ing music lessons, and charging fees for the performance of his works in public concerts, Mozart earned his living as an entrepreneur in the marketplace. In so doing, says the cognitive psychologist Howard Gardner, Mozart laid "a foundation of independence and self-initiated creation."[12] Mozart saw the market as offering him creative freedom.

The key feature of markets of all kinds is brought home when we look at the growth of new market mechanisms. Benefiting both buyer and seller, any transaction creates value. (Since either party can veto the deal, it must be making both of them better off, in their own eyes, than not trading.) Buying and selling is therefore a form of creation. Elementary as this point is, its importance cannot be overstated. There are gains from trade, and people are relentless in finding ways to realize them.

From fine art to finance, from eBay's online auctions to the Rwandan refugee-camp commerce, new markets are continually being built from the bottom up. Entrepreneurs, restlessly thinking up more efficient ways of transacting, play the part of market designers.

It is not just entrepreneurs who act as market designers. Market design also comes from the top down, with the government taking the lead—sometimes, as we will see next, driven by pressure from their constituents.

THREE

He Who Can't Pay Dies

A horrifying AIDS epidemic engulfed Africa toward the end of the twentieth century. Of the 33 million people infected worldwide as of 2000, 23 million were in Africa. Every single day, AIDS was killing an average of 5,500 Africans. The world had never before seen such high death rates among young adults. At the existing level of risk, in some African countries as many as a half of the fifteen-year-old boys were predicted to die of AIDS.[1]

Antiretroviral drugs successfully countered AIDS. U.S. deaths from AIDS fell 70 percent between 1996 and 1998. But success came mostly in North America and Western Europe. Priced at $10,000 to $15,000 for a year's dosage, the drugs were out of the reach of the majority of the disease's victims worldwide. "Some may think that, because better medicines have been found, the AIDS emergency is over. Alas, no," said United Nations Secretary General Kofi Annan in 2000. For most people living with AIDS, the annual price tag of an antiretroviral regime "belongs, quite simply, in another galaxy."

The drugs were priced at roughly ten times the manufacturing cost, the markup reflecting the companies' patent rights. "The poor have no consumer power, so the market has failed them," said Dr. James Orbinski, president of the aid organization Doctors Without Borders. "I'm tired of the logic that says, 'He who can't pay dies.'"[2]

By any humanitarian standard, the global pharmaceutical market as of

the turn of the century was dysfunctional. It shows us markets at their very worst. At the same time, it shows us markets at their very best. It was market incentives, after all, that had spurred the development of the remarkable life-saving drugs.

A reinvention of the drug market began to occur step by step. Unlike the other market innovations we have looked at, the redesign of the market was pushed by public opinion.

* * * *

The high prices of the AIDS drugs were not the only reason for alarm. Little research was going into vaccines or cures for the awful diseases that killed millions each year in poor countries, like malaria, sleeping sickness, leishmaniasis, and tuberculosis. Meanwhile, vast sums were spent in a campaign for drugs to fight baldness and impotence. Even pets' needs did not go neglected: one company had developed an antidepressant for separation anxiety in dogs.

"Pharmaceutical companies will always aim for maximum profits by marketing a new obesity drug rather than pioneering a novel malaria treatment," said Dr. Bernard Pecoul of Doctors Without Borders, which was campaigning for better access to drugs in the developing world. "When new vaccines or medicines are developed, most of the world's population is left out of the picture." The search for new drugs is directed at the cosmetic afflictions of the rich while overlooking the fatal illnesses of the poor. Medicines against tropical diseases make up a minuscule 1 percent of new drug patents.[3] The pharmaceutical companies specialize in the maladies of the affluent.

A drug used for sleeping sickness, eflornithine, exemplifies the predicament, as recounted by the *New York Times*.[4] Sleeping sickness leads to death after an almost unbearable period of illness. Researchers looking for an anticancer drug discovered eflornithine's effectiveness against sleeping sickness accidently. The drug was so successful at bringing people out of otherwise fatal comas that in Africa it came to be called the "resurrection drug." It was unprofitable, however, so the patent holder ceased making it and stocks ran short. The patent holder's interest was reawakened when it found that eflornithine, used as an ingredient in face cream, could prevent the growth of facial hair in women. Because of this use as a cosmetic, its manufacture was restarted.

Salesmanship is the name of the game. Armies of salespeople hawk drugs to doctors. The industry's marketing costs in the United States are estimated

to be more than $8,000 per physician. Far more is spent on marketing than on the search for new and better drugs. For instance, the Pharmacia Corp., maker of an eye drop for glaucoma, among other products, according to its published accounts spent 40 percent of its revenues on marketing and administration in 1999, twice as much as it spent on research. GlaxoSmithKline, the world's largest maker of AIDS drugs, spent 37 percent of its revenue in 2000 on marketing and administration, and 14 percent on research.[5]

In John le Carré's riveting novel *The Constant Gardener*, about a major drug company's dealings in Kenya, one of the characters calls its executives "the most secretive, duplicitous, mendacious, hypocritical bunch of corporate wide-boys it's been my dubious pleasure to encounter." In the name of "the god Profit," the fictive company, an "amoral monopoly that costs human lives every day," peddles dangerously inadequate drugs, tests its drugs unethically, bribes health officials, and intimidates scientists. "Drugs are the scandal of Africa," the novel's hero says. "If any one thing denotes the western indifference to African suffering it's the miserable shortage of the right drugs, and the disgracefully high prices that the pharmaceutical firms have been exacting over the last thirty years."

Le Carré told an interviewer that in writing the novel he had been driven by his "moral anger" at the pharmaceutical industry's "corporate cant, hypocrisy, corruption, and greed."[6] Vilification makes for gripping fiction. It can serve a useful purpose as a call to arms. But to do constructive economic analysis we need to step back and take a broader view. The novelist's subject is people and their character flaws; the economist's is institutions and how they shape behavior. Tempting as it may be to demonize the companies and their executives, damning the players gets in the way of diagnosing the structural problem.

In neglecting tropical diseases and in setting drug prices high, the pharmaceutical companies are responding to the system they are in: they are reacting to the incentives of the marketplace. It is the companies' fiduciary responsibility to act in their shareholders' interest. They invest where they see some prospect of a return. The resources they have available to devote to research, while large, are not unlimited, and they must make choices of where to direct them. "We can't deny that we try to focus on top markets: cardiovascular, metabolism, anti-infection, etc.," says an executive of the French-German company Aventis. "But we're an industry in a competitive environment. We have a commitment to deliver performance for shareholders."[7]

Innovation is a high-stakes dice roll. A blockbuster drug earns a billion dollars or more a year. Such returns do not come easily. Only three out of ten new drugs, according to the industry, make back their investment costs. Bringing a new drug to market is estimated to cost in the range of $200 to $500 million. (These numbers rest on guesswork, as the drug companies do not disclose their development costs for any individual drug.) Total spending on research in 1999, according to industry data, was over 20 percent of sales.[8]

The risk-taking, it must be said, is well rewarded. In profitability, the pharmaceutical industry ranked comfortably first in the 1999 Fortune 500 list of the top global companies. Its profits were 18 percent of revenues, putting it far ahead of the second-place industry, diversified financial firms, whose profits were 11 percent of revenues; the other industries' profits ranged all the way down to zero. These reported profits overstate the pharmaceutical industry's true profits because of the way the accounting is done (research costs are treated as current outlays, whereas it would make more sense to treat them as investments). Correcting for this accounting bias yields lower but still relatively high returns.[9] The drug industry is profitable.

The companies, nevertheless, are not the primary source of the global drug market's failings. They will do what it takes to maximize their profits. Let us take this as given and move on to the deeper issue of the design of the market.

To cover the costs of the research, expensive and uncertain as it is, any drug that is successfully developed must be priced well above its manufacturing cost. Enabling this is precisely what the patent laws, granting monopoly rights to the innovator, were intended to do. The global pharmaceutical market works exactly as it was designed to work. The challenge for those who believe it is flawed is to devise an alternative market design that would induce better outcomes.

* * * *

The root of the shortcomings in the global pharmaceutical market is not companies' policies but countries' poverty. President Thabo Mbeki of South Africa, opening an international conference on AIDS, pointed to extreme poverty, rather than the disease, as the leading killer across Africa. Lowering the price of the AIDS antiretrovirals would make them accessible to more Africans, but most would still miss out.[10] Purchasing them in the amounts required, even at a far lower price, would bankrupt the health budgets of most African nations. At a 90 percent discount, a year's worth of antiretrovirals would cost more than the per capita income in many African nations.

Spending significant amounts on AIDS drugs would take money away from other urgent needs, like drugs against tuberculosis and pneumonia. And purchasing the AIDS drugs by itself would not solve the problem. Administering the antiretrovirals is complicated, and to be effective they require continuous supervision by a doctor, a level of care unavailable in most of Africa. Without an improvement in basic health services, the drugs' effects would be limited even if they were available. The only real solution, therefore, is to eliminate poverty.

Richer countries are healthier countries. There is a robust statistical relationship between health and per capita income.[11] With economic growth come the resources needed to attack disease. Societal changes that would lead to improved prevention, like a higher status for women and better education, are also a necessary part of any AIDS cure, and these improvements tend to follow increases in national income. Economic growth is the only reliable source of a cure for AIDS and the various tropical diseases. Obviously, though, growth is not easy to achieve, and in any case it is a long-term remedy. It would take decades to show effects and provides no hope for the current victims. Immediate remedies are also desperately needed.

Such remedies are not easy to devise. There is no alternative system that would do a better job in pharmaceutical innovation and delivery than the market system does. But the social value of a new vaccine against a tropical disease like malaria, from the many lives it would save, immeasurably exceeds what could be earned from selling the vaccine, given the low incomes of those who need it, so the incentives that come from the market are necessarily insufficient. The sales revenues would be so low that they would probably not cover the innovator's costs of doing the research. Poverty being the main problem, tinkering with the rules of the marketplace cannot solve it. But it might be able to help.

Is the design of the market part of the problem? Well, yes, in a way. It is clear where the research efforts will go when the market promises almost nothing for a cure for malaria and billions for a cure for erectile dysfunction.

Alongside these failings, however, the market system has some truly admirable triumphs: new pharmaceuticals that have prolonged and improved countless lives. The antiretrovirals have helped thousands who might otherwise have died from AIDS. Research has brought a host of other medical marvels, as pointed out by the Pharmaceutical Research and Manufacturers of America (PhRMA), an alliance of U.S. drug manufacturers.[12] Antibiotics and vaccines have almost eliminated diphtheria, syphilis, whooping cough, measles, and polio from the developed world. Deaths from

influenza and pneumonia have been greatly reduced, as have deaths from heart disease, strokes, and ulcers. Millions live longer, more productively, and more comfortably.

Market incentives are what prompted the invention of these miracle drugs. Were it not for the profit motive, many of them would not exist. Adam Smith said self-interest can lead to beneficent outcomes: there is no more striking instance of this than the aggressive pursuit of profit giving rise to life-preserving medicines. No economic system that has ever been implemented, other than the market, has succeeded in consistently spawning major pharmaceutical innovations. The alternatives to the market—such as provision by international agencies or the state—have been far less successful than the drug companies in developing new pharmaceuticals. While government laboratories in the United States and Western Europe do important research, they lack the capacity and the incentives to turn basic science into usable medicines. Given the huge investments and the highly uncertain outcomes, the prospect of profits is needed to induce the continuing development of improved medicines on a large scale. Only the market can provide enough motivation.

Need we, then, be fatalistic? If there is no alternative to the market, is there nothing that can be done to get drugs to those who urgently need them?

* * * *

To say that the drug companies respond to the rules of the marketplace is not the whole story. They do not passively take the market's rules as given, but actively try to shape them. They make sure they have their say on matters concerning market design. Their presence in the world's capitals is conspicuous. They subject the U.S. government to fierce lobbying, in part to counter accusations of price gouging. During the election campaign of 2000, the pharmaceutical industry's spending on lobbying, $167 million, exceeded that of any other industry.[13]

The vast sums the pharmaceutical companies spend on lobbying is a measure of the entanglement of state and market. The pharmaceutical market has never been a truly free market. Intellectual property could not exist without the state, for a sophisticated apparatus is required to define and enforce property rights in ideas. Governments have been essential in maintaining the existing pharmaceutical marketplace and will be essential to any attempt to improve it. That market incentives are needed to induce innovation in pharmaceuticals is not, therefore, an argument for laissez-faire. The

market is an indispensable part of any solution, but only a part of it. The government is involved in two ways: supplying funds and designing the market.

Public health—preventing epidemics and the spread of disease, protecting against environmental hazards, promoting healthy behaviors, responding to disasters—is what economists call a public good. Like other public goods, as I will discuss later, it cannot be left to the market to supply. The control of communicable diseases brings gains that are widely shared. Those who receive vaccination against polio, for instance, benefit not just themselves but others as well. An individualistic reckoning of costs and benefits would result in too little use of vaccines. Public health is recognized in all the developed countries as a legitimate concern of the government. This rationale for state action applies not just within each separate country but also globally. Diseases such as Ebola, cholera, yellow fever, and meningitis spread across national borders. With modern air travel, they are spreading faster than ever. "A communicable disease occurring in one country," notes the World Health Organization, "can the next day find itself transmitted to another, anywhere in the world." The developed countries' sheer self-interest calls for them to fund international disease control.

Basic scientific knowledge also is a public good. The benefits from it are not captured by its discoverer, so markets induce little basic research. This is the reason why governments everywhere fund science. The U.S. government's expenditure on health-related research via the National Institutes of Health (NIH) and other federal agencies totaled $18 billion in 2000. Universities, foundations, and charities spent another $10 billion or so. These amounts add up to more than the research spending of all the U.S. pharmaceutical companies, which was $22.5 billion. Most of the major new drug patents awarded to the drug companies have their origins in government-funded research. Of the key discoveries cited in biomedical patents, just 17 percent came from industry, according to a study by the National Science Foundation. Much of the work that showed the effectiveness of AIDS antiretrovirals, for example, was done by the NIH and other public laboratories.[14] The productivity of the pharmaceutical companies' research rests on state funding.

Market incentives are generally needed to push ideas beyond pure science into usable applications. Converting a scientific breakthrough into a workable new drug is usually done most effectively in the private sector. But there are exceptions. Publicly funded research sometimes succeeds where the market fails. An outstanding example is the development of high-yielding grain varieties in the mid-1960s by an international network of research cen-

ters, including the International Center for the Improvement of Maize and Wheat in Mexico and the International Rice Research Institute in the Philippines. The research was funded by a consortium of governments, international agencies, and foundations. The new rice and wheat strains triggered the green revolution, almost doubling yields. Grains being the staple food of most of the world's people, the high-yielding grain varieties were, in terms of their impact on the very poor, among the most momentous inventions ever made. Following this impressive precedent, the International AIDS Vaccine Initiative, funded by governments, international agencies, and foundations, is searching for vaccines against AIDS, malaria, and tuberculosis.

A lot of money is needed to provide these international public goods. According to Dr. Peter Piot, the head of UNAIDS, a United Nations program, Africa needs $3 billion a year for basic measures to deal with AIDS and tens of billions of dollars more each year to provide Africans with the drugs used routinely in developed countries. Funds in the required amounts can come only from the developed world. "We need billions, not millions, to fight AIDS in the world," Dr. Piot said, "we can't fight an epidemic of this magnitude with peanuts."[15]

Beyond providing money, governments and international organizations have a role in rethinking the market's design, and in particular the rules governing intellectual property. A patent is a compromise solution to a problem that admits no ideal solution. It is an officially sanctioned monopoly. Offering the prospect of monopoly profits, a patent is a powerful incentive to innovate. The amazing pace of pharmaceutical advances in the past century attests to this. The prospect of patents helped induce the development, for instance, of the antiretrovirals as usable medicines.

But the patent system has a downside. The overpricing of the outputs that can result from the monopoly conferred by the patent, while rewarding the innovator, harms consumers. Patents successfully generate inventions while inhibiting their use.

Patent-induced overpricing occurs in any innovative industry but, because of the nature of demand, it is probably more marked in the pharmaceutical industry than elsewhere. The quantity purchased of a typical drug is relatively insensitive to its price. This is because the patient's need is great, decisions on use are made not by the user but by a physician, and the bill is often paid not by the user but by an insurance company or a government health plan. A study of the U.S. market for antiulcer drugs, in which four manufacturers competed, estimated that a 10 percent increase in price would have been followed by only a 7 percent decrease in demand.[16] This means (if you do the

arithmetic) that an increase in the price would elicit an increase in the total revenue earned, implying that had there been a single supplier, as in many other pharmaceutical markets, the price would have been set much higher. When demand is inelastic, textbook economics says, a profit-maximizing monopolist prices far above its production cost. Where the buyers are not price-sensitive, charging what the market will bear means setting prices very high. Patents, for the invaluable purpose they serve, come with a real cost.

Since intellectual property laws are defined and enforced by the state, and since they represent an uneasy compromise between the needs of the innovator and the needs of the user, the rules of the pharmaceutical market are not cast in stone.

* * * *

Some developing countries initiated the redesigning of the pharmaceutical market unilaterally, setting their own intellectual property rules.

In India, the government chooses not to grant product patents in food and drugs, so manufacturers may sell copies of drugs patented by U.S. or European companies. Having to cover only the costs of manufacture and not any costs of research, and not being sheltered by patents, they set prices low. Unlike the developed nations with their patent-supported monopolies, India in 2000 had a pharmaceutical industry that contained some 20,000 companies and charged competitive prices. The difference between monopoly and competition is indicated by fluconazole, a drug used against fungal infections. In India it was unpatented and so was sold by several competing manufacturers, whereas in the United States the patent was upheld and the market was served by a single manufacturer. The price per pill was 25 cents in India and $10 in the United States.[17]

In Brazil, the manufacture of antiretrovirals without regard to patents has enabled large numbers of AIDS sufferers to receive treatment that would have been unaffordable at the patent-induced prices. In 1997 the Brazilian government began encouraging domestic firms to produce unlicensed copies of patented AIDS drugs. The government bought these copies and gave them to patients free of charge. The price of the antiretroviral cocktail was one-fourth its U.S. price. One of the antiretrovirals was a mere one-sixteenth its U.S. price. This policy has made Brazil a rare success story among the developing countries, as deaths from AIDS plummeted. Brazil's president, Fernando Henrique Cardoso, said, "This is a political and moral issue, a truly dramatic situation, that has to be viewed realistically and can't be solved just by the market."[18]

South Africa passed a law in 1997 to make essential medicines affordable by compulsory licensing. (This means appropriating the patent, manufacturing or importing copies of the drug, and paying the patent holder a royalty.) By cutting the licensing fees paid by African drug manufacturers, the government calculated it could reduce prices by between 50 and 90 percent, thus making the drugs much more widely available. Thailand followed South Africa in passing a law permitting drug patents to be circumvented.

The developing countries argued that they were permitted to ignore the patents and produce the drugs themselves under a provision in the rules of the World Trade Organization. Compulsory licensing is permissible in the event of a public health emergency. (The U.S. government itself sometimes decrees that a patent be compulsorily licensed, usually for antitrust reasons, ordering a company to share its technology in order to end a monopoly.)

The multinational pharmaceutical companies disagreed with the developing countries, charging that ignoring the patents was illegal. They lobbied for the U.S. government to impose trade sanctions on Brazil. A spokesman for PhRMA, the alliance of U.S. drug manufacturers, said of Brazil, "They are still part of the world order and need to work things out with our companies." PhRMA reacted similarly to South Africa's initiative. The legislation was "an abrogation of intellectual property," a spokesman charged, arguing that "if AIDS drugs get compulsory-licensed around the world, it will dampen research." South Africa's action, he said, was "piracy." The "knock-off companies in India and Brazil," wrote the columnist Andrew Sullivan, echoing the industry's line, "are at best copiers of American products and at worst thieves."[19]

The drug companies guarded their intellectual property zealously. In Ghana in 2000, for example, an Indian company, Cipla, began selling a generic version of an AIDS drug made by Glaxo-Wellcome, at one-tenth the multinational company's price. The African regional patent authority ruled Glaxo's patents were not valid in Ghana. Nevertheless, Cipla stopped selling it after Glaxo threatened to sue.

The developing countries said they needed to do away with patents to save lives. "How can we be denied access to drugs that prolong life," asked a Kenyan member of parliament, "when our people are dying?" The drug companies retorted that patents are necessary for innovation. "We need intellectual property protection across the board all around the world," a spokesman for Bristol-Myers Squibb said. "Without it, we would not have the incentive to develop new and more effective HIV/AIDS drugs."[20]

Which side was right? Patents being an imperfect device, it is not in principle wrong to overrule them. Since it is not a matter of principle, evaluating the contending claims simply entails comparing the costs and benefits.

There would be a cost of compulsory licensing: overriding the drug companies' intellectual property and making the drugs available at lower prices would mean lower profits and less research on new and better drugs. There would be a benefit: fewer deaths. Even if only a fraction of the Africans with AIDS could be saved (because it would take more than simply a price cut to get the drugs to most of the African sufferers), a fraction of tens of millions is a lot of lives.

The cost-benefit arithmetic in this particular case is easy to do—and it supports the developing countries' position. Since few of the AIDS drugs were sold in Africa at the high prices, there would be little lowering of profits and little or no cutback in research if Africa were allowed to free ride on the world's innovation. For the AIDS drug made by Glaxo-Wellcome, for example, just 10 percent of the $454 million in 1999 sales came from outside North America and Europe. Abrogating property rights, in this case, would have almost no direct cost. There could be indirect costs, via a thin-end-of-the-wedge effect, if a precedent were set that led to the overriding of other drug patents. Smuggling of the drugs back to the West could undermine the drug companies' pricing there. But the benefits—many lives saved or lengthened—are literally incalculable. Unless one believes, religiously, that property rights are sacrosanct, the benefits of overriding the patents in poor countries plainly outweighed the costs. The case for compulsory licensing of AIDS drugs as an emergency measure was overwhelming.

* * * *

The U.S. government at first did not see things the developing countries' way. It sided with the drug companies, in the face of their munificent lobbying. The Clinton administration threatened trade sanctions against countries producing copies of patented drugs. Congress threatened to cut off aid. A 1999 State Department report to Congress said that "all relevant agencies of the U.S. government" were "engaged in an assiduous, concerted campaign to persuade the government of South Africa to withdraw or modify" its pharmaceuticals law. The United States filed a formal complaint against Brazil with the World Trade Organization, claiming that by allowing local firms to manufacture other firms' patented drugs Brazil was in violation of international trading rules.

Momentum gathered, nevertheless. International groups like Doctors Without Borders and Oxfam, the U.K. charity, rallied public opinion.

Newspapers frequently reported on the plight of AIDS sufferers. Activists pushed the issue onto the political agenda. They hounded Vice President Al Gore, noisily heckling his speeches during the early stages of his 2000 presidential election campaign. The group Act Up staged "die-ins" outside the Washington, D.C. headquarters of PhRMA, with mock tombstones, chalked body outlines, and slogans like "medication for every nation." Some shareholders of GlaxoSmithKline, concerned both about the issue in itself and about the damage a bad public image could do to the firm's share price, mounted a campaign to force it to make its drugs more accessible in poor countries. As a result of this broad-based public pressure, by 2001, a decade after public-health experts had begun warning the world of the impending AIDS crisis in poor countries, the tide had turned.

The Clinton administration reversed course and announced it would no longer threaten trade sanctions against developing countries that overruled AIDS drug patents. The World Bank and the United Nations built funds for such purposes. The European Union proposed a two-part plan: tiered pricing, with drug prices being lower in poorer countries, and a reform of international patent rules to make it easier for poor countries to import generic copies of drugs. Private philanthropy also was playing a role: for instance, the Global Fund for Children's Vaccines, run by Bill and Melinda Gates, was set up to cover the costs of immunizing children in developing countries. (The sums fell short, though, of the tens of billions of dollars that UNAIDS estimated were needed.)

When thirty-nine drug companies brought a suit to overturn the South African law allowing patents to be overridden, arguing the law violated international agreements on intellectual property, protesters outside the courtroom carried placards branding the drug company executives as "AIDS profiteers" who were "more deadly than the virus." The suit turned into a public-relations disaster for the companies, as they were accused of putting profits ahead of lives. In April 2001 they dropped it. "We needed to win this case otherwise many of us will die," said Nonthantla Maseko, a South African AIDS sufferer. "Our hope lay in winning this case. We had to win it."[21] By withdrawing their court action, the drug companies set a precedent that was generally interpreted to mean that poor countries could, for public-health reasons, override patents.

The five leading pharmaceutical companies agreed in 2000 to negotiate lower prices on their AIDS drugs for Africa and Asia. Then, in 2001, the major companies announced they would provide AIDS drugs to developing countries for what it cost to manufacture them, about one-tenth the price charged in the West. A stipulation, said Per Wold-Olsen, a Merck executive, was that "processes are put in place so that drugs are not re-exported to the developed world." He added that the governments of developed countries needed to help build health-care infrastructure and distribution systems for the developing countries. John McGoldrick of Bristol-Myers Squibb said, "We seek no profits on AIDS drugs in Africa and we will not let our patents be an obstacle."[22]

Ordinary market forces had pushed the drug companies to change their pricing, as they were starting to face competition from Indian generic pharmaceutical manufacturers. But the change was also a response to the activists' goading. The story of the AIDS drugs shows how consumers and their advocates—aid organizations like Doctors Without Borders and Oxfam, advocacy groups like Act Up, and the press—can push a market to be revamped. It is probably not coincidence that the countries that moved aggressively to change the market's rules—Brazil, South Africa, and Thailand—have governments that, being democratic, are susceptible to pressure from the public.

The solution of selling AIDS drugs at cost in the poor countries is not transferable, however, to drugs against many other diseases. AIDS drugs are a special case when we weigh the costs of lifting patent protection against the benefits, for their discovery was driven by the hugely lucrative market in developed countries. The poor countries would provide a tiny fraction of the global profits from AIDS drugs regardless of what pricing policies were adopted, so their failure to contribute to the research costs would not significantly dampen innovation incentives. With diseases that do not hit the developed world, by contrast, the weakening of incentives for research from overruling patents could be such a large drawback as to outweigh any benefits. Letting the poor nations free ride is of potential benefit only with diseases that strike the affluent countries and have the U.S. and European markets as an inducement to innovation. With tropical diseases, no patents would mean no research. Making innovations freely available would achieve nothing if it meant there were no innovations.

For developing drugs against the diseases that hit the poor countries alone, deeper changes in market design are needed. For such drugs, intellectual property protections need to be upheld if any research is to be done. Perhaps there are other ways, though, of running a patent system. How can research incentives be devised for new drugs against diseases in poor countries? Such drugs fail to be developed under the standard patent system because, despite their very high potential social value, the returns that could be earned from them would not cover their development costs.

Various alternatives and supplements to the patent system, all requiring action by governments and international agencies, have been explored by economist Michael Kremer, a leader in the search for workable ways to deliver drugs to the poor countries.[23] Lowering the cost of innovation by subsidizing the inputs drug companies use in their research, perhaps by means of tax credits, could make it profitable to develop drugs that have a low market value. Because it is hard to monitor research inputs, however, subsidizing inputs is in general less effective than rewarding success by paying for outputs. Another way of tipping the balance of costs and returns is revenue enhancement, under which the government or an international agency promises to top off the company's earnings once the new drug is being manufactured, by paying the company a prespecified sum for each dollar earned from its sales.

Given the poor countries' lack of buying power, this approach requires funding from the governments of Western Europe and North America and international agencies like the World Bank and the World Health Organization. With the $200 to $500 million cost to develop a new drug, these funds need to be very well endowed.

* * * *

The global pharmaceutical market highlights simultaneously the very worst aspects of markets and the very best. To drive the discovery of new drugs, market incentives are indispensable. There is more than one way, however, to design a market. The right design for a market varies with time and place. Any market is imperfect, and from time to time it may need to be redesigned.

Both entrepreneurs and governments, then, on occasion take on the role of market designer. Next we will look at what market design entails: the groundwork that is needed for markets to work well.

Ideas
- Companies will create to make $ not where there is need
- Prices can/are effect more than just demand (gov. regulations)

FOUR

Information Wants to Be Free

The age-old Middle Eastern bazaar is the stuff of travel writing. In Marrakech, Morocco, you enter the bazaar through a tiled gate called Bab Doukkala into a maze of narrow streets teeming with shoppers. Your senses are bombarded by the pungent smell of spices, the gaudy colors of the goods for sale, the shouting of mule drivers. Vendors offer food: quinces, mint, cheese, meat. Craftspeople are grouped by their products: pottery, shoes, brassware, woodwork, engravings, clothing, baskets, mosaics.

Information in the bazaar "is poor, scarce, maldistributed, inefficiently communicated, and intensely valued," as the anthropologist Clifford Geertz put it. "The level of ignorance about everything from product quality and going prices to market possibilities and production costs is very high, and much of the way in which the bazaar functions can be interpreted as an attempt to reduce such ignorance for someone, increase it for someone, or defend someone against it." Prices are not posted for items beyond the most inexpensive. Trademarks do not exist. There is no advertising. Experienced buyers search extensively to try to protect themselves against being overcharged or being sold shoddy goods. The shoppers spend time comparing what the various merchants are offering, and the merchants spend time trying to persuade shoppers to buy from them. "The search for information is the central experience of life in the bazaar," said Geertz. It is "the really advanced art in the bazaar, a matter upon which everything turns."[1]