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A Comparison of Alternative Policies to Promote Health in Developing Economies

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ABSTRACT

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Developing nations are in dire need of pharmaceuticals designed to combat the diseases that are specific to their nations. The pharmaceutical industry is reluctant to research and produce these drugs and vaccines because it is more profitable for them to produce pharmaceuticals that will be purchased by wealthy nations.

The U.S. government must develop a way to encourage the research and production of pharmaceuticals needed primarily in developing countries. There are a variety of options available. In order to evaluate which program(s) should be implemented, it is important to examine the likely effects of each program, particularly the risks of each program. A graph outlining the proposed effects of a purchase precommitment is used to analyze the effects that such a policy might have.

A purchase precommitment will allow for firms to earn a profit, while ensuring a low risk for the U.S. government. It would also ensure that developing nations would receive the pharmaceuticals they desperately need. A combination of programs will likely result in the best outcome for the U.S. government, taxpayers, pharmaceutical firms, and the citizens of developing nations. The U.S. government must take the necessary steps to guarantee the health of people living in developing countries.

A Comparison of Alternative Policies to Promote Health in Developing Economies

Pharmaceutical companies are reluctant to invest in drugs and vaccines needed primarily, or exclusively, in developing nations. The U.S. government should pursue policy options in order to advance research and development of such pharmaceuticals. The question is how the government should go about this task. The government may either utilize programs designed to subsidize research or implement policies to create a market. The government could also combine a number of programs, which would most certainly spur research for the healthcare needs of developing nations. Risk factors must also be kept in mind, for the sake of the government and the taxpayers. The government must stimulate the development of new drugs and vaccines targeting the health issues faced primarily by developing nations while maintaining a low level of risk.

The majority of pharmaceuticals developed today are designed to combat diseases that pose a problem in developed countries. The basic reasoning for this is that there is a market for these drugs. Wealthy nations are willing to spend money for cures for diseases that affect their own citizens. Developing nations, however, cannot afford to spend a great deal of money on healthcare for their citizens. In 1998, low-income sub-Saharan African nations spent approximately six percent for their per capita GDP on healthcare, an amount equivalent to \$18 per person. Health spending in the U.S. for the same year was the equivalent of more than \$4,000 per person, or approximately thirteen percent of its per capita income (Kremer, 70).

There is no market for the sale of drugs to specifically combat the diseases that predominantly affect developing nations. These nations benefit to some degree from drugs designed for use in developed nations, but what they need are specialized pharmaceuticals

developed for their distinct health issues. Less than five percent of the money used for health research and development conducted by private industry in 1992 was spent on diseases specific to less developed nations (Kremer, 69).

In addition to needing specific types of pharmaceuticals, developing nations also require a certain level of feasibility in distributing these drugs. In particular, developing nations need vaccines more than they do drugs. Vaccines are often much more portable and easy to deliver. They are usually less time consuming as well, and more specifically, do not require frequent dosage. Vaccines are also better suited for the needs of developing nations because only limited medical knowledge and training is required for their administration.

In order to gauge the full impact of each disease, it is important to look beyond the number of deaths attributed to each disease annually. The effect of each disease can be examined further by looking at Disability Adjusted Life Years (DALYs). DALYs provide an estimate of the wider impact of each disease, accounting for the number of healthy life years lost because of disability as well as the number of deaths caused. Table 1 shows twenty diseases for which 99 percent or more of the global burden fell on low- and middle-income countries in 1990.

The complex nature of disease makes even basic understanding very difficult. This level of uncertainty makes investment both costly and risky. The weakness of the infrastructure in developing nations is certainly an impediment to the distribution of healthcare products. There is a fear that new products will not be purchased and distributed to those who need them. While some products do exist and are used and purchased, there are many others that are not (Webber and Kremer, 2). The lack of healthcare workers in developing countries means that many patients are either not diagnosed at all or do not receive prescriptions. Many drugs, therefore, regardless of price, are not provided to those who desperately need them. Even though vaccines

have been developed to combat a few of the diseases listed in Table 1, the insufficient level of access prevents these vaccines from being widely distributed in developing nations.

Intellectual property rights are what give pharmaceutical firms their advantage in such a competitive industry. Patents are the source of monopoly power in the pharmaceutical industry. Because of the lack of international property rights, particularly in developing countries, firms are less likely to innovate. The 1994 World Trade Organization Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) required the least developed countries to provide 20-year patent protection for pharmaceuticals. The original year set for this standard was 2006. Because of a public backlash over the pricing of AIDS drugs, the WTO extended the deadline to 2016 (Kremer, 74). It is likely that this date could be pushed back even further.

The TRIPS agreement is not without flaws. It provides a stipulation that countries can temporarily suspend patent protection in times of national emergencies. The definition of what qualifies as a national emergency was left ambiguous, which certainly lessens the effectiveness of such a proposal. Additionally, the lack of enforcement of international intellectual property rights is seen as a deterrent to innovation. There are also some downsides to increasing patent protection. It is possible that increasing patent protection could reduce access because of monopolistic price levels.

As mentioned earlier, though there are a large number of people who need treatments for diseases affecting mainly developing countries, the effective market is incredibly small. The tremendous social benefit of vaccines for this market is incomparable to the perhaps nonexistent private benefits. Another important factor to consider in the question of a market is the lack of specifics in terms of number of affected individuals. The estimates of probable patients are only approximations, not specifics.

There are two different types of programs that can be implemented to spur research and development. Push programs subsidize research inputs, and pull programs reward research outputs (Kremer, 82). Both programs contain attractive incentives, but can also contain significant drawbacks.

Push programs can be described as those that directly reduce the costs of research and development. Push programs include direct grants given to researchers as well as tax credits given for research and development. Grants to researchers upfront for the development of drugs are highly risky. Although the researchers might have genuine intentions, this is not always guaranteed. Researchers in the past have, unfortunately, greatly misused funds allocated to them for research. In addition to this issue, there is no guarantee that a suitable cure will be found for the disease sought. A large sum of money could likely be spent with nothing to show for it. Tax credits for research are also risky. Some risks include possible attempts by manufacturers to claim that research was conducted in connection with a vaccine needed in developing countries, when in fact it was being used in connection with a drug needed primarily in wealthy nations. Additionally, for a disease like AIDS, research could be conducted for strains most prevalent in developed countries, not for the strains that affect developing nations. Frequently included with push programs is the proposal of a faster regulatory review of developed products. By itself it is unlikely to increase the amount of research. In conjunction with other proposals, however, it is likely a positive addition, particularly for smaller firms.

Government-funded research institutions, especially university research labs, also play an important role. Their role is usually to conduct basic research. This basic research will greatly enhance the advances that biotech and pharmaceutical firms will be able to make. Because this knowledge is treated as a public good, this government-funded research saves the industry a lot

of money each year.

Pull programs address the lack of viable markets through the creation of a market (Webber and Kremer, 3). Pull programs are seen as having a much lower risk, particularly for the taxpayer. Under pull programs, governments do not pay out any money until a suitable vaccine or drug is developed. A purchase precommitment is an example of a pull program. This program would commit the government to purchasing a specified number of units of a proven vaccine at a specified price. The commitment would most likely take the form of a contract to ensure that it is legally binding, assuring the pharmaceutical companies of the government's intention and obligation. The most common examples of this program also stipulate a way to make the vaccines available in the nations that need it. This is achieved either by the governments donating the vaccines to the developing nations or charging them a co-payment tied to their respective per capita incomes. However, these programs are not without risk. The fact that output and price must be specified in advance can be risky for both sides. It can be argued that pull programs are not likely to stimulate basic research because of the difficulty in specifying results of basic research in advance (Kremer, 84). The size of the potential market created by purchase precommitments must be large enough to stimulate development from a number of firms. It is estimated that an annual market of up to \$500 million is needed to invigorate a significant level of research (Kremer, 85). It is important to remember that the government would bear no cost unless a suitable product was in fact developed. An additional factor that would be important to consider would be setting the price at an amount per person, not per dose of the vaccine, thereby spurring development of a vaccine that requires as few doses as possible (Glennerster and Kremer, 38). It has also been suggested that a precommitment be combined with an increase in the purchase of existing products. The Gates Foundation, for

example, is attempting to increase the use of underutilized vaccines like that for hepatitis B (Webber and Kremer, 6).

There are other types of pull programs that are also worth considering. One would be the extension of patents to increase the longevity of monopoly power over the market. In order to be effective, though, this proposal would have to be combined with others that would be more likely to create a market. This is because a longer patent in an unattractive market is not an impetus for development. Another possibility would be a tax credit on sales. This is seen as a much more attractive option to legislators, because it essentially eliminates the problems associated with tax credits for research. Although tax credits on sales would require purchase by a nonprofit, government, or international organization, this is becoming increasingly likely given shown interest in purchases by organizations such as the Gates Foundation (Webber and Kremer, 6).

The U.S. government currently provides a tax deduction for pharmaceutical manufacturers who donate their products for use in developing countries. The amount of the deduction, however, is based on the manufacturing cost of the product, which is generally very low (Kremer, 78). This poses a problem, as it is not a large enough incentive for the development of drugs specifically targeted for use in developing nations. A solution to this particular problem would be to alter the tax deduction so that it would be more attractive to pharmaceutical manufacturers. A new tax credit could be implemented based on an estimate of the social benefit of the product, perhaps using DALYs saved as a measure of social benefit.

The Vaccines for the New Millennium Act of 2001 was introduced into both houses of Congress in hopes of encouraging research for pharmaceuticals needed in developing countries. The bill specifically targeted diseases that kill over one million people per year, expressly including HIV/AIDS, malaria, and tuberculosis. Several provisions were included in the bill.

The principal component is a thirty percent tax credit for research and development costs. The bill credits only for actual investments in targeted research during the previous tax year. A provision encouraging research in biotech companies is also key, because many of these companies are not profitable enough for the benefits of tax credits. The bill would make the development credit refundable for biotech companies who have zero income tax liability and gross assets of \$500 million or less. The bill would also allow for a full (100%) tax credit on the sale price of approved vaccines and microbicides to qualified international health organizations or governments in developing countries. Another provision in the bill would create a fund at the U.S. Treasury Department to purchase approved vaccines and microbicides for distribution in developing countries. An additional stipulation in the bill would require the manufacturers to outline a plan to ensure wide access to the product(s) once developed (Collins, 2).

Unfortunately, like previous bills of a similar nature, the Vaccines for the New Millennium Act of 2001 was not passed by Congress. In spite of this, there is hope for passage of a similar bill in the future. The original sponsors of the proposed legislation were Senators John Kerry (D-MA) and Rep. Nancy Pelosi (D-CA). Co-sponsors were Rep. Jennifer Dunn (R-WA) and Senator Bill Frist (R-TN). In the current Congress, Rep. Pelosi has become House Minority Leader and Sen. Frist has become Senate Majority Leader. Additionally, Sen. Kerry is currently seeking the Democratic Presidential Nomination for 2004. Optimistically, these individuals will use their positions of influence to bring support to a measure with similar provisions to the Vaccines for the New Millennium Act of 2001.

By using graphs, we can see what likely effects a precommitment plan will have. In a precommitment situation, as shown in Figure 1, the government would create a market by entering into agreement to pay a certain price (p_1) for a certain amount of the drug (q_1), thus

creating a demand curve. Figure 2 represents the demand of the drug by developing countries before a purchase precommitment is put into place. The demand curve is steeply sloped because even at a very low price, developing nations are unable to purchase a large quantity of the drug. Figure 3 combines the two situations to show the effect a government precommitment plan would have. The firms will produce at output level q_3 , not at the maximum quantity the government had agreed to. Here, we can see that the firms will produce at the level where the marginal revenue and marginal cost curves are equal, giving us the profit maximizing output level, q_3 . By subtracting price level p_3 from the government's agreed-upon price of p_1 , we can obtain the profit per unit produced. We can then multiply this amount by quantity produced, q_3 , to obtain total profit. So, if the government offers a purchase precommitment, and its price level is above that of firm's average total cost level, the firms will make a sizeable profit given the large quantity likely to be produced. The firm will continue to look for ways to lower its average total costs in order to further increase its profits.

A U.S. government policy combining push and pull programs would no doubt have a substantial effect on the amount of research undertaken to combat diseases in developing nations. The Vaccines for the New Millennium Act is certainly a policy option worth considering. It combines programs designed to limit the risk of the government, while at the same time allowing firms to enjoy a healthy profit should they develop an approved treatment. A purchase precommitment would create a significant market for firms to sell their products, yet maintain a low risk level for both taxpayers and legislators. The U.S. government must be willing to bear at least part of the burden of ensuring the health and wellness of developing nations. It is the U.S. government's responsibility to the international community to ensure that pharmaceutical companies produce those vaccines and drugs needed in developing nations.

Figure 1

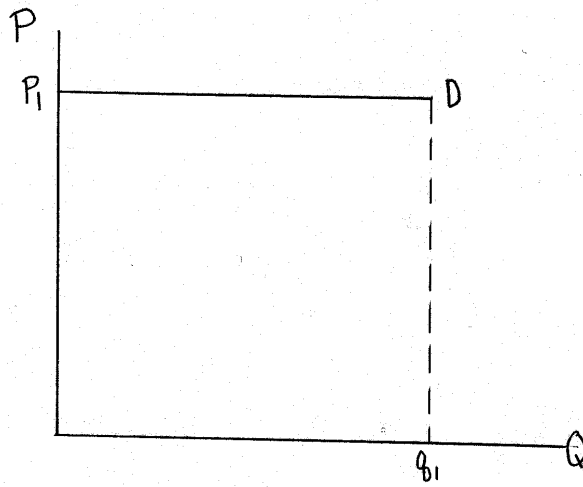


Figure 2

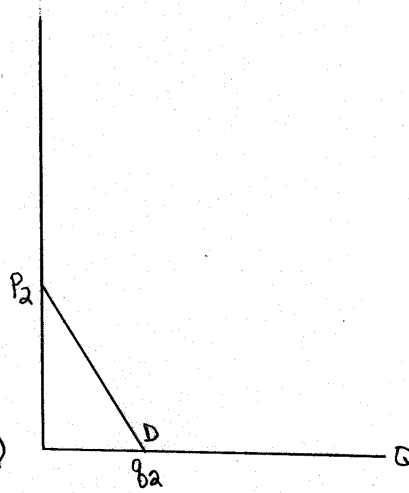


Figure 3

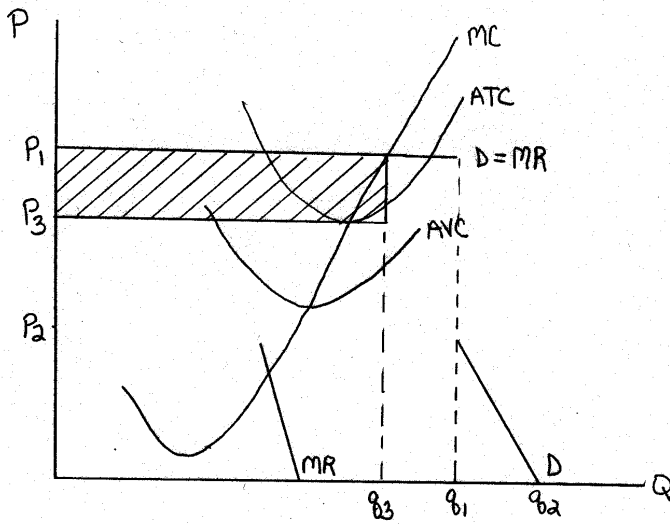


Table 1

Diseases for Which 99 Percent or More of the Global Burden Fell on Low- and Middle-Income Countries in 1990

<i>Disease</i>	<i>Disability Adjusted Life Years</i> (Thousands, 2000)	<i>Deaths per Year</i> (2000)
Diarrhoeal diseases	62,227	2,124,032
Malaria	40,213	1,079,877
Measles	27,549	776,626
Pertussis	12,768	296,099
Tetanus	9,766	308,662
Syphilis	5,574	196,533
Lymphatic filariasis	5,549	404
Ancylostomiasis and necatoriasis (hookworm)	1,829	5,650
Leishmaniasis	1,810	40,913
Schistosomiasis	1,713	11,473
Trichuriasis	1,640	2,123
Trypanosomiasis	1,585	49,668
Trachoma	1,181	14
Onchocerciasis (river blindness)	951	--
Chagas disease	680	21,299
Dengue	433	12,037
Japanese encephalitis	426	3,502
Poliomyelitis	184	675
Leprosy	141	2,268
Diphtheria	114	3,394

Source: Kremer, 71

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