bar{q}_B^* = \frac{a}{4}(3 - \xi) < q_B^* = \frac{a}{4}(2)$ *as* $\xi > 1$.

5 Conclusion and Ideas for Further Research

Many authors have argued that third-degree price discrimination by pharmaceutical manufacturers is desirable to ensure the availability of affordable medicines in low-income countries with relatively small markets, and, therefore, that parallel trade flowing from low-income countries to high-income countries should be prohibited.[51] More specifically, consumers in low-income countries with a high price elasticity of demand are more likely to have access to cheaper patented pharmaceutical products when the manufacturer of the pharmaceutical products can successfully engage in third-degree price discrimination than when parallel trade forces prices towards uniformity.[52]

We agree with the thesis that cross-national price discrimination without parallel trade is desirable from a developing countries' perspective. Our model suggests that the equilibrium price in country *B* under parallel trade freedom – with country *B* being the country with a higher price elasticity of demand – typically exceeds the equilibrium price in country *B* under a regime of national exhaustion of IPRs and price discrimination without parallel trade.[53] Furthermore, the equilibrium quantity in country *B* under parallel trade freedom and uniform pricing is typically lower than the equilibrium quantity in country *B* under a regime of national exhaustion of IPRs and price discrimination without parallel trade. Put differently, a lower quantity of the pharmaceutical product is sold in country *B* at a higher price under parallel trade freedom as compared to a situation without parallel trade. Consequently, parallel trade freedom is *ceteris paribus* detrimental to consumers in country *B*.

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[51] For instance, see Ganslandt, Maskus and Wong (2005: 209), Scherer and Watal (2002a: 41), Scherer and Watal (2002b: 925), Maskus (2001: 41), Maskus (2000b: 1276), and Maskus and Ganslandt (2002: 77). See also World Health Organization and World Trade Organization (2002: 210, 218), Kremer (2002: 76) and Commission on Intellectual Property Rights (2002: 41). See also Hausman and MacKie-Mason (1988), Batson (1998: 489), Danzon and Towes (2003: 184), Malueg and Schwartz (1994), and Fink (2005: 177).

[52] For instance, see Scherer and Watal (2002a: 43). See also Ganslandt, Maskus and Wong (2005: 215) and Garrison (2006: 16).

[53] See also Scherer and Watal (2002a: 43) for an example of niche-pricing of pharmaceutical products in South Africa. More specifically, Scherer and Watal (2002a) suggest that multinational pharmaceutical companies charge a small but very rich minority of the South African population with high drug prices although the unambiguous fact that South Africa is a low-income country would suggest that drug prices are low.

Maskus and Ganslandt (2002) suggest in a non-technical article on parallel trade in pharmaceuticals and its implications for low-income countries that, under plausible circumstances, parallel trade may increase prices in low-income countries and that smaller markets might end up not being served.

Indeed, the analysis of our parallel trade model shows that this assertion is correct if the market in country A is sufficiently attractive as compared to the market in country B, i.e. ξ is relatively high. More specifically, we find that competition from parallel trade is so fierce in this case that the manufacturer has to charge such a high price in country B in order to deter parallel trade that the distribution of the pharmaceutical product in country B becomes unprofitable. In this case, the market in country B will not be served. Consequently, it would be desirable for country B to discourage parallel trade and to encourage price discrimination in order to open the otherwise unserved domestic market.[54]

As an idea for further research, we propose to incorporate national price regulation of pharmaceutical products in order to analyze both the impact of price caps on the occurrence of parallel trade in equilibrium as well as the strategic behaviour of foreign governments to protect consumers in their countries from excessive (monopolistic) pricing.

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[54] *For instance, see Fink (2005: 178). See also Varian (1985) and Maskus (2001: 41).*

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