Economics of TRIPS and Public health

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TRIPS and Public Health

- Agreement that IPRs are important for the development of new medicines but concern about its effect on prices
- WHO-WTO workshop of Differential pricing and Financing of essential medicines, April 2001
- Doha Declaration on the TRIPS Agreement and Public Health, Nov 2001 emphasized use of policies such as PI and CL
- Paragraph 6 solution – exports of pharma products allowed under a CL to supply countries with insufficient manufacturing capacities.
- Economic impact of these policies not well understood
  - Can learn about impact of CL from studies of generic entry post patent-expiry
  - Can also learn from other countries’ experiences with CL – Scherer and Watal, 2002
  - Studies based on simulations (Watal, 2001), surveys (Taylor and Silberston, ‘73)

- Financing of R&D – How much does R&D cost?
  - push and pull factors (Kremer) - patents vs. prizes
    - effects on inventing, developing and marketing new medicines
Key characteristics of the pharmaceutical industry

• Unusually high dependence on patents, trade secrets and test data protection.
  – large scale multi-sector industry surveys conducted in the UK (Taylor and Silberston, 1973) and in the US (Mansfield, 1986; Levin et al 1987; Cohen et al, 2000).

• Highly regulated in most economies
  – Government price controls and purchasing, public and private insurance schemes, restrictions on marketing and promotion, disclosure of proprietary information

• Involvement of “learned intermediaries” such as physicians and pharmacists
  – Principal-agent problem - many times the doctors are not aware of what the patient pays for the drug

• **Very high levels of R&D** investment and high risk of failure
  – Steeply increasing costs with sharply declining productivity; costs incurred even after drug launch

• **Unusual business model of exclusive production – history of the modern pharmaceutical sector – Peter Temin, 1979**

• High accounting rate of profit, which is 3-4 times higher than the average of Fortune 500 companies
  – Profits and revenues based on a very small number of products
  – growth of profits correspond to the growth rate of R&D in this sector

• However, risk of loss of exclusivity during patent term through parallel imports, CL, especially in developing country markets.
Business model for post-war pharma inventions

- Exclusive production by innovating firms without licensing to others enabled them to restrict output and gain monopoly profits. A high price was announced for the new product and only the quantity that could be sold at this price was produced. High royalty payments could have given the same profits but the problem was that royalty rates would have had to be very high in the face of inelastic demand. If elasticity is one and a quarter at monopoly price, then this price (assuming constant costs) would be five times the competitive price and royalty rates would have to be 80 per cent of sales. Given the principal-agent problem, demand elasticity could have been less than this and therefore royalty rates may have exceeded 80 per cent. This would have been unacceptable as royalty rates at that time were typically two and a half per cent, as was the case in streptomycin. Such high royalty rates may have been hard to sustain and enforce and the political pressure to reduce them could have been devastating.

- Whatever the reasons, the industry chose not to licence and instead patent owners chose to be sole suppliers of innovative drugs. The change from non-exclusive licensing to restricted production was seen most clearly in the case of broad spectrum antibiotics. However, since many of these drugs had similar medical benefits, products were differentiated through marketing their qualitative differences. This increased marketing expenditures. These conditions, patent monopoly attenuated by completion from other patent monopolies, extended beyond antibiotics to all drugs obtained through R&D, for example steroids - first generation widely licensed and then 2\textsuperscript{nd} generation of synthetic steroids exclusively produced by patent owning companies. This led to vertically integrated firms that did their own R&D and marketing. This was necessary as these firms got most of their revenues from a very small number of successful products.
Cost of R&D - estimates

• $800 million per approved NCE in 2000$ – DiMasi, 2003
  – Takes into account cost of failures and time cost of development.
  – Criticised as being based on confidential data provided by industry, only accounts for expensive NCEs, very high capital costs etc.

Patents and prices

- Patents could restrict use, reproduction and distribution of medical inventions based on such knowledge for a certain period of time and/or under certain conditions.

- How far above cost the price can be set depends on how much market power is enjoyed by the originator company, which in turn depends primarily on the availability and closeness of substitutes for the medicine in the therapeutic segment.

- Effective patent term of a NCE i.e. balance patent term after obtaining the relevant regulatory approvals, is an average of 8-12 years in the US market. Recent data shows generic competition has intensified – Grabowski, 2007.

- Studies using Indian market data – Subramanian, Watal, Chaudhari et al, Dutta
Policies to regulate prices

- Cost-plus price controls
- Price reimbursements – listed medicines
- Reference pricing
- Competition
  - Parallel imports
    - Advantages and disadvantages
  - Compulsory licences
    - Advantages and disadvantages
      - Taylor and Silberston concluded that R&D will be affected and there will be increased resort to trade secrets instead of patents
      - But 42 US companies subjected to CL decrees did not reduce their R&D relative to sales in comparison to other firms of similar size and product mix. However, there was some tendency for the affected firms to patent fewer of their inventions in the future, resorting more frequently to trade secrecy. (Scherer 1977)
    - Use of CL or threat to use
Differential pricing

• Conditions
  – the seller must have some control over price, i.e. some degree of market power;
  – the seller must be able to identify and segregate consumers according to varying price sensitivities; and
  – opportunities for re-sale from low-priced markets to high-priced markets must be constrained or, in other words, market segmentation must be assured.
    • No parallel imports or reference pricing

• Ways of fulfilling conditions
  – different labelling and packaging, effective segregation of public and private markets, contracts to prevent trade diversion, volume discounts and pooled procurement.
Compulsory licences

• Conditions for CL to work
  – Product/technology must be technically easy and cheap to reverse engineer/copy without the co-operation of the right holder – thus, little or no tacit knowledge, no complex technologies.
    • NCEs vs. biologicals
      – Applicants must have the necessary financial and technical capacity to reverse engineer product and engage in legal battles, where these arise
      – Country must have the administrative, legal and judicial skills to effectively run a CL system and to deal with political/economic issues, where these arise
Which markets attract generic entry?

Figure 1. Market exclusivity by market size.
Rate of generic entry by market size

Figure 2. Average number of generic entrants within 1 year, by market size.
Exclusivity periods by market size

Figure 4. Market exclusivity periods distribution for NMEs with market size: (A) <$100 M; (B) >$100 M.
Difference between pharmaceuticals and biologics

• More complex and sophisticated technologies
• Costs much higher – fixed cost for fermentation, bio-engineering means more expensive plant and machinery; higher variable costs; more extensive clinical trials; longer development time
• Lower rate of entry of generics after patent expiry and no dramatic reduction in prices

Source: Grabowski, 2007
RESULTS FROM GRABOWSKI, 2007
ENTRY AND COMPETITION IN GENERIC BIOLOGICS

DISCUSSION

Generic pharmaceuticals provide substantial financial benefit to individual consumers and third-party payers in the United States. The generic pharmaceutical industry was stimulated by the Hatch-Waxman Act and now represents more than 50% of the US prescription pharmaceutical market by volume. Given the benefits of generic pharmaceuticals in the United States, policy makers are exploring whether consumers will receive the same benefits from the development of a regulatory framework for generic biologic products.

Generic pharmaceuticals provide a substantial price discount over branded products. Nevertheless, it is not the mere presence of a generic product in the market but competition between multiple firms that results in aggressive price competition and discounting. To assess the potential economic advantages to consumers from generic biologic products we must assess the potential for firm entry into this new market and whether competition among manufacturers of generic biologics is likely to be as vigorous as that of manufacturers of generic pharmaceuticals. In this paper, we predict firm entry based on models of monopolistic competition. In the models, market entry is related to the fixed costs of development as well as potential revenues from market entry.
Canada’s experience on CL

Between 1969 and 1977, 227 licenses were issued, only eleven of them calling for domestic production alone without the right of importation. The most typical approach has been for the active ingredients to be imported in bulk, with encapsulation and packaging occurring in Canada. Among 47 drugs for which licenses were issued between 1970 and 1978, the average number of licensees was 3.0, with a range of from 1–11. Although some license recipients did not follow through by actually supplying the drug in Canada, in many cases, and especially for the drugs with substantial sales volume, competition was secured in the generic provision of drugs that would otherwise have been monopolized by the patent owner. On average, generic drugs supplied under compulsory license captured roughly 19% of the total sales of the product lines in which they competed, with penetration rates varying widely across Canadian provinces, depending upon the extent to which provincial drug reimbursement rules encouraged or discouraged generic substitution. In Ontario, where the rules were most conducive to substitution, penetration rates were as high as 55–64% at the retail level. Gorecki estimates that for drugs on which competition through compulsory licensing occurred, prices during the late 1970s would have been 20% higher in the absence of such competition. A later study of 29 drugs subjected to compulsory licensing in Canada but patented in the United States revealed that the Canadian prices were on average 47% lower than their US counterparts in 1982. For Valium, one of the world’s best-selling drugs during the 1970s and the licensed drug sales leader in Canada, the price to hospitals fell from $42 per 1,000 units before licensing began to $4.10 by the end of the 1970s.

In anticipation of proposed free trade treaties, the Canadian compulsory licensing law was weakened in 1987 with the imposition of a 7–10 year exclusivity period for drug patent holders. It was eliminated altogether in 1992. As quid pro quos, the multinational drug companies agreed to locate in Canada drug research and development activities proportional to Canada’s share of their world sales and to accept a new regime of ‘reasonable price’ controls by a Canadian Patented Medicines Review Board.

14 Gorecki, above n 13, at 46. Some companies received multiple licenses to import and/or produce a given drug, so the total number of non-duplicating licenses out of 227 approvals was 152.
15 Gorecki, above n 13, at 86.
Patents and product availability

• Countries with weak IPRs and aggressive price regulation may face substantial delays in the introduction of new medicines – evidence holds for high income countries
  – Multinationals may delay or even avoid launching drugs in lower-priced countries because they are concerned about the implications for pricing in other markets (Lanjouw, 2005)
• **Slower diffusion of new drugs in some countries even in a post-TRIPS era (Berndt et al 2010).** Questionable results.
  – Incentives to originator companies to introduce their products soon after first marketing anywhere in the world by counting the term of test data exclusivity from the date of first approval globally rather than in that country.
  – Economic implications of laws encouraging compulsory working of patents or local licensing on reasonable terms
Abstract and conclusions of Berndt et al, 2010

We examine the international diffusion of new drugs under the post-TRIPS intellectual property rights regime. Even after controlling for drug characteristics and variation in national health expenditure, we find substantial differences across countries in the probability of a drug being commercially available, lowest in countries such as Brazil, China and India with historically weak patent protection. Notwithstanding obligations now in force under the TRIPS Agreement to provide patent protection for pharmaceutical products, sellers of new drugs are much less likely to have market exclusivity in these countries. Conditional upon being launched, a drug is five to 25 times more likely to be generic/multisource in these countries than in, for example, Spain.

Conclusions

The TRIPS Agreement has had little apparent impact to date on competition in markets for pharmaceuticals, at least in the countries considered here. Notwithstanding treaty obligations to provide patent protection for pharmaceutical products, innovator companies are still struggling to obtain market exclusivity in countries such as Brazil, China, and India. Genericization of new drugs is particularly intense in India, where more than 70% of the sample of newly approved drugs considered here are multisource, and sold by an average of eight distinct companies. One of the consequences of the policy choices underlying these market outcomes is weakened incentives for any firm, whether innovator or imitator, to incur the costs of launching a new drug in these countries. These weakened incentives to launch new drugs in “unfriendly markets” are clearly visible in our data as slow (or no) diffusion in the global marketplace. Less than two-thirds of the new drugs in our sample were commercially available in Brazil, China and India by the end of the period considered.
Financing R&D for neglected diseases

• Market failures associated with low incomes, poor medical infrastructures, and weak insurance systems in developing countries in generating innovation for Type 3 diseases
• Some combination of public support for research and targeted public-private arrangements (e.g., GATB, GAVI) are necessary. Co-ownership of IPRs – conditional use in different markets.
• Global bio-medical R&D treaty
  – Would require each government to contribute financially, in relation to their income levels, to a fund to cover a broad spectrum of R&D costs ranging from basic research to clinical trials.
  – Would also establish open-access medical databases and publishing, ask for transparency in research costs on the part of biomedical companies, and establish norms for managing IPRs that take account of access interests in developing countries
• Push and pull schemes
  – AMC is a guaranteed minimum purchase, typically funded by public resources, of new vaccines or medicines that meet pre-defined standards for safety and efficacy
  – UNICEF, the World Bank and GAVI are collaborating on an AMC project to develop a vaccine for pneumococcal disease
  – Prizes that are paid to inventors of treatments for specific diseases
    • If the reward is too large governments will overpay firms in the form of economic rents, while if it is too small no innovations may occur
CURRENT DEBATE IN THE WHO

SUBSTANDARD/SPURIOUS/FALSELY-LABELLED/FALSIFIED OR COUNTERFEIT?

SSFFC!
BIG QUESTION ON IP AND PUBLIC HEALTH

HOW TO RECONCILE INCENTIVES FOR INNOVATION WITH ACCESS TO MEDICINES?
THANK YOU ALL FOR YOUR KIND ATTENTION AND GOOD LUCK!