Incentives for the efficient and equitable production and uses of knowledge

Professor Joseph Stiglitz
Chair of the Brooks World Poverty Institute

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Well it is a real pleasure to be here and especially to talk on this subject which I think is one of the key issues facing, not only the UK, Europe, but the whole global economy. We often talk about the economy today as the 'new economy', the 'innovation economy' or the 'knowledge economy', and just as in earlier centuries in the 19th, 18th century the centre of the economy was agriculture and who owned land determined who had economic and political power, there is a sense today that who owns, who controls knowledge, who owns knowledge will determine economic and political power, so in a sense the issue of Who Owns Science is a big issue, it is not just about science, it is really about modern society, throughout our society and where it is going. Now academics have mixed feelings about intellectual property, let me just tell a couple of stories. About 20 years ago I got a letter from China that was just beginning at that time to open up, it was from a publisher there who wanted me to write a forward to a pirated edition of one of my textbooks (audience laughs) and I was actually very pleased (audience laughs) because you know a country of a billion people, if only one tenth of one per cent of them read my book it would be more readership than I had anywhere else. Moreover, and this is really the point, China was really embarked in one of the greatest experiments of all time, the movement from Communism to a market economy and if that experiment went well it would make an enormous difference to the lives of hundreds of millions of people and as academics the reason that we do our writing has nothing to do, you know we enjoy the income, I am not going to say that we give it all away but that wasn’t what motivated originally my writing the book or doing the research. I was much more motivated by a concern that the ideas be used and that they have an influence where they were relevant, so I was actually very pleased about this but I have to say that my publisher did not share my enthusiasm. Then a little bit later I was in Taiwan, which at that time had a very bad reputation for respecting intellectual property rights, I was at a conference and we had a brief interlude, I had time to go down to a bookstore and as I was going to the bookstore I had a debate in my mind, I was wondering whether they had pirated another one of my books and I had a debate in mind whether I wanted them to have pirated it or not. On the one hand if they pirated it that was theft and theft as we all know is terrible, on the other hand if they hadn’t pirated it it had meant they were ignoring me and by the time I came to the bookstore I had concluded that it was much worse to be ignored (audience laughs) than to have something stolen from one, and I was pleased to discover that they actually had pirated it so I was really (audience laughs). Well I tell that because it does illustrate, I think, a very important point, as I say, that those of us who are engaged in science and I apologise to those of you who are real scientists that I use that word for social science, but those of us who are engaged in research are not really motivated, for the most part, by quests for income, really are much more motivated by curiosity, trying to understand how the world works and are really concerned about the dissemination of our ideas. We in some sense go to extraordinary lengths to ensure that our ideas get heard and disseminated. The basic framework of a university is open discussion, open architecture, open expression, of ideas and the basic framework of the intellectual property regime, particularly as it has evolved in the last quarter of a century has been to close down access to knowledge and there is in that sense a real tension. Now many people, many of the discussions of intellectual
property begin by an analogy between ordinary property and intellectual property and we are all sort of engrained into the importance of ordinary property rights for making our economy function. It is important for incentives, it is hard to think about, you know the experiment where you try to get rid of property rights, Soviet Union, was a disaster, and so everybody understands the importance of property rights in some form or another and it is reasoning by analogy, they say ‘well if property rights are important, aren’t intellectual property rights important, aren’t they just the same thing applied to the concept of knowledge’, and the answer is that actually knowledge is fundamentally different from land, shares, other kinds of property. The basic idea was made very forcefully more than 200 years ago by Thomas Jefferson, America’s 3rd President and if you go to Washington and the Jefferson Memorial you can see this printed on the wall and basically, I will give a modern language interpretation of what he said, basically he said ‘knowledge was like a candle, when one candle lights another it doesn’t diminish from the light of the candle’, and what he was saying was in a much more poetic form what economists have talked about more recently in a technical sense, knowledge is a public good. A public good has two key properties, the most important property is the property of non-rivalrous consumption, that when one person, if you are sitting in a chair somebody else can’t sit in it, only one person can occupy it, if you eat some food somebody else can’t eat that same food, but knowledge is different and the example that Thomas Jefferson talked about highlights that, one person can know it, I can tell you what I know, now you know it maybe not perfectly but you know it and it doesn’t diminish from what I know. You could put it another way, again in more economic jargon that the marginal cost of you knowing it is zero, there still may be a transmission cost and you have to pay attention to that but the basic concept is that knowledge is fundamentally different from ordinary goods. There is another attribute of public goods in general, is what they call, non-excludability, it is difficult to exclude others from enjoying the benefits. The nature of knowledge is that you can do it but it is costly, you can exclude others and that is what intellectual property is about, it is about excluding others from enjoying the knowledge that is already there, and for which there is no marginal cost for the usage of that knowledge – that is what intellectual property is about. Now the fact that you are excluding somebody from using knowledge for which there is no marginal cost creates an inefficiency, it is inefficient to restrict the use of knowledge and yet we do it. In fact the right to issue patents, copyrights, is in the United States is in our constitution you know viewed as you know very important, and you ask the question Why? In actual fact intellectual property is worse than just exclusion, it gives somebody a monopoly power over that knowledge and often that knowledge itself, if it is really important, gives them a monopoly power over a product and that monopoly power is often abused as we see in the case of Microsoft, control of the operating system, and I say this, I mean this is not an issue of controversy, courts in the United States, Europe, Korea have all agreed that Microsoft has been abusive of the monopoly power that was derived from it’s intellectual property. The only question about Microsoft is what to do about abusive monopoly power and it is so abusive that they can’t figure out what to do about it but that it is abusive, there is no debate about that. With all apologies to the good works that may have come out of the profits that have been generated from that monopoly power. So the question then is, we have created this monopoly power, normally public policy is against creation of monopoly power, we try, we have competition authorities, we have fair trade commissions, we try to promote competition and the reason is very clear, what makes a market economy work efficiently is competition, so the question is why do we not only tolerate and almost encourage creation of monopoly in this area and allegedly the reason is that this particular temporary, and I have to emphasise temporary, grant of monopoly power, it is believed provides incentives for innovation. So there is a societal cost in that the information is not used as well as it should be, could be used, but there is a benefit, an alleged benefit, that it promotes innovation. The problem is
that increasingly we are becoming aware that because we have designed our intellectual property regime badly, particularly shaped by the obvious monopoly powers that have benefited from the intellectual property regime, that we have the cost of monopolisation but we don’t have the benefit of faster innovation, that in fact monopoly power can, the intellectual property regime may not only cause, what we call, a static inefficiency in the usage of knowledge, actually cause a impede innovation, actually set back the pace of science and innovation.

This is a concern that actually goes back a long way and people who have studied the history of innovation have been aware of this. In the last, in the beginning of the last century there were two important innovations, the automobile and the airplane and in both cases intellectual property almost stymied the development of these innovations. In the case of automobiles maybe we would have been better off if it had stymied, it was before we knew about global warming, and the story for those who are not familiar with this are that somebody who was not, people don’t remember him now, but somebody got the patent on a four wheel self-propelled vehicle, the fact that somebody else may have invented a four wheel vehicle in Germany or somewhere else was irrelevant to the American patent office, this often happens, we don’t have a very good global knowledge base and they got the patent, but his intent wasn’t to promote innovation, his intent was to create a cartel and he used this, this often happens, he used that patent as a cartel, as a ringleader in a cartel, and it worked very well. Most of the other automobile manufacturers were quite willing to pay him a certain amount for the use of his patent in return for which they all agreed to keep a high price and they were all making lots of profits. There was only one innovator who had a different vision of what an automobile was supposed to be and that was Henry Ford and his vision, and his vision was that a car ought to be a low priced vehicle that would change the whole transportation system in America and the world. So he wanted a people’s car and that meant a low cost car and that was totally against the spirit of the cartel and so he sued, you know, said the patent was not a valid patent, sued, he had both the determination and the resources to win the patent which was extremely costly and he finally won the patent but had he failed we would not have, the development of the modern automobile would have been delayed by a considerable length of time. The other major innovation at the beginning of the century was the aeroplane, most of you know the story again of the Wright brothers, flying at Kitty Hawk in 1903 but there was another innovator who also did some fundamental innovation on the aeroplane around the same time and got a patent on some key aspects of the airplane and the development of the airplane was stymied for years because nobody wanted to do the research, to develop an airplane, the next stage of the airplane because they couldn’t afford to pay off both of them and if they paid off one of them the other would sue.

And it is a phenomenon that has more recently become to be called ‘the patent thicket’ and it has become absolutely terrible in the area of software, anybody who writes a successful software programme knows, commercially successful, not one that works but commercially successful, will find that he is sued because he almost surely will have trespassed on somebody else’s patent and we had a lecture just a little while ago about the fact that disclosure of that information, it is very hard to get that information, and besides if you spent all your time finding out what patents had been applied for, you wouldn’t have any time to do your own research. So you have to either decide, it is like some of us, we say there are some of us who write and some of us who read, and if you are going to do research you can’t spend all your time looking at the patent, and there are people just generating patents all the time, you will find yourself sued. And the most remarkable, the most famous case of that is the BlackBerry and I really appreciate that there is almost nobody here, as far as I can see nobody here, normally when I give a talk before a
business community everybody is looking down at their BlackBerry and doing their email as I talk, and I really appreciate that nobody here is doing that but many people thought that the BlackBerry was a very important innovation going forward, I am not sure, but as you may know that BlackBerry was almost shut down in the United States by one of these patent trolls, and they demanded 600 million dollars ransom to continue to operate and BlackBerry said 'oh we will give you some money but we want some of that money back if it turns out that your patent is invalid', patents because there was more than one. And they said, 'no under American intellectual property law we have absolute right to shut you down whether our patents are valid or not, until our patents are proven to be invalid you can’t use them so you either pay us 600 million dollars or you go out of business', so they did pay the 600 million dollars and in the subsequent, I guess it has now been almost two years, I think all of the patents have been declared invalid for which they paid the money, they are still under appeal but the preliminary order on all the patents is that they have been declared invalid. That is an example that highlights the ways in which the patent system is not encouraging innovation because if you are a researcher and you are thinking about doing an important innovation you know that you will be sued, you will be engaged in litigation, so it is encouraging economic activity in the legal area (audience laugh) but that is not what it is supposed to be doing, it is supposed to be encouraging economic activity in innovation, and it is probably discouraging economic activity in the innovation area.

There are several other reasons why the intellectual property regime discourages innovation, I have referred to one of them earlier, knowledge leads to, the IPR system leads to monopoly power and monopoly discourages innovation. What encourages innovation is competition and IPR, intellectual property regime, discourages competition and so in that way discourages innovation. It also has another adverse effect on innovation, one of the most important inputs into the production of knowledge is knowledge, it is the first thing we do in a research project, we look at what knowledge is available that is relevant, and unfortunately one of the aspects of the intellectual property regime is it makes access to information, access to knowledge that might be used in follow-on innovations more difficult, so that is another example. Most people, or at least there is at least a strong view that Microsoft has not encouraged innovation. For instance, two of the most important products that they have developed have been the Explorer and the Media Player, both of them they essentially stole, the idea was innovated by somebody else, in the case of their internet Explorer before that was Netscape and that was based on public innovation, and the Media Player the basic innovation was done by Real Network, but the fact that they could use their monopoly power over the operating system to squelch these other firms is a very important lesson. It means that if you come up with a product that is important and you don’t face the problem of a patent thicket you will be squelched by Microsoft, that doesn’t encourage innovation either. So these are some of the reasons that innovation isn’t encouraged by the current intellectual property regime. There is a fundamental problem that relates to the public good of knowledge that results in excessive patenting in our economy. The question is, there is a broad question, there are a number of very difficult questions in the design of an intellectual property regime, I haven’t had time to go into them but ideas like what is the breadth of the patent, what is patentable, basic mathematical algorithms are not patentable or didn’t use to be patentable, that is an example you know, you ask what led to the innovation of the computer, it was basic science, ideas like Turing’s Turing machine, that wasn’t patentable so the basic things that are the basis of modern science, most of, many of those things are not patentable and yet they occur, if you believe the rhetoric of advocates of intellectual property they would say those things could not have occurred because there is no intellectual property but yet they did occur. The scope of intellectual property really is very narrow, limits,
it is really about the application of basic ideas, most of which originate in universities and other kinds of research centres, so we have to understand that the role is very limited. But another problem with intellectual property, very different from ordinary property, the boundaries are hard to define. You know where the boundaries of a piece of land are, people spend a lot of time doing, surveying what are those boundaries, but what are the boundaries of knowledge, it is very difficult to tell what is a distinct piece of knowledge. Each piece of knowledge uses other knowledge and that is why it is such a litigious area, but inevitably all these complexities mean that there are going to be patent suits, patent disputes, what is novel, you know, we granted a patent for instance for the idea that ‘Slash Q’, Q might mean quip, that was a breakthrough in intellectual ideas, that you might use a letter Q to stand for quip but he got a patent for this breakthrough which took a lot of research. So there are these ambiguities and the result of that as I say there is a lot of litigation. The patent office in the United States has almost never seen a patent that it didn’t like and the result of that is there is a lot of patents granted and then there are suits and then they get overturned, but if you think about the process, there are very strong incentives for patenting because when you patent you take something that was public and make it private, it makes it your own. But what do you do when you challenge a patent, you take something that was allegedly private, it was decreed private and you make it public, so challenging a patent is a public good itself, anybody, once you challenge it you put it in the public domain and anybody can use it so there is going to be a shortage of challenges and an excess supply of applications and so the result of this is that the system is biased towards excessive patenting, well that means things that should be in the public domain are not.

The final and perhaps most fundamental point about, a general principle I want to raise in terms of efficiency is that the social returns to innovation do not accord with the private returns associated with a patent system. The reason markets work well in general is that prices measure marginal costs of production and marginal benefits, but what is the marginal benefit from innovation, the marginal benefit of innovation is the fact that the idea is available a little earlier than it otherwise would have been, and we all like to think that the work that we did was so deep it would be several centuries before anybody else would have come across that same idea, but I think in moments of more realistic appraisal of our own work we realise that even fundamental things like you know, you read the book the double Helix, it was a race and if they didn’t, the team that got it didn’t get it, it would have been discovered a day later, so what is the social return, the social return of that race, I mean in a sense the social return of the person that got it was the fact that the information was available a day earlier, but the person who gets it doesn’t get, that is not his return, the benefit of being a day earlier, that would be very small, what he gets is the whole prize, he gets the whole thing of the monopoly right for an extended period of time and because of the way the patent system works especially and in the medical areas where you can engage in a process called ‘ever greening’ and you can often, it is officially 20 years but you can extend it and extend it and extend it. So there is a very big gap between private returns and social returns. An example of that, that we were talking about this morning that John did in the Human Genome project, everybody knew, or there was a strong belief that there would be the decoding of the human genome, and yeah while that was true, there were a number of private firms that were in a race to beat them, to get the patent on a particular gene because if they could get the patent on that gene they would have something which was very valuable and the most famous example that many of you may know about is the gene, the genes for which the patent is owned by Myriad in the United States, that predicts breast cancer with a high, these are significant probabilities that if you have these two genes you will get breast cancer therefore it is very important that you have that information, and the cost of the test, the economic cost, the cost of the
actual resources used in providing testing are not very significant but in the United States they charge several thousand dollars and because 50 million Americans don’t have any health insurance, if you are one of those 50 million people you don’t get tested and if you have those genes you have a much higher probability of dying unnecessarily. Knowledge that could be valuable and could save lives isn’t being used because you are poor and that is a theme that we will come back to a little later. So this was a case where the benefit of the research was nil but the social cost of the patent system was huge.

Well I want to turn, that raises the broad issue of equity, fairness of the intellectual property regime, the reason I wanted to spend so much time talking about the efficiency of property is that a lot of people just assume, they worry about the inequities that they know about that are so apparent, but they assume, they buy the line that the drug companies, big pharma makes that it is an important part of the incentives system, what I wanted to emphasise is that it actually may be impeding innovation. But the other story is that it is also inequitable and I was describing a few minutes ago the notion that in a way the intellectual property regime makes private what is public, in a way it is a little bit like the enclosure movement of the 16th, 17th, 18th century in the UK, in Scotland and England, where you had common land that was enclosed, throwing off large numbers of people, the argument for it which is actually, which is a little bit like this argument, the argument for it is that it increased the efficiency of the use of land, it avoided over grazing, actually that argument isn’t quite right because there are other mechanisms, regulatory mechanisms that control over grazing, but even if that argument were true there was a clear trade off between efficiency on the one hand and equity on the other. But in the case of intellectual property where what is going on is the enclosure of a commons, it is the commons of knowledge, it is the knowledge commons that are being enclosed today, knowledge that ought to be in the public domain is being privatised and that enclosure of the commons is not only inequitable but it is inefficient, it is resulting in less efficient use of knowledge and perhaps even impeding the production of knowledge.

(5 minute warning given)

Five minutes, okay well let me go, let me talk about two of the areas of concern that I have had, one of them has to do with developing countries. What separates developed from developing countries is not just a gap in resources but a disparity in knowledge, the intellectual property regime, the current intellectual property regime makes it more difficult to get access to knowledge, it makes it more difficult to close that knowledge gap and that is why at the World Intellectual Property Organisation, the developing countries have called for a development orientated intellectual property regime. The area where equity concerns, ethical concerns have been raised most forcibly is in the area of health, that intellectual property results in less access to health to generic medicine itself for a fraction, 2, 3 per cent, 5 per cent of the price of brand named medicines, this is particularly important when you are a developing country, an Aids medicine might cost 150 dollars, the brand name costs 10,000 dollars, if your income is 300 dollars you are not going to able to afford 10,000 dollars. So when the trade ministers signed the Uruguay Round Agreement in Marrakesh in the Spring of 1994 they were in effect signing the death warrants of thousands of people, of millions of people in the developing countries, they meant that they would not have access to generic medicines and let me make it clear that was the intent, it wasn’t the intent to kill people but it was the intent to make access to generic medicines less successful. And I want to emphasise here the difference in the way we think about these things internally, domestically and externally and I felt very strongly about that because at the time I was on the Council of Economic Advisors, under President Clinton and one of the big issues he was elected on was
on the issue of healthcare, it was one of the big issues then, it is one of the big issues now and he ran on access to healthcare, particularly the poor and the bad guys in this particular debate were the drug companies for their high prices, and yet when it came internationally we were in effect in bed with the drug companies, we were, that was the reason for the intellectual property regime. Inside the White House the Council of Economic Advisors, the Office of Science and Technology Policy, both opposed the intellectual property regime, the TRIPS agreement, we thought it was bad for American science, we thought it was bad for Global science, we thought it was bad for developing countries, we thought it was bad for the world, but our views didn’t prevail, it was really driven by two industries, the pharmaceutical industry and the entertainment industry, protecting copyright on Mickey Mouse was deemed to be very important and more important than the lives of people in the developing countries. Well, as I say, this case is not just a matter of dollars and cents; it is really important, it is a matter of life and death. There is a big asymmetry, while we work very hard to protect our intellectual property, we did a very bad job of protecting intellectual what you might call the intellectual property in the developing countries, traditional knowledge, bio-diversity, developed a whole concern over bio-piracy. An example, the United States granted a patent for basmati rice, Indians thought they had been eating basmati rice for centuries but the patent office, I jokingly say that they must have tasted it and thought it was a really good product, they never had an Indian restaurant in Washington at the time (audience laughs) and so they gave a patent. Fortunately in this case, and if the patent had been sustained and India had recognised it as we would encourage India to do it meant that every time anybody in India ate some basmati rice they would have to send a cheque to the United States. Well in that particular case India had the resources, the Indian government challenged the patent successfully but it was costly. And next another aspect of equity, access to the legal system is not equitably distributed and so developing countries face very high costs in challenging the patents made by American corporations.

Well let me just conclude by saying that as we look at these issues, we have to realise that we need an intellectual property regime that is tailored to the different circumstances of different countries, different sectors, that we have to realise that the current system is not only not efficient but it is also very inequitable, there are alternative ways of promoting innovation and, well I can’t lay them out here but what I want to point out is nobody really thinks that we ought to abandon completely the patent system, the issue isn’t whether we have a patent system or not, the issue is what are the portfolio of instruments that we use for promoting innovation and access to knowledge, and those include government funded research, prizes, a whole variety of mechanisms both to induce, to effect the providing centres but also to lower the costs for innovation. The current system isn’t working very well and it is particularly not working very well for developing countries, while the developing countries are paying large prices, the drug companies are spending more money on marketing and advertising than they do on research, more money on research for lifestyle drugs like growing your hair than they do for life saving drugs and almost none of the money they spend are on diseases that are particularly in developing countries. So we have a system, the current balance doesn’t serve I think anybody’s interests other than the drug companies. One of the reasons that I am hopeful for reform is even many areas, important areas of innovation in the United States are becoming aware that it is impeding innovation, the software industry is trying to get some changes in the intellectual property regime. So the issue that we have under discussion of how to create a better intellectual property regime or let me put it, a better innovation system is really key to creating a more dynamic, a more innovative economy. Thank you.

(audience clapping)