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Lessons from the pricing of AIDS drugs in developing countries**

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**Socially Responsible Pricing:
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Abstract

Corporate social responsibility (CSR) has major implications for pricing decisions in some markets. An extreme case is the pricing of life-saving drugs in developing countries; industry critics have pointed to price as an obstacle to treatment and a factor in the deaths of millions of AIDS victims. This article examines socially responsible pricing in the form of differential pricing across markets taking into account ability to pay and social welfare. The implications of this remedy to the issue of access to drugs in developing countries are explored.

Multinationals are criticized for profiting from developing-country consumers. Our analysis of AIDS drug pricing between 1999 and 2003, suggests that, in fact, the high prices of AIDS drugs in developing countries sub-optimized contribution earnings in those markets. In the 1990s, multinationals could have earned greater contribution in developing countries by reducing prices, while also saving thousands of lives. However, that could have jeopardized earnings in developed countries, and this, together with other factors, created barriers to socially responsible pricing.

Neither multinationals nor developing-country governments can alone create conditions for socially responsible pricing to prevail. We identify the role of different players in addressing barriers to socially responsible pricing and moving prices of AIDS drugs to levels today where significant proportions of consumers can have access to them. These players included multinationals, governments, non-governmental organizations, and multilateral institutions such as the World Trade Organization and the World Health Organization. We conclude by identifying lessons for managers in industries with characteristics similar to the drug industry, where socially responsible pricing also may be needed, if not demanded.

“Some may think that because better medicines have been found, the AIDS emergency is over. Alas, no. For most people living with HIV/AIDS today, the \$10,000 to \$60,000 (U.S.) annual price tag of an anti-retroviral regime belongs, quite simply, in another galaxy.”

U.N. Secretary General, Kofi Annan, January, 2001

“The poor have no consumer power, so the market has failed them. I’m tired of the logic that says: ‘He who can’t pay dies’.”

Dr. James Orbinski, President, Medecins sans Frontieres, 2000

There are 2.8 billion people who live on less than \$2 a day and this half of the world’s population is essentially unserved by multinational companies. This is a matter of great concern when lives are so clearly at stake, as is the case with certain pharmaceutical products. Price is an obstacle to many of the world’s population having access to life-saving drugs as well as other essentials such as food and education. The needs of the world’s poorest people cannot be met by charitable donations alone and multinationals have faced tremendous pressure to reduce their prices in developing countries to better serve the poor. While the multinationals have been portrayed as insensitive to the needs of the poor by maintaining high prices that patents allow them to charge, the prohibitive prices of drugs in developing countries cannot be explained by firms’ desires to earn large profits in these countries. Other important factors, particularly those that threaten to jeopardize profits in developed countries, serve as disincentives for price reduction in developing countries. As we show in this paper, this points to a need for coordinated action by developed- and developing-country governments, multilateral institutions and NGOs (non governmental organizations), as well as firms, to help create the conditions in which prices can be lowered to a “socially-responsible” point at which the poor can be better served.

Drug access in developing countries, particularly for HIV/AIDS drugs, has become a major issue of corporate social responsibility (CSR). Thus, it is within this context that this paper explores the lessons from the pricing of AIDS drugs in developing countries—including the need

for a multilateral response—and, more broadly, examines the concept of socially responsible pricing, which we define as pricing that attempts to sustain or enhance social welfare.¹

Socially Responsible Pricing

CSR refers to the firm's societal obligations, especially to those affected by its policies and practices. Responding to CSR issues can result in higher costs for the firm. The additional costs assumed by the firm might reflect externalities that otherwise would have been imposed on others, including some of its stakeholders (e.g., environmental harm), but its shareholders' economic interests are less well served. However, failure to respond on a CSR issue might itself lead to the firm incurring even higher additional costs (e.g., from reputational harm and lost sales) and thus, under some circumstances, there is a "business case" for CSR.² The financial implications of CSR are particularly apparent where pricing is the issue. Socially responsible pricing reflects pricing decisions consistent with a firm's obligations to society and is not necessarily maximizing the firm's economic interests. Hence, motivation for socially responsible pricing may also stem from a "normative case"—that it is the morally right thing to do (Smith 2003).

Socially responsible pricing can involve *higher* prices, such as coffee wholesalers paying more than three times the market price for Fairtrade coffee to support small farmers, as well as consumers paying a premium for coffee and a variety of other fair-traded products (Harford 2003). Arguably, these higher prices take into account market externalities. Socially responsible pricing also might require that a product's prices be increased in order to "demarket" it to lessen

¹ Our use of the term social welfare is consistent with its general use in marketing and strategy rather than the precise and various meanings found within economics (e.g., Rawlsian social welfare, conservative social welfare) and it is used interchangeably with the term consumer welfare. Further, our references to pricing are from a marketing rather than from an economics perspective, which involves the exercise of managerial discretion in setting price including the possibility of decisions influenced by moral as well as economic values.

² Smith (2003) asserts that CSR and profit maximization need not be mutually exclusive and that company action on a CSR issue may be in the economic interest of shareholders (also see, for example, Martin 2002).

unwholesome demand (Kotler 2000).³ More typical, however, and more challenging from the perspective of the traditional view of pricing as marketing's moment of self-interest, is a societal and/or ethical obligation to *lower* price. In this paper, we restrict our attention to socially responsible pricing in the form of differential pricing, where companies price discriminate across markets to take account of ability to pay and social welfare.

There has been little or no prior attention to socially responsible pricing, as such. However, there are related literatures. For example, studies which show that "the poor pay more" have resulted in policy recommendations consistent with our definition of socially responsible pricing (e.g., Andreassen 1975). Another related topic is price gouging, which is generally not regarded as socially responsible and may be deemed unethical and illegal and prompt policy responses that restrict its use (e.g., during fuel shortages after a natural disaster), though from an economics perspective it may be more efficient (e.g., reduces queuing).

Studies have shown that consumers are likely to judge price increases as unfair if they increase the firm's relative profit, but are perceived as fair when justified by increased costs to the firm (Kahneman, Knetsch and Thaler 1986). However, Nagle and Holden (1995) point out that with claims of price gouging, the perception of unfairness may have little to do with profitability and recent research has identified a broader array of factors influencing price fairness perceptions, including past prices and competitor prices (Campbell 1999; Bolton, Warlop and Alba 2003). The concept of socially responsible pricing suggests that ability to pay is also a factor in price fairness perceptions. Perceptions of unfairness in the pricing of drugs in developing countries clearly have been influenced by ability to pay as well as company profitability. Such perceptions of price unfairness may point up a need for firms to give attention to socially responsible pricing. (As with

³ It is rare for demarketing price increases to be initiated by the firm marketing the product, such price increases are more likely to come from a tax rise.

claims of price gouging, however, understanding the objective fairness of a price and whether it is socially responsible calls for a far broader analysis.)

Price discrimination and its welfare implications receive extensive coverage within economics. The standard analysis is to treat price discrimination as an attempt by the producer to extract consumer surplus and thus it might be considered antithetical to consumer welfare. Under what is known as first-degree price discrimination, a firm would charge each customer the maximum price that the customer is willing to pay for each unit bought (the reservation price) and all consumer surplus is captured by the firm (Pindyck and Rubinfeld 1989). Price discrimination is not possible without some degree of monopoly control, though it need not necessarily be contrary to consumer welfare; it might, for example, permit lower prices and greater access for the poor and result in more efficient use of resources (Douglas 1975).

The question of socially responsible pricing has come to the fore with pricing in the research-based pharmaceutical industry. Concern was expressed at the pricing of AZT, the first treatment for AIDS, when it was originally introduced (Chase 1987). Monopoly control and the life-threatening characteristic of AIDS permitted an extremely high initial price (it was the most expensive prescription drug on the market). More recently we have seen concern expressed by multilateral institutions, governments and NGOs about the price of AIDS and other drugs in developing countries. Pharmaceutical company responses to the issue of drug access in developing countries include differential (or “preferential”) pricing policies. This is essentially the use of a firm’s monopoly control to price discriminate across markets to promote social welfare rather than to extract consumer surplus. We view this *discretionary* action by firms as a form of socially responsible pricing.⁴

⁴ In a report for the WHO and the UK’s Department for International Development, Grace (2003, p. 1) differentiates between terminology used in relation to pricing of AIDS drugs: “The terms ‘differential pricing’, or ‘equitable

In the next section we examine the drug access issue in more detail. We then focus more specifically on differential pricing, one of the major industry responses, and the lessons that emerge from an analysis of industry pricing over the 1999-2003 period. Having explored socially responsible pricing within the context of the pharmaceutical industry, we conclude by broadening our discussion to other industries.

ACCESS TO ESSENTIAL MEDICINES IN DEVELOPING COUNTRIES

According to the World Health Organization (WHO), AIDS was the second leading infectious killer in 2000, with 2.9 million deaths worldwide. Disparities between the developed and developing world are highlighted by HIV/AIDS, for although it is a disease that afflicts both, 95% of HIV-positive people live in developing countries and most AIDS deaths occur there (over two million in sub-Saharan Africa alone in 2001). While governments and organizations such as UNAIDS (United Nations Programme on HIV/AIDS) and the WHO have key roles to play, the pharmaceutical industry could do more. With the potential of untreated HIV/AIDS in developing countries to have major impacts on the workforce and on child rearing in afflicted families, it has major economic as well as health and human consequences, especially in high-incidence countries in Africa.

By mid-2003, there were 29 million people with HIV/AIDS in sub-Saharan Africa, estimated to be 70% of HIV/AIDS victims worldwide (UNAIDS 2003C). While the incidence of the disease was around 10% across sub-Saharan Africa, in four countries (Botswana, Lesotho, Swaziland, and Zimbabwe) it was over 25% (WHO 2003). South Africa, with 5 million victims (an incidence of 11%), had the largest number of AIDS victims in the world (UNAIDS 2002). At

pricing' can be defined as pricing based on ability to pay. As it relates to the policy goal of maximizing health impact through affordability of medicines, a more accurate term might be 'equity pricing', where countries apply a price structure or pricing policy according to some principle of fairness or equity. In practice this may mean proportionality with income per capita, human development index or similar indicators." Our use of the term socially responsible pricing reflects a more generalizable and potentially broader (though possibly more arbitrary) basis for pricing that is consistent with corporate social responsibility and the exercise of management discretion.

the end of 2002, only 50,000 of the 4.1 million HIV/AIDS victims requiring antiretroviral (ARV) treatment in Africa—that is, around one percent—were receiving it, in contrast to the almost universal treatment of HIV/AIDS victims in developed countries (WHO 2003). Of the 800,000 people receiving ARV treatment worldwide in 2002, only 300,000 were in developing countries.

While healthcare and other infrastructure shortcomings of developing countries restrict the flow of drugs to developing-country AIDS victims, WHO and UNAIDS (2002, p. 2) reported that “many countries have underutilized health system capacity that, but for lack of financing and affordability, could be used to expand treatment today.” They note (p. 2): “despite the major reductions in ARV prices, the annual cost of ARV treatment for a person living with HIV still exceeds the annual per capita gross domestic product of many least developed countries.”

Undoubtedly, there can be much debate about who should pay for increased developing-country access to AIDS and other drugs. Some have pointed to the responsibility of developing-country governments for the health and well being of their peoples, contrasting health expenditures with spending on defense, while others have asserted a human right to good health under the U.N. Declaration of Human Rights, suggesting a more diffuse responsibility. Regardless, pharmaceutical firms have faced considerable pressure to increase drug access. NGOs (such as Oxfam, *Médecins Sans Frontières*, and Treatment Action Campaign) have campaigned vigorously against the industry, securing a high-profile victory in 2001 when the industry was forced to withdraw a case brought against the South African government over its plans to allow distribution of generic copies of AIDS drugs. Generic competition also has been a factor in countries that have generic manufacturing and have not agreed to WTO restrictions, most notably Brazil and India (Vachani 2002). Downward pressure on prices was also felt in

other markets as the generic price in these countries was used as a “reference price”⁵ by activists who argued that the huge disparity in price between the developed world price and that of generics reflected profiteering by the drug companies. Firms have tried three major approaches in response to the access issue: drug donations, out-licensing and differential pricing.⁶

Drug donation programs date back at least 15 years to Merck’s development of a treatment for onchocerciasis (“river blindness”), a tropical disease that afflicts people in some of the world’s poorest regions. Although there was no commercial market for the drug, Merck invested tens of millions of dollars in its development and, in 1987, set up a program for its free distribution in collaboration with WHO, the World Bank, and others. Around 25 million people a year are treated under the program and avoid the risk of premature blindness.⁷ Other firms have followed suit, such as GSK (and Merck) who donate large quantities of medicines as part of the Global Alliance to Eliminate Lymphatic Filariasis (“elephantiasis”), which afflicts over 120 million people in 83 countries.

In theory, drug donation programs set the price for drugs at zero and remove it as an obstacle to drug access. Tax benefits allow firms to off-set at least as much as the marginal cost of the drugs, though they might have administration costs to bear (as well as any R&D). Collaboration with health authorities of country governments and multilateral organizations such as the WHO also enable targeting of the most needy populations. However, these programs have drawbacks. They can burden recipients with hidden costs (e.g., drug distribution) as well as donor countries (lost tax revenue). They can be challenging to administer because demand is more difficult to estimate without market signals. They can harm commercial sales when there is

⁵ In marketing, a reference price is “any standard of comparison against which a potential transaction or purchase price is compared” (Winer 2000, p. 311).

⁶ There are other approaches, such as public-private partnerships. For a more comprehensive review of the options, see Gardiner (2003).

⁷ www.merck.com/about/philanthropy/9.htm

unauthorized diversion into the private sector and, when provision is via the public sector, access to the drug is not maximized, especially in countries where private sector provision dominates. Most important, these programs are not considered sustainable given the scale required for HIV/AIDS—conservatively estimated at close to 6 million people in developing countries in need of ARVs (WHO and UNAIDS 2002)—and when long-term therapy is needed, in contrast to one-dose treatment (as required with river blindness and elephantiasis). Even if the scale could be achieved, NGOs (and many within the WHO) fear that firms would not stay committed.

Out-licensing allows the firm to charge a lower price via a developing-country manufacturer that produces the drug under license. Typically, the firm makes no profit from the arrangement (e.g., royalties support drug distribution). For example, in 2001, GSK granted a voluntary license to Aspen Pharmacare, South Africa's largest producer of generic medicines, to manufacture GSK ARVs in South Africa. GSK waived its royalty and instead required a 30% fee on sales as a donation to NGOs managing HIV/AIDS programs in South Africa.

Out-licensing has the advantage of distancing the firm from the lower price and potentially reducing the scope for price referencing. It is also a commercially appealing response to generic competition and can attract favorable media. However, the price may not be low enough to make the product affordable for large proportions of the population in need, there are limitations posed by the restricted availability of developing-country companies with adequate quality control systems, and the price referencing problem does not entirely disappear. It has not been adopted widely to date.

Differential pricing entails selling at different prices in different markets. It has been the most widely used approach and is assumed to be more cost effective and sustainable than donation. While it too has drawbacks, differential pricing has clearly become the preferred solution of a number of firms and NGOs. It is examined in more detail in the following sections.

Differential Pricing and the Industry Business Model

A key characteristic of the research-based pharmaceutical industry's business model is the commitment of large resources to R&D for drug development. This results in a cost structure with high fixed costs and very low variable costs. Under perfect competition drug prices would be driven down to levels that yield low contribution margins and discourage drug discovery.⁸ However, as a result of the patent system, inventors have a monopoly for up to 20 years for most new drugs. Thus, companies are able to maintain prices high enough to earn profits that fund future R&D and provide attractive returns to shareholders, as shown by the bold lines in Figure 1. The industry consistently reports the highest levels of profitability. According to *Fortune*, the pharmaceutical industry in 2001 continued to hold the top ranking position with an average industry profit of 18.5% as a percentage of revenues, compared to a median 5% return for all industries surveyed⁹ and the reported 2001 net margins of the three largest companies (Pfizer, GSK and Merck) ranged between 15% and 24%. The dotted lines in Figure 1 show how the model is changed by the introduction of differential pricing.

Insert Figure 1 here

The price of some life-saving drugs is quite high. For example, a year's supply of a multinational's patented three-drug ARV combination for a single AIDS patient was priced at around \$10,000 in developed-country markets in 2003. Similar drugs produced by Indian generic drug manufacturers were being sold at around \$300 in some developing countries. The quality of the products and processes of leading generic drug manufacturers have been verified as meeting developed-country standards by western regulatory agencies. Some of these companies also have supplied bulk drugs to developed-country multinationals, which convert them into pills. This

⁸ Contribution refers to the difference between selling price and variable cost and not to charitable contribution.

⁹ *Fortune*, April 15, 2002.

attests to the high quality of major generic manufacturers' products and their much lower prices point to the high profitability of the ARV category for the multinational drug companies.

Between 1999 and 2003, the prices of ARVs sold by multinationals in developing countries dropped dramatically, from around \$10,000 for a triple-drug ARV combination to under \$1000. In the following sections we examine ARV pricing in developing countries from the viewpoint of profit and social welfare maximization and how that changed over 1999 to 2003.

AIDS DRUG PRICING IN 1999

In 1999, the prices of multinationals' AIDS drugs were much too high for developing-country customers, prompting remarks such as those of Kofi Annan and James Orbinski given at the outset of this article. Before 1995, when the WTO's TRIPS agreement was negotiated, the lack of strong patent protection in developing countries forced multinationals to sell drugs at much lower prices in developing countries than in developed countries.¹⁰

Profit-Maximizing Perspective

Given differences in price elasticity of demand in developed and developing countries, the optimal pricing strategy for maximizing profits calls for segmenting the markets and pricing low in developing countries and high in developed countries. In industries with cost structures like that of pharmaceuticals, profit is maximized when prices in different segments are roughly inversely proportional to their price elasticity of demand (Danzon 1997; Ramsey 1927). If multinationals were selling drugs across the globe at a uniform price, they were probably sub-optimizing profits in developing countries. At high prices they earned a large unit contribution

¹⁰ Not so long ago, even some developed countries had weak patent protection for drugs. Canada instituted its strong protection of drug patents in 1992. Its 1923 law allowing compulsory licensing of drugs for local manufacture was extended to imports in 1969. This resulted in prices of US-patented drugs being 47% lower in Canada than in the US. Canada began weakening its compulsory licensing laws as it prepared to enter into trade treaties. In return, multinationals agreed to locate more R&D in Canada and adopt "reasonable price" controls instituted by the Canadian Patented Medicines Review Board. Italy introduced drug patent protection only in 1978. Indeed, the US Defense Department bought Italian generic drugs until 1961 when it was forced to stop by Congress (Scherer and Watal 2002).

but sold very few units. If they had reduced prices in developing-country markets they would have earned less contribution per unit, but might have sold so many more units that they would have earned greater profits.

We modeled the economics of selling AIDS drugs in developing-country markets in order to estimate the level of contribution at stake for multinationals (see Appendix). Central to this analysis is a demand estimate, which is used to calculate potential contribution from selling triple-drug combinations of AIDS drugs in developing countries at different prices in 1999, when there was minimal donor assistance. There was little to be earned in developing countries (only about \$10 million) at the \$10,000 per-patient per-year price owing to the small demand (approximately 1,000 at that price). Had prices been lower (say \$750-1000), demand would have increased significantly to 50,000-80,000. While contribution would have risen to a maximum of between \$20 and \$36 million (depending on the variable cost—see Appendix), the incremental amount at stake was small relative to industry net revenues. So multinationals lacked a large economic incentive to reduce prices substantially. On the other hand, the prospect of product diversion to developed-country markets if developing-country prices were very low, or of price referencing depressing developed-country prices, must have been sobering, as it threatened to jeopardize contribution in developed-country markets which was enormous by comparison (about \$4-5 billion).¹¹ While at the global price of \$10,000 multinationals were sub-optimizing developing-country contribution, they were probably maximizing global contribution.

Welfare-Maximizing Perspective

From a welfare-maximizing perspective lower drug prices are naturally preferable. Given the extremely low income levels of developing-country AIDS patients, the prices of ARVs would

¹¹ Assuming price of \$10,000 per person per year and variable costs of \$300-500, multinationals would have earned \$4-5 billion in contributions from sales to half a million developed-country patients.

have had to fall far below variable costs to make them affordable for the six million patients who needed them. If prices fell to \$56 to reach this six million patients, suppliers of drugs would have lost \$1.7-3.0 billion. Between those two extreme price points (\$10,000 and below \$100), however, are points where multinationals would not have suffered a major contribution penalty in the developing-country market. They might, in fact, have earned higher contribution than at the \$10,000 price, while social welfare could have been enhanced considerably. For example, at prices of around \$750-\$1000, between fifty and eighty thousand patients might have been served instead of around one thousand at \$10,000.

Tradeoff Between Developing-Country Contribution and Lives Saved

The case of AIDS drug pricing provides interesting insights with regard to the tradeoff between contribution earned and lives saved in developing countries, which is presented in figure 2. As price starts out at \$10,000 toward the right, and moves left to lower levels, more lives are saved. In Zone I, multinationals could not only have saved more lives as prices fell, but also could have increased contribution earnings in developing countries. However, moving the price to points that would have raised welfare required tackling barriers, such as the risk of diversion, which could have compromised contribution in developed-country markets.

Insert Figure 2 here

In Zone II, as prices fall below \$750-\$1000, the actions needed to raise welfare cease to be congruent with those necessary to raise profits. Multinationals would have needed to begin sacrificing contribution in developing countries to save lives. However, initially at least, thousands of lives could have been saved with contribution reductions that were not relatively large. This is where multinationals had the opportunity to demonstrate their commitment to human welfare by lowering price and challenging other stakeholders like governments and NGOs to contribute resources to save even more lives.

Maximization of social welfare (Zone III), however, would have been very difficult for multinationals to achieve alone. As Figure 2 shows (and Table A2 in Appendix), to provide ARVs to all the patients who needed them would have required an enormous commitment of resources in the absence of donor assistance and it would be difficult to expect multinationals to price at Zone III levels. In addition, there would need to be adequate infrastructure for massive drug delivery, almost certainly not present in most developing countries at this time.

Coordinated Stakeholder Responses to Achieve Socially Responsible Pricing

There are a number of potential costs and risks that appear to discourage socially responsible pricing by multinationals, at least in the context of access to essential medicines. The coordinated effort of multiple stakeholders is necessary to overcome these barriers to socially responsible pricing. These stakeholders include developing- and developed-country governments, multilateral institutions such as the UN, WHO and the WTO, private donors, NGOs, and generic product manufacturers, in addition to the multinationals themselves.

Product diversion. One of the risks of significant price differences between countries is the possibility of product diversion across countries. For example, in 2002 AIDS drugs sold by one of the multinationals at sharply reduced prices in Africa were found illegally resold in Germany and the Netherlands (Dyer 2002). The Dutch government recalled two of the drugs fearing contamination in transportation and planned to prosecute the importer. While it is important for developed-country governments to discourage unscrupulous distributors, it is also important that they address the needs of developed-country patients whose insurance does not adequately cover procurement of life-saving drugs creating demand for diverted products. By 2002 the number of uninsured Americans had risen to 43.6 million (Harding 2004). Currently, the US government is more preoccupied with the issue of whether to allow drug imports from its NAFTA neighbors than with the impact of drugs diverted from distant developing countries.

Developing-country governments also have a role to play by creating stronger monitoring and control of low-priced drugs introduced into their public health systems. While this may not eliminate diversion it might contain the risk. Multinationals can also discourage diversion by introducing different brands and packaging in developed and developing countries so that diverted products can be more easily detected (though regulatory requirements generally mean that this involves considerable time and expense). Returning to the industry business model in Figure 1, the italics denote factors that threaten the sustainability of the model, including price referencing and competition from generics as well as diversion.

Price referencing. Price discrimination across countries could result in increased pressure for price reductions in developed countries. The prospect of jeopardizing profits in developed-country markets probably made multinationals reluctant to reduce prices in developing countries. On the other hand, it is not clear how much this would have increased the problem of large institutional buyers negotiating aggressively for discounts, since such buyers were aware that variable costs of drugs were a fraction of selling prices, and the provision of low-priced drugs in developing countries would not, in itself, have provided significant new information. However, AIDS activists might well have capitalized on this in their campaigning against the multinationals. There is not much other stakeholders can do about this issue, except that if developed-country governments address the needs of the poorer segments in their own countries, pressures for lower prices from multinationals might ease.

Inadequate infrastructure and avoiding drug resistant strains. Multinationals claimed that lack of infrastructure was a bigger hurdle to treating developing-country patients than drug prices (Lohr 2002), though this was not the view of the WHO and UNAIDS. Aside from drug distribution and administration challenges, it was claimed that without proper infrastructure patients would end up not taking their medication as directed, rendering the treatment ineffective

and helping create drug-resistant strains of the virus. In Europe, almost 10% of fresh AIDS cases are resistant to at least one drug (McNeil 2003). The medical infrastructure is sorely lacking in developing countries and needs billions of dollars to upgrade, most likely via contributions of multilateral agencies, developed-country governments and private donors. NGOs are helping by keeping up the pressure on those stakeholders to focus on infrastructure development and making up for some of the shortcomings in public health systems by providing testing and patient care.¹²

Donor reluctance. When poor patients are unable to pay for medication, clearly one possible solution is for the drug companies to lower their prices. However, if they are quick to cut prices, donors and local governments may be under less pressure to provide financial support. The more the donors pay the better the economics from the multinationals' perspective since donor funds flow through to drug producers as payment for drugs purchased and increase potential contribution. Perhaps the zero-sum aspect of this "game" created reluctance on the part of multinationals to cut prices early on and let donors and governments off the hook.

Pressure from NGOs is perhaps the most effective factor in inducing developed-country governments and private donors to put up funds necessary to save lives. However, when drug prices are high, donors lack motivation to contribute significant amounts from their scarce pool of funds, since the impact of donations on saving AIDS patients is relatively low and prevention programs appear to offer greater rewards. Donors' willingness to provide funds would be likely to rise as drug prices fall. NGOs have made a valuable contribution by pressing various stakeholders to permit the sale of generic products in developing countries thereby enhancing the impact of donors' funds and creating conditions for them to increase donations, while also putting pressure on multinationals to reduce their prices.

¹² It is important to note that despite infrastructural shortcomings the risk of developing drug resistant strains in developing countries may be overstated. The evidence suggests that Africans are more likely than developed-country patients to take their medicines as prescribed. In Africa, 80-85% of patients follow prescribed treatment procedures compared with 60% in developed countries (Economist 2003).

Administrative overhead. The profits at stake in developing countries are relatively small and while safeguards might protect companies from diversion there are administrative costs involved in setting up, managing, policing and fine-tuning a differential price system. From the multinationals' viewpoint, the economic benefits may not have justified the effort involved. However, over time, as NGOs have applied pressure on multinationals and the public relations challenges have increased, maintenance of uniform prices has become costly and unpopular, strengthening the case for socially responsible pricing, as described below.

AIDS DRUG PRICING IN 2003

Despite barriers to price reduction, multinationals' AIDS drug prices fell sharply over 1999-2003 because of important changes in the industry, particularly changes in political support, growth in generic competition and increased donor funds (UNAIDS 2003A; Vachani 2002).

Change in political support. When the US government suddenly stopped pressuring the South African government over its plans to allow manufacture of generic AIDS drugs, multinationals found themselves politically isolated and unable to resist calls for price reductions in developing countries. Brazil's decision in 1997 to ignore US pressure and aggressively license local generic manufacturing also helped set an example for others. The primary impact of this decision was non-generic manufacturers lowering the average price for a year's supply of ARVs by two-thirds to around \$4,500 and reducing the government's health bill by an estimated \$472 million over three years (Smith and Duncan 2004).

Generic products. The high prices of multinationals' products became unsustainable in developing countries where generic manufacturing commenced and increased. However, some developing countries lack the ability to manufacture generics locally and, until recently, WTO rules prohibited their import. In anticipation of the WTO meetings at Cancun in September 2003, which were seen at risk of being derailed in the absence of liberalization of generic imports

during medical emergencies, the US withdrew its opposition to such imports (Becker 2003). As developing countries that lack local manufacturing capability begin to import generic drugs the downward pressure on prices of multinationals' drugs likely will increase within those countries.

Donor funds. While greater availability of generics reduced demand for high-priced branded AIDS drugs there was a significant upward shift in the demand curve at lower prices as a result of a substantial increase in funds made available by donors. Prominent among donor initiatives was the Global Fund, set up at the urging of the UN with contributions from the governments of the US, UK, France, Germany and other countries, and private donors such as the Gates Foundation. The other channel was bilateral assistance provided by developed-country governments. In February 2003, President Bush announced a significant increase in bilateral aid devoted to HIV/AIDS. In addition, developing-country governments increased their own commitment of resources to combat AIDS. In 2001, as part of the Abuja Declaration, African countries pledged to allocate 15% of their national budgets to health care (UNAIDS 2003B).

As a result of pressure from donors, the disbursements made from the Global Fund and other multilateral donors stipulated the purchase of drugs of adequate quality at the cheapest prices. This meant that the funds would be utilized only for drugs with prices around \$300. (By May 2003, the cheapest generic ARV combination recommended by WHO was just under \$300; see UNAIDS 2003A.) However, US funds were to be used to purchase drugs from multinationals, whose prices in late 2002 were around \$1000.¹³

Profit- and Welfare-Maximizing Perspectives

As the Appendix indicates, with \$600 million of donor funds for drug purchases, multinationals stood to earn maximum contributions of around \$175-\$245 million at prices of \$1000. As Figure 3 shows, Zone II became attractive for multinationals as it provided the

¹³ The US government shifted toward acceptance of generics in mid-2004.

opportunity to earn significant contributions while saving many more lives than before. Zone III, which is where prices needed to be to ensure universal access, remained elusive.

Insert Figure 3 here

From a welfare-maximizing perspective, the situation in 2003 was far better than in 1999, with more patients served with life-saving drugs. However, the funds were inadequate to provide drugs for all the patients who needed them. On the basis of our demand estimation, at the \$300 price point less than 40% of the six million who needed the drugs would have had access to them.

By May 2003 the cheapest branded ARV combination being sold in developing countries was priced at \$675 (UNAIDS 2003A). Over time, prices of other branded products would likely drift down as well, with most multinationals charging around \$700. Meanwhile, generic products have begun appearing at around \$200, giving hope that the price of generic drugs of certified quality will also drop to that level. Even so (and assuming availability), nearly 40% of victims needing ARVs would go untreated.

Stakeholders' Roles

The role of multiple stakeholders in moving the price of AIDS drugs down toward socially responsible levels is illustrated in Figure 4. NGOs provided the initial impetus by highlighting the need for action, and followed that by continually exerting moral and public relations pressure on governments, donors and multinationals. In response, multinationals made modest price reductions (Glaxo offered lower prices on AIDS drugs in Africa as early as 1997). The appearance of generic products demonstrated how low the variable manufacturing costs were and, where generic manufacture was allowed, put multinationals under severe competitive pressure. Multilateral institutions legitimized the call for action and that increased pressure on multinationals. Large developing-country governments, such as Brazil, helped legitimize generics, enhancing their impact. Developed-country governments, such as the US, which

initially protected multinationals' interests by dissuading developing-country governments from infringing on multinationals' intellectual property rights, backed off from that position and ultimately shifted to providing large donations for drug procurement. The Accelerating Access Initiative, created in 2000, was a coordinated industry response in combination with WHO and UNAIDS, that achieved some negotiated price reductions on a country-by-country basis of as much as 80-90% by 2002, but even the lowest prices under AAI were still more than double those of comparable generics.¹⁴

Insert Figure 4 here

Having lost the support of developed-country governments in the intellectual property rights battle, facing severe competition from generics, and with donors showing signs of substantially increasing assistance, multinationals cut prices significantly. With a shift in the US position on restricting generic imports, and under intense pressure from developing countries in the weeks before the 2003 Cancun meetings, the WTO eased import rules. In 2004, donors were looking to find ways to put together the massive financial and other assistance needed to provide near universal availability.¹⁵

DISCUSSION

Over the last five years, access to ARVs has increased substantially, though not fast enough for most AIDS victims. Analyzed from the perspective of corporate social responsibility, this might be viewed as a CSR failing, with important implications for the pharmaceutical industry and more broadly. Martin's (2002) "virtue matrix" provides a framework for

¹⁴ Grace (2003) reports the effect on AAI prices of much lower priced generics and that the relatively high prices under AAI (along with other factors) constrained its impact. Even with substantial price reductions, AAI prices still exceeded annual GDP per capita of many LDCs and, as of December 2001, only 27,000 people in the 19 countries participating in AAI had ARV access.

¹⁵ The 2004 World Health Report was optimistic about the prospects for success, while Richard Feachem, Executive Director of the Global Fund, reported in May 2004 that finance and drug costs, which were now as low as \$150 per person per year, were no longer the binding constraints they once were on providing treatment for AIDS, with the main constraint now being the capacity of countries to deliver drugs to those who needed them (Williams 2004).

understanding the evolution of forces that affected socially responsible pricing in the context of the access issue. Martin starts from the premise that managers of publicly traded companies cannot (rationally) engage in activities that erode shareholder value. His matrix provides a classification of CSR activity according to whether it is “instrumental” and clearly is intended to serve shareholders’ economic interests (e.g., cause-related marketing campaigns) or “intrinsic” and motivated, at least initially, by the belief that it is “the right thing to do”, though it might not be of economic benefit to shareholders. Intrinsic CSR actions are “strategic” or “structural”.

Strategic CSR at the same time as benefiting society might also benefit shareholders by being aligned with corporate strategy, but this outcome is unclear at the time such actions are contemplated (e.g., James Burke’s famous decision as CEO of Johnson and Johnson to recall Tylenol following deaths from product tampering, at considerable expense and despite advice to the contrary from the FBI and others). There are impediments to *structural* CSR because it would not benefit shareholders and, Martin argues, requires collective action (of businesses and possibly others, such as NGOs) or government mandate (e.g., air bags in automobiles).

In 1999, engaging in socially responsible pricing by reducing the price of ARVs in developing countries from between \$10,000 to \$1,000 (Zone I of Figure 2) would have been consistent with strategic CSR, where society benefits but it was unclear that benefits would accrue to shareholders. It would have taken a commitment to a normative case for CSR or at least a leap of faith by managers. While total industry contribution from developing countries would have been maximized, the additional contribution was relatively modest and there were considerable risks attached to the use of tiered pricing. In Zone II, contribution declines from a maximum to zero and becomes increasingly negative in Zone III, and it was not apparent that any countervailing benefit was likely to be forthcoming from consumers, employees, NGOs or

governments. Zone III pricing would most certainly have been structural CSR; it would have benefited society but reduced shareholder value.

In 2003, pricing toward the lower end of Zone I has become the norm and firms can be instrumentally motivated in pursuing this pricing policy, so this is no longer strategic CSR. Moving to prices within Zone II requires some sacrifice of profit even with the donor funding available, and thus is more consistent with strategic CSR. Business leaders do this because they are intrinsically motivated—acting on an ethical imperative. However, the legitimacy of their actions and at least some of the pressure to act has come from the increased engagement with the issue by NGOs, consumers, employees and governments. Action might ultimately be in the best interests of shareholders as well as society; for example, it might allow the industry to retain what is generally a highly profitable business model. Zone III pricing would permit welfare maximization (assuming adequate healthcare infrastructure), but shareholders would not be well served (it would eliminate all industry profits from the category and probably more). As in 1999, pricing in Zone III demands the involvement of other parties, such as governments and NGOs—the firm cannot do this alone—consistent with Martin’s notion of structural CSR.

What Could the Pharmaceutical Industry Have Done Differently?

In the context of the access to essential medicines issue, it is difficult to see how multinationals (certainly, if publicly held) could have maximized social welfare acting alone, even assuming this had been their intent. The economic costs would have been so high, in this case running into billions of dollars, that multinationals alone could not reasonably be expected to bear them (aside from whether multinationals could address other obstacles to drug access, beyond price). Multinationals could, however, have significantly enhanced social welfare. Instead of persuading developed-country governments to assist them in deterring patent erosion in

developing countries, they could have taken a proactive stance and assumed leadership in devising a coordinated strategy to reach the poorest patients, by doing the following.

Accepting sub-optimal earnings in developing countries. While it is unrealistic to expect stockholders of multinationals to put up billions of dollars to provide drugs to the neediest when powerful governments and private donors contribute little, it is not unreasonable to expect them to absorb a certain level of contribution reduction (in this case, less than 1% of profits earned in developed countries) in order to save lives. Given that not all multinationals' products are life-saving drugs, such sacrifices are not required on all products and shedding a portion of developing-country profits is unlikely to threaten multinationals' business model. However, as we show, there is a role for other stakeholders to help address barriers to price reduction.

In light of the reputational impact on the industry during this period as a result of the access issue, the business case for CSR may have provided sufficient incentive for price reductions of the magnitude reflected in Zone II in Figure 2 (i.e., to \$300-500). This is with the benefit of hindsight. In contrast, one might also point to the normative case.

Acknowledging a normative case. Social contract theory can provide the normative rationale (Donaldson 1982; Dunfee, Smith and Ross 1999). Consistent with classic social contract theory (e.g., Locke, Hobbes, Rousseau), Donaldson (1982) identifies a social contract for business founded on consent; i.e., he asserts that corporations exist only through the cooperation and commitment of society. This suggests an implied agreement between the corporation and society. As Donaldson (1982, p. 42) writes: "If General Motors holds society responsible for providing the condition of its existence, then for what does society hold General Motors responsible? What are the terms of the social contract?" The simplest form of the contract is to specify what business needs from society and what, in turn, are its obligations to society.

In the case of pharmaceutical firms, the social contract appears to provide for special treatment with regard to intellectual property such that new drugs may be patent protected for up to twenty years and monopolistic prices charged during this period (as per Figure 1). In return, society expects the profits from these activities to provide the incentive to develop new drugs, many of which may be life enhancing if not life saving. Arguably, the last 5-10 years have seen this social contract being reinterpreted to include greater provision for poorer sections of society in developing countries.¹⁶ The responses of GSK's CEO, Jean-Pierre Garnier, to critics at GSK's 2002 Annual General Meeting reflect this view, though they also reveal the importance of employees as a potential motivator underpinning CSR's business case:

Some months ago ... I said that I did not want to be head of a company that caters only to the rich. I made access to medicines in poorer countries a priority and I take this opportunity to renew that pledge. We have 110,000 people who go to work every morning because they are pro-public health. We have to make a profit for our shareholders but the primary objective of any policy put forward in the industry is public health.¹⁷

Challenging governments and donors. By taking a proactive welfare-enhancing stance, multinationals could perhaps have challenged governments and private donors to assume the bulk of the financial costs. While in the short run, implementing a differential pricing system might have involved assuming transaction costs of managing the system, it would have allowed multinationals to take the high ground and enhanced NGOs' pressure on donors and governments to provide greater financial assistance for drug procurement. Moreover, as the flow of financial assistance increased multinationals would have benefited by selling more drugs.

¹⁶ An alternative social contract might be proposed whereby patent protection is treated as a special dispensation for pharmaceutical firms in developed world markets only, with patents inapplicable in developing-country contexts (after all, gray markets and the threat of diversion are the problem of rich countries, not the most poor). However, at the very least, this would be inconsistent with broader international trade developments and efforts to protect intellectual property (but see Grace 2003 for a response to this problem).

¹⁷ Smith and Duncan, op. cit. Similarly, Merck's culture is committed to the alleviation of suffering and this is recognized to be an important motivator of its staff. Asked about why Merck chose to donate Mectizan, the river blindness drug, Roy Vagelos, Merck's CEO, said it was because of "... the people at Merck. The research people and how disappointed they would be if the drug never reached the people that would benefit" (Hawthorne 2003, p. 17).

Facilitating price discrimination. Diversion is a major risk for a differential pricing strategy and the challenges of gray markets should not be understated (Myers and Griffith 1999). However, in various industries (e.g., automotive, retail, airline, aircraft and hotels) firms have developed strategies to segment markets and design product and service packages in ways that reduce the chances of product flow across markets. Given that much of the developed world is served with drugs paid for by insurance companies or national health providers, with appropriate packaging and branding it might have been possible to devise ways to limit gray markets to levels low enough to make price discrimination effective.

Working with generic manufacturers. One of the serious challenges to manufacturers of patented drugs is competition from generic drug manufacturers. While these companies pose serious threats in the marketplace they also serve as valuable suppliers who help contain manufacturing costs. Multinationals have to strike the appropriate balance in terms of combating them and cooperating with them (Economist 2004). In the effort to supply developing-country markets with inexpensive drugs there is little reason why multinationals could not have relied on supply from generic drug manufacturers, especially if their own variable costs exceeded those of generic manufacturers.

Willingness to accept the hassle. The top management of any organization must juggle numerous projects that compete for its attention. Under ordinary circumstances it is important that managers focus on the most important activities from a profit viewpoint. When lives are at stake, however, there is at least a moral imperative for giving attention to irksome problems that present little apparent profit potential but great opportunity for enhancing human welfare. Gupta and Taliento (2003, p. 100) assert that there is “a moral, strategic, and financial responsibility to do so” on the part of companies seeking to benefit from globalization.

Socially Responsible Pricing Beyond the Pharmaceutical Industry

There is rising interest in multinationals' impact on poverty alleviation (Jain and Vachani, 2004). Prahalad and Hammond (2002) suggest that serving the base of the world's economic pyramid could be lucrative as well as potentially improve the lives of billions of people. However, it is the very bottom of the pyramid where most HIV/AIDS victims are to be found—the 20% earning less than \$1/day (World Bank 2003). Our analysis of the access issue suggests, at least in the context of AIDS drugs, it is difficult to make the case that this market could be lucrative for multinational drug companies unless donors commit substantial funds to procure drugs, some of which flow through to multinationals as profits. However, it is possible to see how this most vulnerable segment of the world's population could have its life chances dramatically enhanced as a result of multilateral action, with firms willingly or under pressure making provision for drug access in combination with aid agencies, NGOs and others. We have suggested that this outcome—albeit somewhat speculative as yet for many disease categories—may be realized via differential pricing.

It is sometimes claimed that the pharmaceutical industry is a special case. Thus, we identify other products and markets where we might find pressure to adopt this form of socially responsible pricing and where multinationals could extend their reach to the less advantaged parts of the world's economic pyramid. That said, while the disparity in income between developed- and developing-country markets suggests that the scope for socially responsible pricing is greater in the latter, with more than 12% of the U.S. population officially below the poverty line, there is ample opportunity for firms to look at home too (though the greater physical proximity suggests the diversion and price referencing problems are also likely to be greater).

Our analysis suggests that socially responsible (differential) pricing is likely to occur when the following conditions exist: 1) an element of monopoly control; 2) high fixed costs and

low variable costs; 3) a life-saving or profoundly life-enhancing product or service; and, 4) a differential ability to pay across market segments. Examples of such products would be those that help alleviate poverty by providing necessities such as food, healthcare, and education. Outside healthcare, we might include computer software, educational books, and agricultural inputs such as high-yielding seeds.¹⁸ Intellectual property is key to competitive advantage in these industries and enables firms to enjoy market power and command prices several times variable cost.

In the software industry, Microsoft has been forced to move away from uniform pricing to differential pricing with steep discounts in Asian developing countries because of two factors (Harney 2004). First, loss of market to pirated software. For example, in China pirated software accounts for about 90% of the market. Second, the decision by large developing-country governments, such as Brazil's, to shift to free, or inexpensive, substitutes such as Linux. In educational publishing, companies such as McGraw Hill and Prentice Hall have used differential pricing of textbooks to serve developing-country customers for over thirty years. In the agriculture sector, there is concern that wider acceptance of higher-yielding genetically-modified seeds will result in increasing concentration and market power of suppliers, such as Monsanto, resulting in high prices. Some experts feel that developing-country farmers, who might be unable to afford the higher priced seeds, risk becoming uncompetitive in international markets (Steed 2002). The Commission on Intellectual Property Rights set up by the British government's Department for International Development has recommended that developing countries should refrain from providing patent protection for plant varieties (Commission on Intellectual Property

¹⁸ It might be argued that, unlike healthcare, these products and services are life enhancing rather than life saving and thus the case for socially responsible pricing is less compelling and, to the extent that they are life enhancing rather than essential, people might be better off with subsidized incomes and the capacity to exercise choice. We note that some of these products are clearly life saving (e.g., seeds that enhance food security). Further, our argument can be buttressed from a positive rights perspective, according to which one might assert a right to education, for example (consistent with Article 26 of the U.N. Declaration of Human Rights).

Rights 2002). Depending on how the industry and the WTO rules on intellectual property rights evolve, there could be an argument for differential pricing of seeds across countries.

With the examples outside the pharmaceutical industry, as with AIDS drugs, there are facilitating factors and potential obstacles to socially responsible pricing. NGO activism is a likely stimulus—and, arguably, set to grow (Spar and La Mure 2003; Teegen, Doh and Vachani 2005). The risks of diversion present a major obstacle that needs to be overcome. Equally, with greater transparency of pricing (especially via the internet), there is also the risk of lower prices in one market leading to downward pressure on prices in another higher-priced market. Nonetheless, as we show in our analysis of the issue of access to AIDS drugs, it is possible for these challenges to be met and the prospects for the world's poorest people to be substantially improved.

CONCLUSIONS

The problem of inadequate access to essential medicines has profound implications beyond its effects on the many millions who suffer and die prematurely. It is an issue of corporate social responsibility to the extent that pharmaceutical companies could substantially improve access and a major marketing strategy issue where price is identified as an obstacle to access and differential pricing strategies are a possible solution. We suggest that these pricing strategies are a form of socially responsible pricing—pricing that takes account of ability to pay and is intended to maintain or enhance social welfare, the firm's economic interests notwithstanding. An examination of AIDS drug pricing between 1999 and 2003 shows how differential pricing has considerably increased access to ARVs, but not entirely as a result of discretionary action by the pharmaceutical companies. Even though our economic analysis suggests that developing country contribution would likely have been greater if firms had priced substantially lower in developing countries relative to developed countries in 1999, there were major impediments to be overcome. We conclude by commenting on some of the more important lessons that emerge with regard to

the pharmaceutical industry and the pricing of essential medicines and, more broadly, the scope for socially responsible pricing in other industries.

Lessons for the pharmaceutical companies. Developing countries are not a priority for the research-based pharmaceutical industry because although potentially huge in volume, the size of the market monetarily is close to insignificant. For example, in 2002, Africa represented approximately 1.3% of global pharmaceutical industry sales of just over \$400 billion.¹⁹ From an economic mindset, the developing-country market may not seem worth focusing on. Modest drug donation and out-licensing programs allow the industry to appear to be doing something and in some cases have made an important contribution, but these initiatives are of limited scope, at least relative to HIV/AIDS. It was disingenuous of the industry to argue that price wasn't an obstacle to access and certainly the industry could have acted sooner to lower ARV prices substantially. Over 1999-2003, prices were lowered by more than 90% and yet likely still allowed a mark-up many firms in other industries would be envious of (we estimate 100-200% on variable cost).

We have shown that differential pricing raises the prospect of diversion and price referencing that can affect lucrative developed-country markets, and of inadequate infrastructure that can constrain drug distribution and increase the likelihood of drug-resistant strains. There would also be increased administrative costs and less likelihood of action by other parties. Thus, a differential pricing strategy is unattractive from an economic standpoint. However, we might speculate on the extent to which consideration of these factors *actually* worked against an earlier shift to differential pricing. As likely, perhaps, was simply an inertia and “business as usual” approach in the face of a pandemic. Either way, however, when lives are at stake, managers need to be able to switch from an economic mindset to a more socially responsive mindset and ask

¹⁹ Source: IMS Health, IMS World Review 2003 (available at www.ims-global.com).

what strategies are needed to enhance welfare while containing costs and risks. This can be instrumental in achieving socially responsible pricing.

Our examination of AIDS drug pricing over 1999-2003 shows that the adoption of (more) socially responsible pricing was not purely the result of firms acting on their own volition in line with a normative case for CSR. Indeed, many of the industry's critics would question whether normative considerations figured at all. What is clear, however, is that the business case became compelling through a combination of activities by multiple stakeholders. Socially responsible pricing was not only a way to proactively enhance welfare but also to preempt pressure from NGOs and others that would ultimately force multinationals to price differentially anyway. The industry was being pilloried in the media as a result of criticism by NGOs (and some investors). Political support was reduced as protecting intellectual property rights was being interpreted as detrimental to developing countries and more latitude was being granted to generic products in the face of a growing realization of the impact of HIV/AIDS. With the scale of the problem becoming more apparent, multilateral organizations, governments and foundations began taking decisive action. An individual firm's scope for determining price was substantially reduced.

Of the many lessons evident for the pharmaceutical industry, perhaps the most important is the need for a fundamental shift in understanding of its social responsibilities with regard to developing countries. This shift speaks to a requirement for socially responsible pricing, by accepting sub-optimal earnings in developing countries and finding ways to reduce the obstacles, in combination with other stakeholders. This proactive stance goes beyond pricing to include, for example, R&D on tropical diseases, not an industry priority of late.

Lessons for policymakers. Contribution margins on drugs are huge relative to most industries, but policymakers and others should not automatically assume that resistance to differential pricing reflects a desire to profit from developing countries. More likely is the fear of

losing profits in developed country markets. Governments and other parties could do more to recognize the constraints on CSR and, more specifically, help a move toward socially responsible pricing by addressing the barriers, such as the risk of diversion.

Lessons for firms in other industries. As we show, other industries have characteristics similar to those of the pharmaceutical industry and suggest a possible opportunity—or potential pressure—for socially responsible pricing. For managers in such industries who wish to enhance their firm’s contribution to society and preempt activism that could seriously tarnish their image and jeopardize shareholder value, we have four suggestions: 1) *Define the opportunity and the barriers.* Carefully assess the opportunity to enhance social welfare through differential pricing, its impact on profits, and the barriers that prevent it from being achieved. 2) *Anticipate pressures and seize the initiative.* If high prices deprive consumers of major life-enhancing products and variable costs are low, pressure on firms may well be inevitable. Firms that seize the initiative and take the lead in moving multiple stakeholders forward toward reduction of barriers to socially responsible pricing can hope to achieve the objective of enhancing social welfare while preserving shareholders’ interests. 3) *Partner with diverse stakeholders.* Creating conditions for socially responsible pricing calls for coalitions among odd partners: multinationals, NGOs, developing- and developed-country governments and multilateral institutions. Managers need to deal with this diverse set of constituents, some of whom can be difficult to understand and work with. 4) *Use generics for leverage.* Firms may need to recast relationships with manufacturers of generics. They can become partners instead of competitors, helping reduce variable costs and extending reach into the lowest levels of the pyramid, where poverty has its strongest grip—and where relatively small investments can make a disproportionately large improvement in social welfare.

Figure 1
Modified Business Model for Research-based Industry

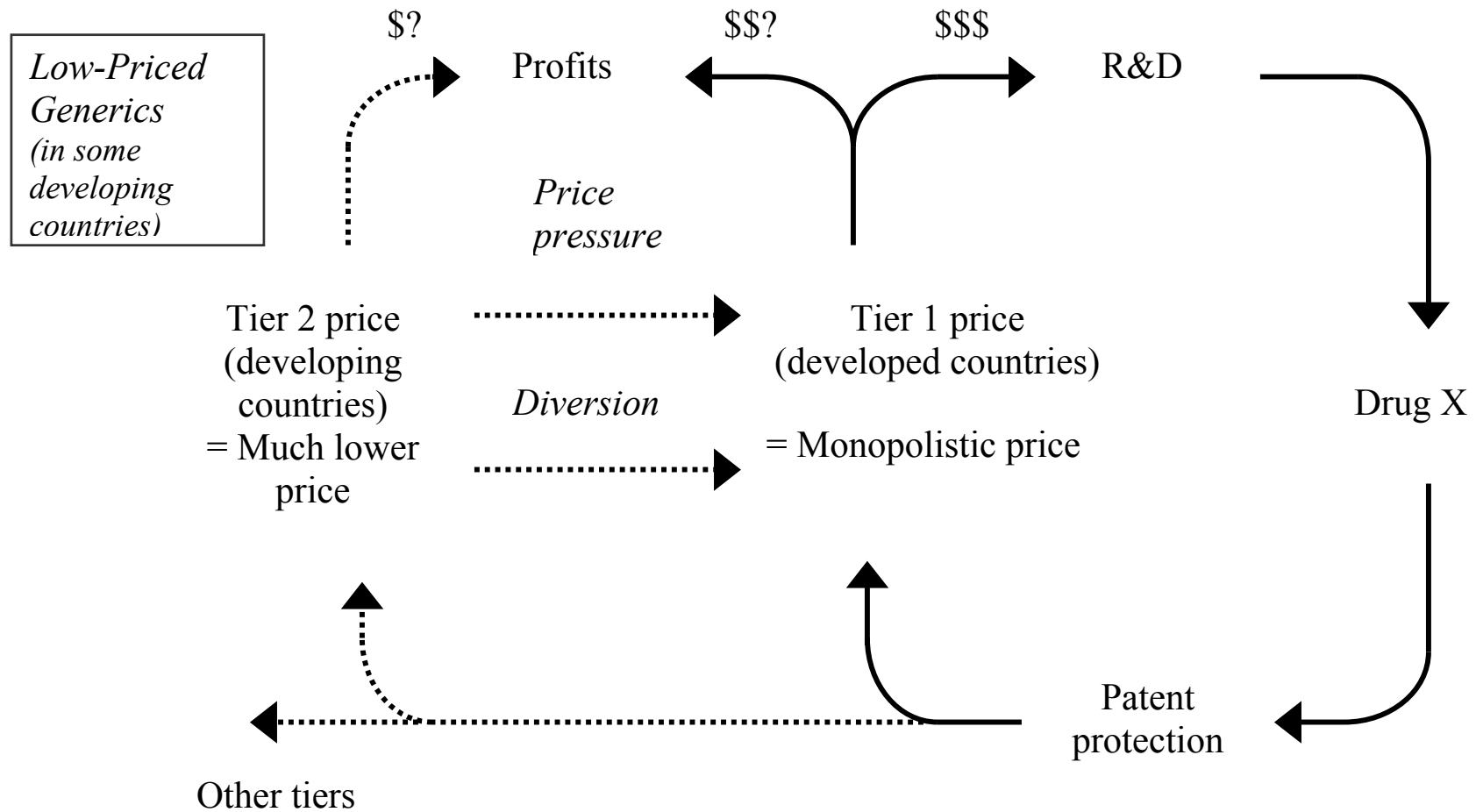


Figure 2

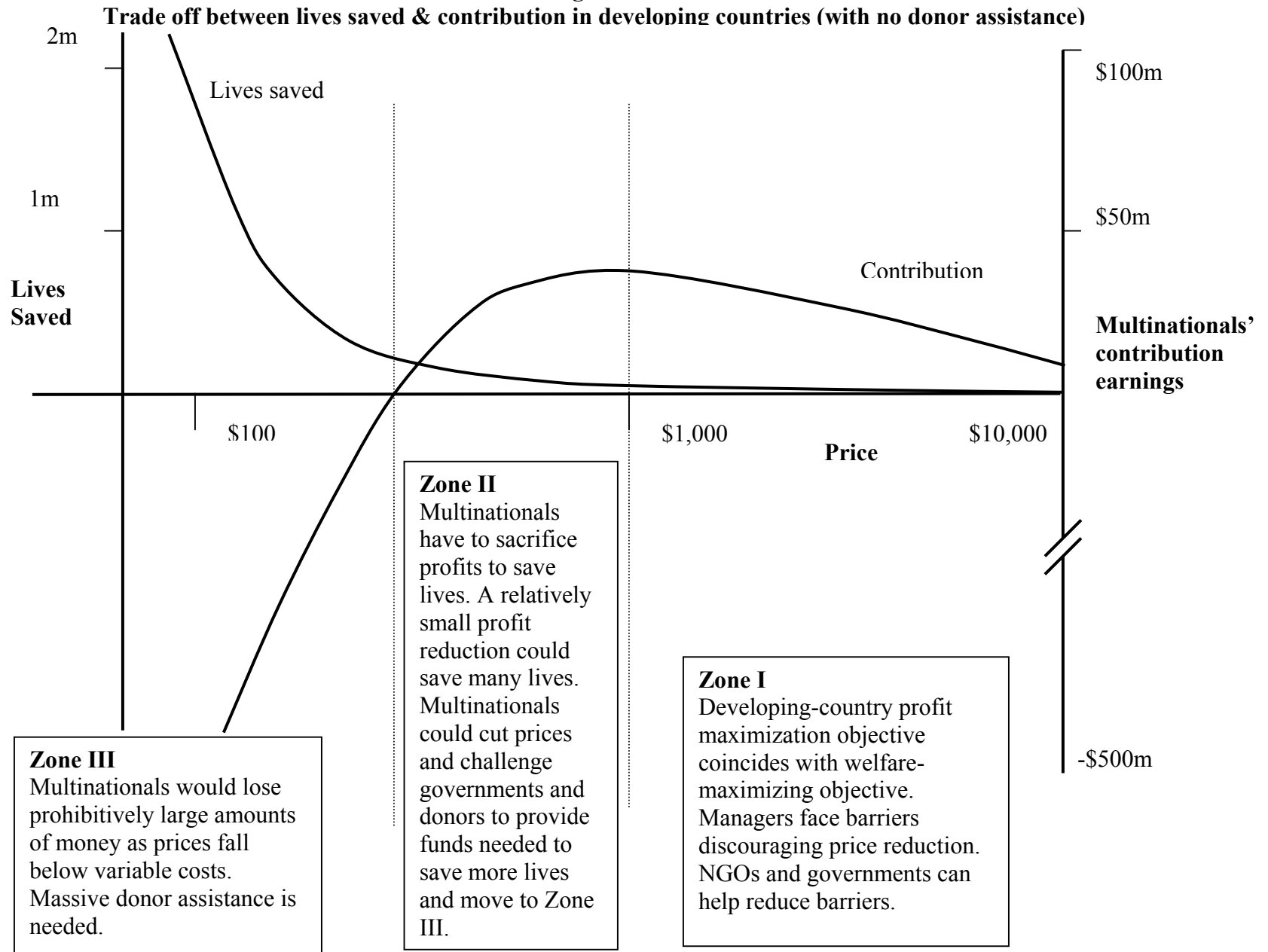


Figure 3

Trade off between lives saved & contribution with \$600 m of donor assistance

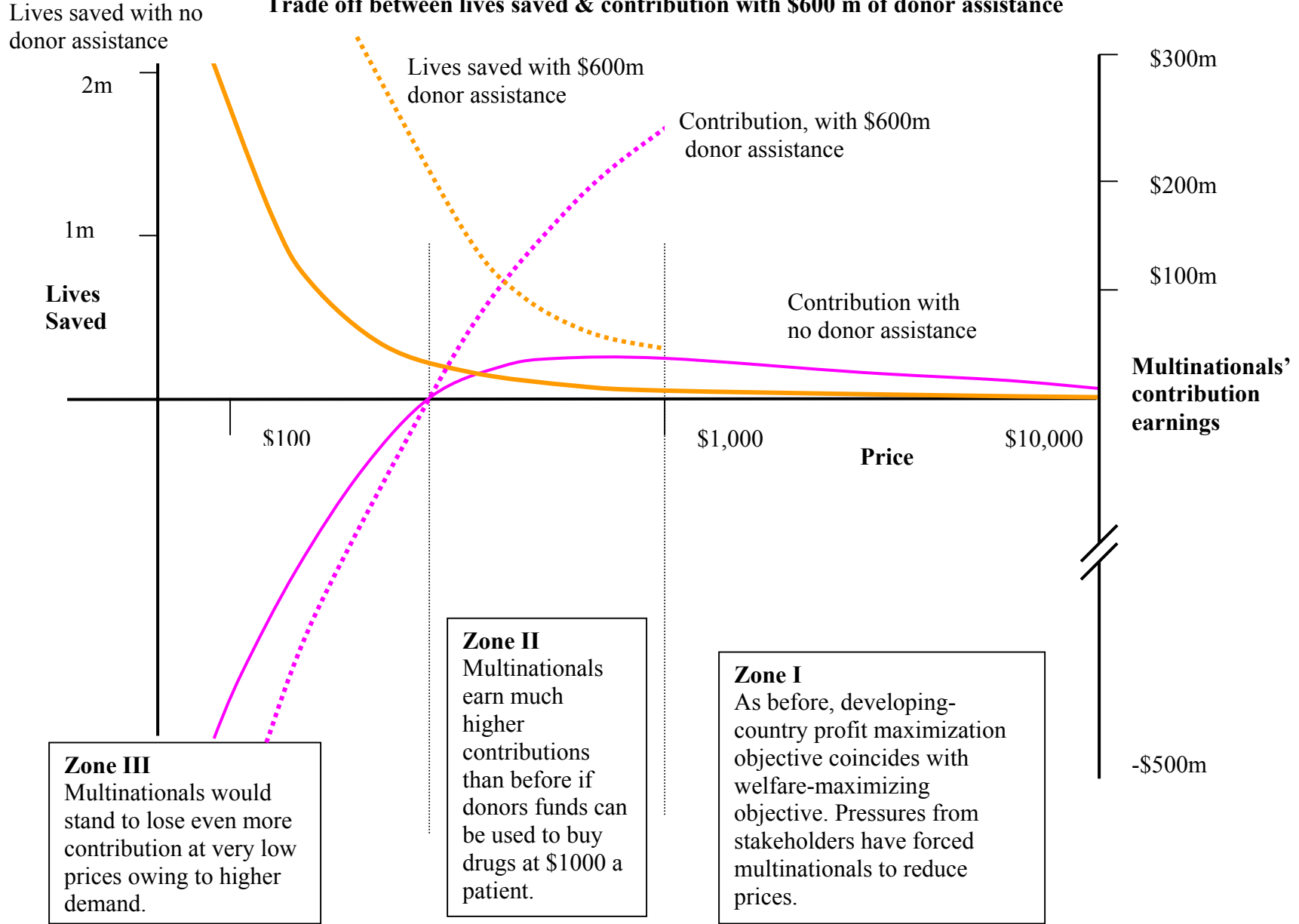
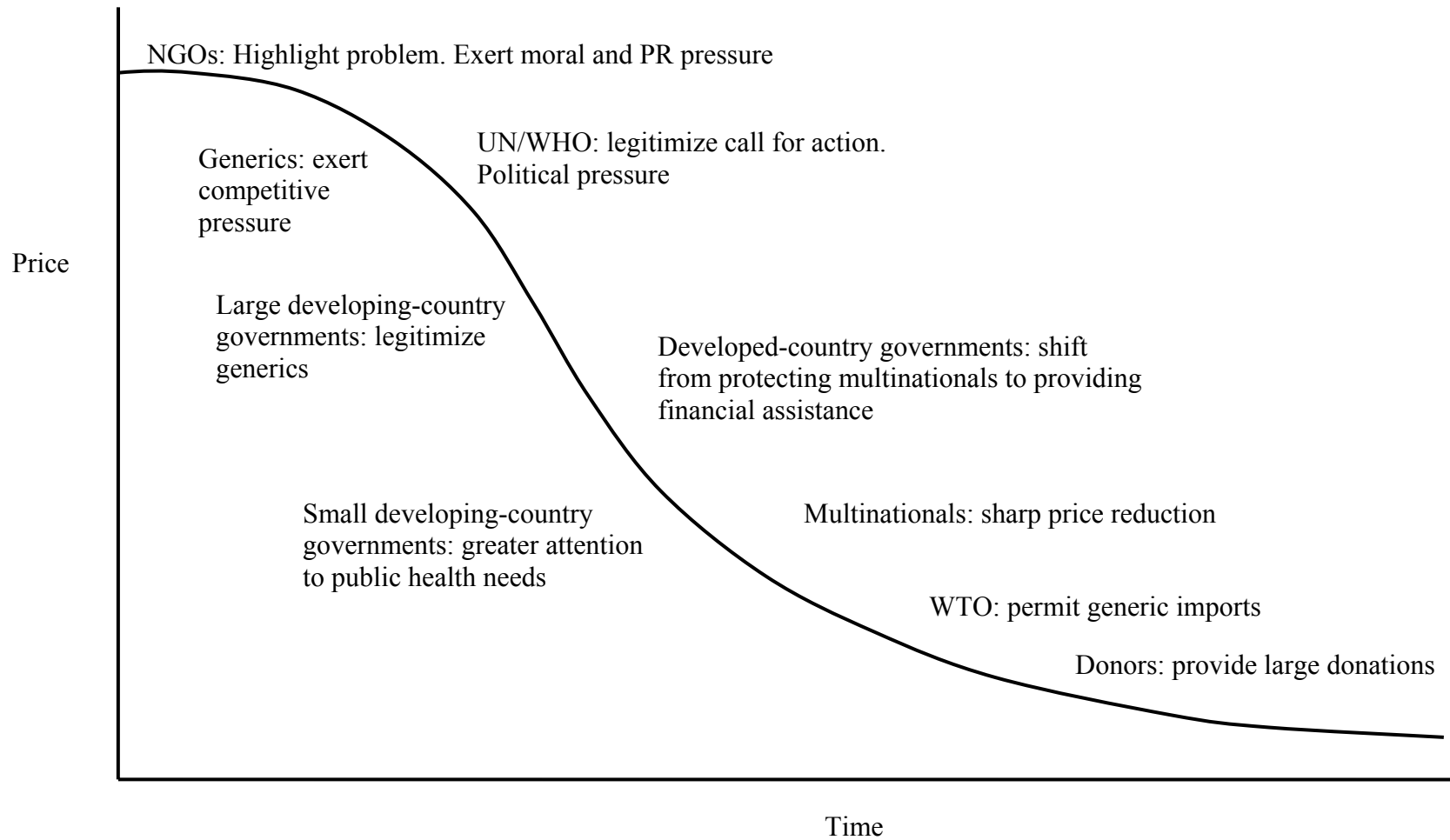


Figure 4
Role Played By Major Stakeholders



Appendix: Demand And Contribution Estimates

Demand estimation (assuming negligible donor assistance)

We estimated demand for ARVs in low-income developing countries (in sub-Saharan Africa and Asia) at different prices assuming negligible donor assistance, as was the case in 1999. We made three assumptions. 1) The demand curve is curvilinear, such as the constant elasticity demand curve, which is widely used in business forecasting: $P = aQ^b$. (P is the price for a year's supply of ARV for one patient, Q is the demand in thousands, and a and b are constants. This is justified since it is generally agreed that demand changes little at high prices and a great deal at low prices. 2) In 1999, the developing-country demand at a \$1000 price²⁰ was about 50,000. This is a reasonable assumption because at the end of 2001, when more donor funds were available than in 1999, the total number receiving ARVs in sub-Saharan Africa and Asia was less than 60,000.²¹ 3) As price falls by a factor of four, demand increases by a factor of ten. This is based on findings of a McKinsey study in Uganda (UNAIDS 2002, p. 146). By using assumptions 2 and 3 we derived the demand curve to be:

$$P = 10,542Q^{-0.6021}$$

Reality checks. To test if the model produces realistic estimates at other points we checked its predictions at the extremities of the range. At the low-price end our model predicts price would have to be \$56 for demand to rise to 6 million. This is consistent with health economists estimates that that price would have to fall to \$30-40 before cost ceases to be a barrier to drug access for AIDS victims (Brown 2002) of which there are estimated to be 5-6 million in developing countries (WHO 2003). At the high-price end our model estimates demand would fall to 1000 at a price of \$10,542. This is consistent with statements of UN officials that a negligible number of developing-country AIDS victims could afford ARV treatment at \$10,000.

Limitations. While this demand curve helps determine intermediate points to estimate variation in contribution earnings as prices go from \$10,000 to \$1,000, one cannot use it to predict precise demand, especially in the lower-price region where small changes in assumptions can change demand substantially.

Contribution estimates

In order to calculate contributions earned by research-based pharmaceutical multinationals we estimated their variable costs using CIPLA's manufacturing cost structure (CIPLA 2002) and making significant provision for higher costs in developed countries. As shown in Table A1, we arrived at variable costs for research-based pharmaceutical multinationals ranging from \$300 to \$500.

²⁰ Prices fell drastically in 2000, and judging by accounts in UNAIDS reports, it is reasonable to assume that during 2001 prices had fallen to around \$1000 in developing countries.

²¹ It was less than 30,000 each in sub-Saharan Africa and Asia (UNAIDS, 2002, p. 22-23 and 29).

Table A1: Estimated Variable Manufacturing Costs of a Year's Supply of ARV Drugs

	Generic product cost Dollars per unit	Pharmaceutical multinationals' projected variable cost			
		Low estimate		High estimate	
		Multiple of generic cost	Dollars per unit	Multiple of generic cost	Dollars per unit
Materials	135	100%	135	150%	203
Salaries & wages	14	500%	70	700%	98
Manufacturing expenses	16	200%	32	400%	64
Depreciation	5	200%	10	400%	20
Total manufacturing cost	170		247		385
SG&A	50	100%	50	200%	100
Total manufacturing cost & SGA	220		297 Rounded up to 300		485 Rounded up to 500

With minimal donor assistance (1999)

We used the demand curve and variable cost estimates to model multinationals' contributions at different price points in Table A2.

Table A2: Annual demand and contribution estimates for AIDS drugs in developing countries (for three-drug ARV cocktail with minimal donor assistance, 1999)

Price	Number of patients	Revenue	Contribution assuming \$300 variable cost	Contribution assuming \$500 variable cost
\$	('000)	(\$m.)	(\$m.)	(\$m.)
10000	1	10	10	10
4000	5	20	19	18
2500	11	28	24	22
1000	50	50	35	25
750	81	61	36	20
500	158	79	32	0
400	229	92	23	-23
300	369	111	0	-74
200	724	145	-72	-217
100	2290	229	-458	-916
56	6000	336	-1464	-2664
40	6500	260	-1690	-2990

We tested the sensitivity of our analysis to changes in demand assumptions with two other demand curves comprising two linear segments and more conservative demand estimates at lower prices: 1 m and 0.2 m instead of 2.29 m. Our inference with regard to a higher contribution opportunity at lower prices did not change.

With \$600 million donor assistance (2003)

Table A3 provides estimates of demand if we assume that US\$300 million is made available from the Global Fund and the same amount from the US government's bilateral aid program, and if drug pricing is \$300 or less for purchases under the Global Fund and \$1,000 or less for US government aid. When price drops to \$1,000 we assume that 300,000 patients are served with drugs bought with \$300 million from the US government's bilateral aid program.²² As prices drop further these funds buy proportionately more drugs. When prices fall to \$300 the demand spikes on account of \$300 million becoming available from the Global Fund to buy drugs. The demand stops growing at prices below \$100 as all those needing the drugs are accounted for.

We see that there is much more contribution to be made at the price point of \$1000 than at higher prices. This is driven by the fact that demand picks up sharply at prices of \$1000 and below as donor funds take effect. Furthermore, as long as a significant portion of donor funds are available to buy drugs at \$1,000 (rather than at \$300) there is little incentive for multinationals to drop prices below the \$1000 point, where contributions are much higher.

Table A3: Annual demand and contribution estimates for AIDS drugs in developing countries (for three-drug ARV cocktail with \$600 m. donor assistance, 2003)

Price	Number of patients				Revenue	Contribution assuming \$300 variable cost	Contribution assuming \$500 variable cost
	Self supported	Paid for by Global Fund	Paid for by US Funds	Total			
\$	('000)	('000)	('000)	('000)	(\$m.)	(\$m.)	(\$m.)
10000	1	0	0	1	10	10	10
4000	5	0	0	5	20	19	18
2500	11	0	0	11	27.5	24	22
1000	50	0	300	350	350	245	175
750	81	0	400	481	361	216	120
500	158	0	600	758	379	152	0
400	229	0	750	979	392	98	-98
300	369	1000	1000	2369	711	0	-474
200	724	1500	1500	3724	745	-372	-1117
100	500	3000	3000	6500	650	-1300	-2600
56	500	3000	3000	6500	364	-1586	-2886
40	500	3000	3000	6500	260	-1690	-2990

²² Some of these could be among those previously counted as potential self-supporting customers but this number is difficult to estimate and we assume that demand from self-supported patients remains unchanged at 50,000.

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