

Professor Stiglitz's Contributions to Debates on Intellectual Property

Dean Baker [Centre for Economic Policy Research]

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Introduction

While much of Professor Stiglitz's work has involved showing us how markets don't work the way the standard textbook story tells us, his work on intellectual products has largely been about reminding us about the role of government in structuring markets. There is a tendency for many people involved in policy debates to think of patents, copyrights, and other forms of intellectual property as part of the natural order. Professor Stiglitz's work reminds us that these are government policies designed for the purpose of promoting innovation and creative work (ICW).

This is an essential, if simple, point. It is generally recognized that without some form of deliberate policy, the economy would underproduce research and development, as well as creative work. Intellectual property rights are one mechanism that we can use to deal with this market failure, however it is not the only one. Furthermore, while there is a strong argument for respecting intellectual property rights once they have been granted, going forward there are an infinite number of ways these rights can be structured, making them stronger or weaker, insofar as we choose to rely on them at all.

Stiglitz puts granting intellectual property into a larger framework of tools for promoting innovation and creative work (Stiglitz 2010, 2011, and Baker, Jayadev, and Stiglitz, 2017). In designing policy to promote ICW, we need to consider not only the optimal strength and length of intellectual property monopolies. We need to assess the circumstances under which these tools are desirable over other mechanisms.

Stiglitz's framework divides the type of mechanisms for supporting ICW into two general categories: push and pull mechanisms. Push mechanisms involve paying for work upfront with the hope that it will achieve a desired outcome. Pull mechanisms involve setting a target and then rewarding those who successfully reach the target.

Both push and pull and mechanisms can be structured to be either centralized or decentralized. A centralized structure would mean that the government or some central agency decides what to fund or what specific outcomes should be rewarded. Decentralized structures would leave these decisions to individuals or market outcomes. The next section outlines these categories in a bit more depth with examples for each category. The second section briefly assesses the relative merits of each type of mechanism, noting circumstances in which one may be preferable to other. The third section briefly discusses the importance of intellectual property both as a share of national income and as a major factor affecting distribution, both within and between countries.

Alternative Mechanisms for Supporting ICW

It is common to treat centralized push mechanisms and decentralized pull mechanisms as being the primary options for supporting ICW. Centralized push mechanisms include government funded research, such as the work supported by the National Institutes of Health (NIH) and the *Biomedical Advanced Research and Development Authority* (BARDA) in the United States, as well as government funding for creative work, such as France's Center for National Cinema or the much smaller National Endowments for the Arts or Humanities in the United States.

These are push mechanisms in the sense that they award funding in advance of the work being performed. There is a competitive granting process, through which applicants' proposals are vetted, but the funding is generally committed before the work is done.

Most ICW is supported through decentralized pull mechanisms, most notably patent and copyright monopolies. The logic of this mechanism is that the government sets up general standards under which these monopolies are effectively prizes, and then innovators and creative workers are allowed to gain monopoly profits based on their innovation for the term of the monopoly. Obviously, they can continue to profit even after the period of monopoly has expired, but then they must sell in normal market-facing competition.

In addition to these mechanisms, there are also examples of centralized pull mechanisms and decentralized push mechanisms. The most obvious example of a centralized pull mechanism is the government awarding a prize based on an innovation achieving a certain standard. The most famous example of such a prize was the British government's promise in 1714 of a large reward for developing a mechanism for effectively measuring longitude at sea (Sobel, 1995). There have been many other cases where governments have awarded prizes for some innovation or creative work.

Many researchers have proposed some sort of prize mechanism for developing prescription drugs (e.g. Kremer, 1998 and Hollis, 2005). The logic would be that the government would buy up rights to a drug, and the purchase price is determined based on some formula for its effectiveness and potential usage. The drug could then be sold as a generic in the free market.

The best example of a decentralized push mechanism would be the charitable contribution tax deduction in the United States. While most of the contributions that qualify for this deduction go to religious organizations or charities that provide services, some of the qualifying contributions go to organizations like orchestras, operas, or non-profits that support specific types of art and culture. With a top marginal income tax rate of roughly 40 percent, the government is effectively paying 40 cents of every dollar that high income individuals choose to contribute to support creative work.

These mechanisms can be thought of as general categories; however they can be mixed in various ways to achieve desired outcomes. For example, we can envision a structure where the government parcels out research money for a particular purpose like cancer research to a number of prime contractors. These prime contractors would have long-term contracts which would allow them to directly spend the money or alternatively to award subcontracts to smaller companies or start-ups. While the origin of the money would be centralized in this story, the ultimate decision on which research gets funded would be somewhat decentralized.

In a similar vein, the government could offer an individual tax deduction, or a tax credit, for a narrower set of activities. For example, it could restrict the tax credit to supporting journalism, either print or web-based or both. In this case, the decision as to which journalists or news outlets get funded would be

decentralized, but the government would have narrowed the range of options that qualify for the deduction.

It should be apparent that different mechanisms may be best for different types of ICW. Unfortunately, the sections dealing with intellectual products in recent trade agreements, such as the TRIPS provisions of the WTO, have sought to standardize rules across types of products, without considering the possibility that different rules may be appropriate in different areas. The next section describes these mechanisms in more detail and the benefits and drawbacks of each one, looking at the various areas in which they can be applied.

The Relative Merits of Mechanisms for Supporting ICW

As noted, the most common mechanisms for supporting ICW are centralized push systems and decentralized pull systems in the form of grants of intellectual property. Each of these has clear merits in particular circumstances.

Centralized Push Mechanisms

A centralized push mechanism is widely accepted as a useful way to support basic research in a number of areas. Most wealthy countries support some [amount of basic scientific research. The United States spends over \\$50 billion a year on biomedical research through the National Institutes of Health](#), with several billion more going through other government agencies. The European Union loosely coordinates spending of around [\\$15 billion](#) annually. In addition, there are government programs supporting research on the development of computer chips and other technical advances, as well other areas of scientific research, like astrophysics. There are little foreseeable commercial uses of this research.

The key benefit of a centralized push mechanism is that it can be used to support innovation in areas that are deemed to be a high priority by experts in a field. It also has the advantage that the findings can be fully open and accessible to researchers throughout a country, and indeed throughout the world. This means that researchers can quickly benefit from each other's findings, building on them when they are useful, and avoid following dead ends that others have uncovered. Also, since the work has already been paid for, it can be made universally available over the Internet at essentially zero cost.

The major downside to a centralized push mechanism is that it can lead to a bureaucratized process where procedures needlessly delay the pace of research funding. There is also the risk that the agencies parceling out funding will be controlled by groups of insiders who dismiss worthwhile projects from less well-connected or well-established researchers.

There is also the risk of political interference; that political factors will play a major role in the distribution of funds. This can be either an ideological issue — conservatives not wanting to support funding for research on medication abortions — or a spoils system, where political allies receive funding whether or not their proposals have the most merit.

These political concerns are especially important in the context of creative work. At least in the United States, there is relatively little agreement on what sort of creative work deserves public support. As a result, public funding for music, movies, writing, and other forms of creative work has always been very

limited. In European countries, there seems to be greater acceptance of government funding of creative work, presumably because much of the public accepts that support for that work has merit.

There are ways to mitigate the problem of a centralized push system becoming overly bureaucratic. For example, the government could award long-term prime contracts, much like military contracts, to conduct research in various areas. This might be especially useful in the case of prescription drug research. The government could award 10 to 15-year contracts to companies to do research in specific areas, such as heart disease or lung cancer. Contracts could be renewed, expanded, or terminated depending on a company's success.

This structure would give companies a strong incentive to be innovative in pursuing their goals, since presumably they would want their contracts renewed. This should also mean that they would have an incentive to seek out start-ups or talented researchers with new approaches. The parceling out of funds to private contractors should also provide a further layer of insulation from political interference, apart from whatever rules are in place to protect the granting agency itself.

The incentives for sharing findings in a push system with open research are directly opposite from the incentives in a pull system. In a pull system, the goal is to be the first to get a patentable product and to share as little information as possible that could be useful to competitors. In contrast, in a push system with renewable contracts, the goal would be to show that the contractor had made valuable contributions to addressing a public health problem.

If a company in the push system had a major discovery that another company then developed into a useful treatment, it could claim credit as a factor in renewing its contract. For this reason, a company operating within a push system of this type would have a strong incentive to publicize its research findings widely.

A centralized push system of this type could co-exist with a decentralized pull system, although it would increase the risks for companies operating in the latter. In addition to the possibility that research will prove unsuccessful, there would also be the risk that even a successful innovation could face competition from an innovation developed through the push mechanism that is selling without patent protection at a far lower price.

This would be an especially high risk in the case of prescription drugs, where the time needed to develop a new drug can often exceed a decade. As long as all drugs are being developed through the patent system, any new drugs developed by a competitor will be selling at a patent protected price. The possibility of competitive drugs selling as cheap generics would qualitatively change the nature of the risk that companies operating within the patent system face.

Decentralized Pull Mechanisms

Grants of intellectual property, the major form of a decentralized pull system, offer at least a limited way around the problems of centralized push mechanisms. Most immediately, it avoids the problem of stultifying bureaucracies preventing promising avenues from being pursued.

Ostensibly, anyone is free to pursue a line of research, or a particular form of creative work, without needing approval by any government entity. They can then look to use the grant of monopoly protection to profit from their work for the duration of the monopoly, and possibly longer insofar as there is an enduring first mover advantage.

The decentralized pull route also avoids the obvious concerns with political interference. A company pursuing a line of research that faces political opposition, can ostensibly still get a patent monopoly and profit from any resulting innovations. Similarly, a creative worker can still get a copyright monopoly, even if powerful interest groups disapprove of their work. Also, a decentralized pool mechanism means that the government does not have to bear the cost of failures. An unsuccessful innovator or creative worker will bear these costs.

These are large advantages over a centralized push mechanism, but they also come with large costs. Most obviously, items protected by patent and copyright monopolies can sell for many multiples of their marginal cost. It is common in the United States for prescription drugs to sell at prices that are [15-20 times](#) the price of a generic equivalent, after the patent has expired and competitors have had time to enter. In some cases, especially with drugs for rare diseases, the price can be more than 100 times the free market price. In the case of copyrights, material that could otherwise be transferred at zero cost over the web can instead carry substantial prices.

The deadweight losses in such situations can be quite large. Economists are often very concerned over the losses from trade tariffs of 10-25 percent. The losses from patent and copyright monopolies, which are equivalent to tariffs of several thousand percent, can be several orders of magnitude larger. As a practical matter, such high costs can translate to an inability to get an item that would be of value, ranging from the relatively mundane, such as access to a movie or book, to impeding access to important research tools such as business software or biomedical tests to preventing people from getting access to drugs that are necessary for their health or life. It is a very different world when a drug needed to treat a medical condition costs tens or hundreds of thousands of dollars for a year's dosage, rather than a few hundred dollars. In a world without patent monopolies or related protections, prescription drugs would almost invariably be relatively cheap. It is rare that it is expensive to manufacture and distribute a drug.

The enormous gap between price and marginal production cost leads to the predictable types of corruption. Most immediately, patent holders have an enormous incentive to mislead potential buyers about the quality of their product. This is an especially large issue with prescription drugs, where there is a serious problem of asymmetric information. The manufacturer is likely to have far more information about the safety and effectiveness of their drugs than patients or their doctors. As a result, it is common for drug manufacturers to exaggerate the safety and effectiveness of their drugs. The opioid crisis was the most extreme example of this sort of deliberate deception to promote sales, but less consequential examples are common as well.

This incentive structure also corrupts the research process itself. It has been common for the pharmaceutical industry to pay doctors and researchers, either directly or indirectly (speaker fees are a common route), to write articles touting their drugs. Medical journals have struggled for decades to find mechanisms to ensure that they are not serving as a platform for paid advertisements for the pharmaceutical industry.

The corruption can also extend to the drug approval process. Recently, there was the widely publicized case of the Alzheimer's drug Aduhelm. The Food and Drug Administration's independent panel of experts felt that the evidence from clinical trials did not warrant the drug's approval.

Nonetheless, as a result of extensive lobbying by Biogen, the drug's manufacturer, the FDA [approved](#) the drug. Without the promise of patent monopoly profits, there would have been little incentive for anyone to push the FDA to approve a drug where the clinical evidence did not demonstrate its safety

and effectiveness. Patents can also distort the research process in other ways, especially in the case of biomedical research. The pharmaceutical industry will only carry through research if there is an expectation that it will lead to a patentable product. This means that it has little interest in examining the extent to which diet, exercise, or environmental factors might affect an illness or the extent to which an older off-patent drug might be an effective treatment.

In principle, this gap could be filled by publicly funded research, but since there in general is no systematic coordination of research, there is no reason to believe that this will be the case. Furthermore, a pharmaceutical company that hopes to develop a patentable drug has no reason to share evidence that a non-patentable product may also be an effective treatment.

The enormous markups allowed by monopolies also give incentives to abuse the patent process itself. It is standard for drug manufacturers to seek dozens, or even hundreds, of patents on major drugs. Although the validity of these patents may be dubious, the cost of challenging them in court can be substantial. Furthermore, there is a major asymmetry when the patent holder is fighting to maintain a monopoly, whereas a challenger to a patent is simply trying to gain the right to sell in a competitive market.

This asymmetry is effectively a public good problem. Challenging an invalid patent does not just give the challenger the right to ignore the patent claim, it allows other competitors, and for researchers in general, to make use of the patent without compensating the patent holder (Henry and Stiglitz, 2010). However, the challenger only gets their own benefit, not the larger benefit to society. For this reason, many invalid patents are likely to go unchallenged, leading to both higher prices and higher costs for innovation in many areas.

Even the claim that the government does not have to bear the cost of failed projects ends up being somewhat dubious under closer examination. While the public sector may not directly pay for a failed research project or a movie that flops, there are economic resources being committed to these efforts. From the standpoint of the economy as a whole, we would like to minimize the amount of resources that go to develop a product or produce a valued creative work. The fact that the public sector doesn't bear the cost directly is really beside the point.

There are comparable issues that arise with the copyright side of the story. For example, "fair use" allows some amount of copyrighted material to be freely used without payment or authorization. The most common example is quoting from a copyrighted work in a scholarly article or other publication. However, the limits of fair use are not well-defined. A deep-pocketed copyright holder can use infringement lawsuits to harass critics or competitors. And, since third parties can be held liable for copyright violations, the threat of an infringement suit may keep material out of newspapers, of television, and even of the Internet.

As is the case of patent monopolies, the beneficiaries of copyright protection also spend considerable resources lobbying for longer and stronger protections. The length of copyright protection has been extended repeatedly in the United States and other countries. Incredibly, in the United States the protections have been applied retroactively, as though we can somehow give incentives for people to do creative work decades in the past.

There is also the issue of penalties. In both the case of patent and copyright, the laws are structured to be friendly to the claimant. For example, it is standard for a claimant to a patent to continue to benefit from the monopoly over the period in which a claim is contested. In the case of copyrights, the law provides for statutory damages. These can run into the thousands, or even tens of thousands of dollars,

and include attorneys' fees, even in cases where the actual damages may be trivial, perhaps tens or hundreds of dollars. Needless to say, it is not an efficient situation when the enforcement costs exceed the benefits at issue.

Even the supposed benefit of protecting innovation and creative work from political interference may be less clear with these decentralized pull mechanisms than it may originally appear. While it is easy to see the political risk with a centralized system deciding which research should be pursued or creative work should be supported, these risks don't go away with a decentralized system.

The recent effort to ban a drug for medication abortion, which was long ago determined to meet the FDA's standards for safety and effectiveness, has to raise concerns among pharmaceutical companies over future research spending. Would a pharmaceutical company invest hundreds of millions of dollars trying to develop a new drug for medication abortions, or some other area that raises major political questions, knowing that political considerations may ultimately prevent its sale and distribution?

The recent efforts by the Biden administration to limit trade with China in areas that it considers related to the military provides another example. China is potentially an enormous market for many products. If a chip manufacturer finds that a newly developed chip cannot be sold there over these concerns, it would face a substantially smaller potential market.

The same applies to creative work. If politicians can limit the distribution of a book, song, or movie, then it will discourage creative workers from dealing with politically charged topics. Again, this political interference may not be as direct as in a centralized system, where the agency determining funding is ultimately answerable to politicians, but there are risks nonetheless.

In short, there are many downsides associated with the structure of the patent and copyright system that we rely on to support the bulk of innovation and creative work. These problems are more far-reaching than is generally recognized. These problems make a strong argument for giving more consideration to alternative mechanisms.

Centralized Pull Mechanisms

The most obvious centralized pull mechanism is a prize fund. The logic here is that the fund would be used to pay for successful innovations based on pre-established criteria. There are a variety of methods through which the size and winners of the prize can be determined (Kremer 1998, Hollis 2005).

The basic story is that the prize would be awarded in exchange for the government taking possession of a patent (This could be done with copyrights as well, but the prize proposal is most often suggested with patents, and especially patents related to prescription drugs). After awarding the prize, the patent would be placed in the public domain. In the case of prescription drugs, the drug could be produced and sold as a generic, at the free market price.

Depending on how the prize is structured, the recipient could also be required to disclose all the research that led up to the innovation for which the prize was awarded. This would be a step toward making more research open-source, but it would only apply to research for which a prize is awarded, and even then, it would only be after the prize is awarded.

Developing a drug is a process that typically takes many years. During this period, the research would remain proprietary. Also, the company receiving a prize would still have an incentive to keep as much of its work as possible secret, in order to give it an advantage in further research.

The prize system would also perpetuate a major source of waste in the patent system: companies duplicating research in a race to develop drugs to treat common condition. While some competition is desirable, it is a waste to duplicate research to reach the same goal. If there is evidence that one path is clearly better, there is no benefit to society of continuing to pursue a second path. However, with a patent system, a pharmaceutical company may have hopes of recovering sunk costs if it eventually develops a marketable drug, even if another drug is safer and/or more effective. This problem would likely still exist with a prize system, although a well-structured system could limit needless duplicative efforts by offering considerably lower prizes for less effective drugs.

The prize system would not address the problem that companies would have no incentive to pursue non-patentable treatments for conditions. This means that if a long off-patent drug provided evidence of being an effective treatment, or dietary or environmental factors may affect a condition, a prize tied to a patent would offer no incentive to pursue this research.

It is possible to structure prizes that reward innovation more broadly, but the cost would be that the conditions for getting the prize would likely be less well-defined. This means that there would be both more ambiguity about which inventions or discoveries would warrant a prize and also the decisions would be more contentious. In addition, the risk of political interference becomes greater when the conditions for awarding a prize become less formulaic.

Decentralized Push Mechanisms

The logic of a decentralized push mechanism would be that the government would set rules for a subsidy for ICW and individuals decide the recipients subject to general guidelines. The model for this sort of system would be the tax deduction for charitable contributions in the United States.

Under the U.S. tax system, a person can deduct a contribution to a registered tax-exempt organization from their taxable income. To be eligible for a tax-deductible contribution, an organization has to register with the Internal Revenue Service (I.R.S.) and indicate what sort of activity they do that allows them to qualify to receive tax deductible contributions. The I.R.S. has general categories for which organizations qualify, such religious organizations, educational organizations, or charities providing service. Cultural organizations, such as museums and orchestras, can also qualify.

The tax deduction as it is currently structured is highly regressive. The overwhelming majority of low and middle-income taxpayers do not itemize their deductions, which means that even if they gave \$500 or \$1,000 to a qualifying organization, they would not benefit from the deduction.

Furthermore, since the benefit is a deduction from income, rather than a credit, higher income people in higher tax brackets would receive the largest benefit. The vast majority of people are in the 10 or 12 percent brackets, which means that even if they did itemize their deductions, they would only get back 10-12 cents for each dollar contributed. By contrast, high income households would be getting back close to 40 cents of each dollar contributed.

However, these are features that can be altered. The government could give a credit of say, \$100-\$200 per person, to support creative work. This would get around the regressive structure of the tax deduction for charitable contributions.

To be eligible to receive this money, the person or organization would have to register with a government agency indicating what sort of creative work they did, or they supported, if it is an organization. This would simply mean indicating they were a writer, musician, movie director etc., or that an organization supported work in this area. There would be no effort to determine if they are a good writer or musician, just as the I.R.S. does not try to determine if a religion is a good religion when approving its tax status as qualifying to receive tax deductible contributions. The only issue is whether the organization in fact engages in the activity that they claim. The same would apply to individuals or organizations that receive funds through a tax credit to support creative work.

The other condition that could be imposed in this system is that recipients of tax credit money are not eligible for copyright protection for a substantial period of time (e.g. 3-5 years). The logic is that the government only provides one subsidy, not two. If a writer or musician gets funding through the tax credit system, the government will not also give them a copyright monopoly. The public has paid them for their work and is now entitled to benefit from it without paying a second time. This should create a vast amount of material that can be transferred at near zero cost over the Internet.

The point of excluding people within the system from benefiting from copyright protection for a period of time is to prevent the tax credit system from being a farm system for the copyright system, in the way that minor league teams develop players for the major leagues. If the two are existing side by side, it makes no sense for the government to pay people to build up a following in the tax credit system, and then, when their work is highly valued, to wall it off behind copyright protection. This rule would require creative workers to commit to the tax credit system for a substantial period of time, if they opt to go this route.

A benefit of this sort of rule is that it is largely self-enforcing. People will have to register to be eligible to receive the tax credit. This means that if they get a copyright during the period of exclusion, they would be unable to enforce it. An alleged infringer could simply point to the fact that the plaintiff had been in the tax credit system within the specified period, and the case would be dropped.

Mixing the Systems for Supporting ICW

As noted earlier, we already have a mix of systems for supporting ICW, however as Professor Stiglitz has argued, we may want to alter that mix, and rely on different mechanisms for producing various types of items. Where we have products that depend to a large extent on consumer tastes, like smartphones, it is likely that we would want to rely largely on decentralized pull mechanisms.

The argument for this would be similar to an argument for relying on market mechanisms rather than centralized planning. Competitive firms are likely to be better situated to respond quickly to consumer sentiments than some sort of centralized government agency.

By contrast, there is a much stronger case for the push mechanism in the case of prescription drugs, vaccines, medical equipment and other health-related items. First, there are enormous problems of asymmetric information in this area. The manufacturer will inevitably know far more about their product than a patient or even a doctor. The monopoly profits from patents or related protections provide them with an enormous incentive to exploit this asymmetry.

Second, since the issue is people's health, there are enormous consequences of mistakes. Someone can be unhappy if their smartphone doesn't perform as expected, but the wrong treatment for a medical condition can impair someone's health permanently or even jeopardize their life. This is a qualitatively different sort of problem.

Third, there is typically a third-party payer in the case of health-related items — either the government or an insurer. Therefore, the logic of being sensitive to consumer demand doesn't have a role in this context.

Manufacturers of prescription drugs and medical equipment profit by knowing what they can get these third parties to pay for, not responding to patients' needs (at least directly).

There is a huge opportunity for innovation that would fall between these extreme cases. As is widely recognized, there is a role for a centralized push mechanism in funding basic research. However, where basic research ends and innovation to develop a marketable product begins, is not always a clear line. It might be desirable for the government to be somewhat less generous in allowing private actors to take advantage of publicly supported research.

The government could be more aggressive in securing and enforcing patents on publicly funded research. While charging large licensing fees for use of these patents would be antithetical to the goal of limiting the gap between patent protected prices and free market prices, it could require either shorter patent lengths or some sort of compulsory license on subsequent innovation as a condition of using a government patent.

This could mean, for example, that a company that relied on a government patent for a later innovation, would agree that its patent would extend for a shorter period (e.g. five years) as a condition of using the government patent. Alternatively, the company could be required to allow competitors to use its innovation for a standard fee (e.g. 10 percent of the sale price) for the duration of its patent.

These sorts of conditions could be shaped any number of ways, and it is likely that different rules would be applied in different areas. A wide range of possibilities exist, and they need to be considered, especially in a context where the United States and other countries seem to be moving towards increasingly explicit forms of industrial policy. If the government spends tens of billions of dollars on research, and then grants private companies patent monopolies or related protections on this research, it is effectively a public subsidy to these companies' profits.

It is also important to note, that even in the context of the TRIPS rules, there is still considerable flexibility in setting rules on intellectual property. While the rules may require that patents in all areas run for a full 20 years, nothing prevents a government from getting companies to agree to a shorter period of effective protection as a condition of getting access to publicly funded research. It is important the full range of options be considered in structuring policy.

The Money at Stake

There is little appreciation, even among people in policy debates, for how much money is at stake with intellectual property. Intellectual property rules, as they are currently structured, also play a huge role in creating and preserving inequality, both within countries and between rich and poor countries. While it would be difficult to produce a careful estimate of the extent to which intellectual property protections

raise the prices of goods and services above their free market price, we can get a ballpark number from examining the categories where intellectual property is a major determinant of the current price.

Table 1 shows a number of categories where intellectual property accounts for a major portion of the current market price. The first column shows sales in each category in 2022. The second column shows the percentage of the sales price that is assumed to be attributable to intellectual property rules. The third column shows the implied excess spending attributable to these rules.

Table 1: Total Savings From Patent/Copyright Alternatives

Billions of 2022 dollars

Consumption categories	Current spending	Share due to IP	Potential savings
Prescription drugs (line 121)	\$525.9	80%	\$315.5
Non-prescription drugs (line 122)	\$94.9	50%	\$47.5
Computers and other information processing equipment (line 46)	\$242.4	60%	\$145.4
Recorded music and video material (line 42)	\$20.3	80%	\$16.2
Educational books (line 67)	\$13.5	70%	\$9.5
Recreational books (part of 90) (line 58)	\$25.9	50%	\$13.0
Newspapers and periodicals (line 141)	\$91.8	80%	\$73.4
Motion pictures (line 212)	\$6.5	80%	\$5.2
Cable and satellite television and radio services (line 217)	\$96.0	80%	\$76.8

Investment

The total figure of \$957.2 billion is equal to 3.8 percent of 2022 GDP. It is almost 40 percent of after-tax corporate profits for the year. It comes to \$2,900 per capita. By any measure, this is a substantial sum of money.

To be clear, this is not a sum that would somehow be magically freed up if we eliminated all intellectual property protections. Assuming that we want to continue to support ICW, we would need to use much of this money to finance it through other mechanisms. This figure can be seen as a calculation of how much is at stake with our current rules on intellectual property.

It is also important to recognize that these rules have played an important role in maintaining and increasing inequality both within and between countries. It is common in policy circles to assert that technology has led to an increase in inequality in recent decades.

This claim misrepresents what is at stake. Insofar as some workers have gained at the expense of others in the last four decades, it has not been because of the technology, but rather our rules on technology. If we take an extreme case, where we do not have any patents or copyrights or related forms of protection, and non-disclosure agreements in labor contracts are not enforceable, it is very difficult to see how computer programmers, or other big gainers in recent decades, would be getting large salaries.

Not having any policy in place to support ICW would almost certainly lead to slower economic growth, as well as failing efforts to deal with climate change and improve public health, but the specific policies that have led to so much inequality were matters subject to political choice. They were not dictated by the technology itself.

This also applies to inequality between nations. If developing countries could freely use technologies developed by rich countries, it could hasten the rate at which they catch up with the rich countries. Imagine a world where any software could be freely transferred from rich countries to developing countries, where drugs, fertilizers, pesticides and medical equipment could be produced without paying licensing fees or royalties. This would have a huge impact for developing countries.

It also would enormously improve the health prospects of people in the developing world, if they could get drugs and medical equipment at the marginal cost of production, rather than having to pay fees for patent licenses and other forms of intellectual property. In the pandemic, millions of lives could have been saved in developing countries if there had been a fully open flow of technology from the earliest days of the pandemic. This would have allowed, among other things, for massive production and stockpiling of vaccines, while they were still in the testing phase. The benefits of having a large stock of vaccines to be distributed as soon as they were determined to be safe and effective hugely outweighed the downside risk of having to discard vaccines that might not be approved.

The fact that this sort of sharing was never seriously considered demonstrates the desperate need for clearer thinking on the financing of ICW. To be clear, this was not an issue of rich country pharmaceutical companies losing profits. There would be nothing precluding an arrangement where technology was freely shared, which means both non-enforcement of patents and also non-enforcement of non-disclosure agreements, and companies were compensated after the fact for their lost profits.

There would be a risk that this sort of ex ante compensation system would give a company less profit than they might have gotten by staying with the existing intellectual property system, but this would hardly be a necessary outcome. And, companies would retain their right to sue in court if they believed that compensation was inadequate.

There would be a risk that if we did test a system of open technology in the pandemic, that its advantages would be apparent, and there would be a reluctance to return to the pre-existing system of

IP. While the pharmaceutical industry's concerns along these lines might be understandable, it is hard to be very sympathetic to them. Insisting on maintaining IP rules throughout the pandemic led to a needless sacrifice of lives and exposing tens of millions of people to infections that could have been avoided.

Conclusion

Professor Stiglitz has provided us with a useful framework for analyzing mechanisms for incentivizing ICW. Current policy debates tend to treat the existing structures as givens that cannot be altered. Stiglitz's work is a powerful rebuke to this thinking. Rules for incentivizing ICW are infinitely malleable. There is good reason for believing that we can adopt mechanisms that are both efficient and more equitable. The structuring of rules for incentivizing ICW is already enormously important for the economy. It is likely to grow in importance in the future, as an increasing share of GDP is devoted to intellectual products. These rules will also be enormously important to the efforts to deal with climate change, future pandemics, and other threats to global health. It is long past time that we have serious debate on how the tools for promoting innovation and creative work can be best structured.

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Author contact: dean.baker1@verizon.net

SUGGESTED CITATION:

Dean Baker, "Professor Stiglitz's Contributions to Debates on Intellectual Property", *real-world economics review*, issue no. 105, October 2023, pp. 12–24. <http://www.paecon.net/PAEReview/issue105/Baker>

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