

Competitive Enterprise Institute

"Declining Marginal Cost Industries in the Global Information"  
Age

Friday, May 7, 2004

[Tape 1, Side A]

Mr. Smith: Yes, sit around the outside if possible at first, because those are where the mics are for questioning and we're recording this for posterity or what have you. So the bulk of the housekeeping functions, let's see, the bathrooms are one floor up either by the elevator or by the stairs and it's left and then right -- a critical thing. According to this, we're about 15 minutes late, so things will probably slide 15 minutes throughout the day unless we gain a little bit on one of the panels. To those of you who were here last night, you'll hear some of these same things over again, but let me first welcome all of you for coming. This is an interesting, I think very interesting topic, and one that we hopefully will be far ahead of by the end of this day.

The CI, for those of you who do not know us is an activist group. We work on the analytic conferences like this, but we also aggressively push them into the medium and we actually do advocacy work too. We litigate, we work with the regulators

and with the administration to try to change laws and change policies.

Today's topic, "Declining Marginal Cost" topic is one comes about in part because all of you will have [indiscernible] and we're about to show a video of [indiscernible]. But the idea that an industry is characterized by not having to charge for the last unit, but it does that, not having enough revenues to cover its overhead costs and certainly not enough to invest in new capital and new innovations. It's not atypical.

There are a large numbers of industries in the United States and elsewhere that have this characteristic. [Indiscernible] basically pointed out in those situations is really only two choices. Some form of creative financing, multi-part pricing or something of that type and/or government intervention, government subsidy. And he pointed out that in his view, he saw very little reason to suspect that having the general public pay for a service used by a select few rather than the select few would come up with a better social outcome. And that's sort of the theme we're going to be developing today.

In your letters that you have inviting you here, I outline some of the ways in which declining marginal cost firms actually solve their problems. There's a whole array of them

and we'll be reviewing them, I hope, in a sector-by-sector basis today. But the idea of, for example, multi-part pricings; entry fee ideas; selective rebates, coupons, things of that type; prior contractual arrangement; retail price maintenance, there's a whole series of areas bundling, where you bundle services together in a package and then price the package as a whole as opposed to ala carte pricing, which as some of you know has been pushed in the recording area and elsewhere.

There are two problems, and I hope by the end of the day we're further along in trying to solve. The first one is a better understanding of all of the techniques that are now being used and could be used to finance or to maintain in the free market, declining cost energies. And secondly, is there anything that we can do to legitimize those practices?

Some of you know the terms selected by economists are not always designed very well to persuade the public and the classic example in this area is discriminatory pricing. Why we're using discriminatory pricing when as it turns out almost automatically degrades the idea and makes it look bad. And of course, as you've heard me say, discriminatory pricing is not the right term. It's differential pricing, everyone wants to be neutral or if your concern is we are about putting a positive spin, give people a chance to really like the idea

before they really condemned it. You probably do not even want to use differential pricing. You want to use -- well, in a diverse world, we need diversity pricing. So diversity pricing is one of the ways we argue in this area.

What we're going to do is a brief film first right [indiscernible]? The firm is first. Last week -- well, two weeks ago now -- I went to Chicago and prior to that I'd written both Lester Telser and Ronald Coase about this conference. Both were interested. Well, Lester's relatively young, but Coase called me back and said, "Mr. Smith, I like the conference idea. I think it's a very timely one, but I'm 93 years old, I don't travel much anymore."

So, I said, "Well, if you won't come to me, I'll go to you." And we videotaped him and you'll see a very roughly edited videotape we have today. And then we'll go to our first panel, which Alex will deal with and I'll leave that part up to Alex to introduce the speakers and all.

When you speak today, when you have questions, please give your name too, because we're recording all of this, and it's going to be easier to identify speakers if we know who they are. Oh, we have timecards. Ester has timecards. Each of you knows how long you're supposed to speak and given the amount of material we're going to cover today, please try to keep to it. So first the video...

Via Videotape:

Mr. Telser: ...really began in [indiscernible] in a very [indiscernible] called Mathematical [indiscernible]. A slab book that had very important ideas in it about how a competitive market works.

[Videotape malfunction]

Mr. Telser: ...a slim book that had very important ideas in it, and was one of the very first rigorous analyses of how a competitive market works. So I view the theory of the [indiscernible] as essentially a theory of competition, because it makes very, very explicit the idea that people bargain with each other. They try to make the best deals that they can for themselves and they look around and as a result of all of their competitive bargain among themselves, finally there emerges a set of outcomes that nobody can improve upon. So the price is the best price that the seller can get, and it's the lowest price that the buyers have to pay consistent with making the largest number of trades possible in the market.

Now, when the Edgeworth started, he was really applying primarily to markets, but it also has many other applications. And it became discussed in the theory of gains in 1944 in a very famous book by [indiscernible]. But it didn't really become appreciated by economists until a little bit later when

Martin [indiscernible] pointed out the connections between Edgeworth had done 60 years earlier and what was in the theory of gains. But the essential idea of the theory is competition, contracting, and allowing people the freedom to make the best deals that they can for themselves.

Now, sometimes what it leads to and becomes very interesting is a study of what kind of rules are required in order to make a market work. It is the market doesn't mean that there's [indiscernible]. It requires appropriate rules so that you get an outcome that is not only in the public interest, but is also in the interest of all the participants.

Mr. Smith: I understand you and Sam [indiscernible] had a bet about the future of airline regulations.

Mr. Telser: Right.

Mr. Smith: Do you think you could tell us that and how did that result?

Mr. Telser: Well, I had a bet with Sam; I think it was in 1978 and I think it was a dollar. And I said the result was going to be a great reduction in the number of airlines. And I think I said in maybe 10 years or 15 years or something, we'd be left with only about 5 or 6 airlines. So Sam, after this lapse of time, said "I was wrong, Les." He lost the bet and so I never collected the dollar. But it took longer for this to happen. And I think there is a general tendency for economists

to think that reasonable things will happen more rapidly than they actually do happen. It takes a very long time before inevitable forces.

And this brings us back in the way of the theory of the core because in a system where public policy makes it hard to put on certain kinds of constraints on the arrangement when [indiscernible] airlines continuously lowering the core of the prices. And on the other end, one finds mergers and more significant global mergers are actually blocked by ownership rules, by any merger views in the business place. And mergers are very interesting also because of the emphasis on pricing. There has to be independent pricing decisions. And they're depending on cost conditions. This may not work. You can't really have a simple pricing with a viable industry.

And what often happens in order to get around this, there are mergers. But mergers are often interpreted as monopolistic. But they may actually be a way of avoiding the constraints that are imposed by other kinds of regulations. When you talk about the economic profession, I think that many of the people in the economic profession, like in other academic fields have had very little direct experience in business. They're sort of, to use the [indiscernible] term, in the intelligentsia. They tend to think of themselves in different ways.

*But in Chicago there's been a long tradition, 110 years, in which there has always been a certain kind of emphasis and approach that is different than in many other places. And that prejudice hasn't really been overcome. That is, I think that this notion about how businessmen become wealthy, my guess is that it's sort of lurking underneath and it has for many economists.*

*Mr. Smith: And so the economic profession remains more of a theory base than an [indiscernible] base field with the prejudice that would affect the intellectual populous, certainly.*

*Mr. Telser: And it's only recently, I would say, the last maybe 40 or 50 years that you begin to see some changes. Now for instance, one of the strongly held views that I share with Ronald Coase is that people don't leave money on the table. That is, they don't do stupid things. They try to make arrangements so that they eliminate waste. And this may require doing things that run against some deeply held, rather naive views.*

*One of the things that we try to do here is that when we take a student in, we try to teach them something so that when they leave they know things that they didn't know when they started. But, I think that in many places that isn't true.*

*The prejudices that they had when they came in are still with them with they emerge with a degree.*

*Mr. Smith: Well, going back in some ways to the roots of modern economics, people like Kix [phonetic] and Bagoo [phonetic] and Samuelson and so on, certainly it put economics in general, not necessarily Chicago on this highly conceptualized path. Was that a fortunate decision? I think you've said some things about this.*

*Mr. Telser: Well, there is -- I'm not opposed to theory. I do a lot of theory myself. I am opposed to sort of a theory for its own sake. I think that what you have to do is to try to solve problems. And you have to use your experience to solve problems.*

*Now, in particular, one of the most important factors that influenced me in my theorizing was consulting work that I did for a consulting firm, A.T. Carney [phonetic] on railroads when the Penn Central Railroad went bankrupt and it was such a big bankruptcy that a special arrangement was made. There were special legal arrangements made to handle the Penn Central Railroad. And there was serious attempt made to try and understand how railroads actually work and what we could do to revive them and get them to be financially viable.*

*And I was involved in that, and I learned a lot about railroads as a result. I mean, I actually learned a lot about*

how railroads worked. And in general, I think that doing the right kind of consulting is a very important part of the experience of an economist. What we have to do, we have to have something like a laboratory. If you're studying chemistry or physics, you don't just sit there with a book and read about. You actually have to go into a laboratory and do experiments and see how this stuff really works. And I think that we should be doing this also in economics.

I also did consulting in the auto industry. And I think I had to get up once at six o'clock in the morning to visit a Ford plant, a plant where they make Lincolns, and I think that's a very useful experience to see how this stuff is actually done. You learn something by doing -- I have learned from all of the consulting that I have done and I think it would be useful for economists to do this.

Now this is not antitrust. This is learning how a business works and how these things operate. You learn about things that are not in the textbooks. If you just talk to economists about railroads or assembly plants or whatever, that is unconvincing, because they call that anecdotes. You also have to have theories that relate to this stuff so that they can see that you're really talking about general things. You're not just talking about little stories and particular things.

Mr. Smith: The one bedrock belief of most antitrust regulators is that price coordination, naked price fixing as it's generally defined, can never enhance [indiscernible] and yet, with these mergers being driven in a way by this process..

Mr. Telser: In fact, that was in Bentley Myers' [phonetic] dissertation on the cast iron pipe industry, where they had worked out an arrangement due to the nature of the cost of producing cast iron pipe and dependent companies worked out an arrangement that actually lead to efficient production despite government rules governing the way cast iron pipe had to be sold in public situations. It's what the companies did amongst themselves, led to producing cast iron pipe at a lower total cost than would have been possible given strict adherence to the kinds of auctions that the government required.

Mr. Smith: One of the questions, of course groups like CEI do and as a consultant you deal in particular cases is that we find aggressive regulatory agencies in the United States, the Department of Justice, the Antitrust Division and the Federal Trade Commission now abroad increasingly, the European Commissions [indiscernible] competition. They all seem to be making pretty fierce judgments about the [indiscernible] of bundling, pricing policy, coordination policies with very little seeming doubt about the rest of the work they're doing.

Any advice you would give these people or any hope that they would..

Mr. Telser: It's hard for me to -- well, they have a kind of arrogance or bureaucratic bias. And one of things and it's hard for me to say what you can do about it. One of the things that could be done is that there should be more serious empirical work in order to see what are the consequences of some of these things. There have been, for example, some studies on the actual affects of antitrust, have they really attained the goals that their proponents claim.

Mr. Smith: Robert Crandall, and I think it was Cliff Winston [phonetic] just had a Brookings paper and found very little evidence that antitrust regulations had achieved any concerned [indiscernible].

Mr. Telser: Right. And often they have the reverse effect. They often have bad effects rather than good effects. And I don't really know how you handle -- I don't think that you can really do anything directly with the bureaucrats. I think that maybe the best way to handle this problem is with enlightened politicians. If you were to ask me who I thought which President of the United States was the best economist we ever had, you could probably guess what I'll say.

Mr. Smith: Ronald Reagan.

Mr. Telser: By far.

Mr. Smith: Because he actually understood the market wasn't stupid and wasn't evil.

Mr. Telser: Right. And was really very good at this. And I can't think -- it would be hard and I could name some presidents that were simply God awful in their understanding of this. And I would F- sort of like a student that went into Stigler and complained about his grade, which was an F and Stigler said to him, "Well, F is the lowest grade the University would allow me to give you."

Mr. Smith: Thank you very much. I'm looking forward to this conference and your work has been an inspiration to [indiscernible]...

Mr. Telser: Well, thank you.

Mr. Smith: We're trying in other ways to figure out how to take these insights and make policy [indiscernible] them. It's very much an enjoyable job. It's a little frustrating at times too.

Mr. Telser: I'm sure it is. More frustrating, I think, than I could handle.

[Videotape Break]

Mr. Smith: ...in preparation for a conference we're going to be dealing with on the declining marginal cost problem and its implications for public policy.

Mr. Coase: And I am Ronald Coase. I'm a professor at Emeritus of Economics at the University of Chicago where I still do research and writing at the age of 93.

Mr. Smith: We're going to be asking some questions that deal with largely the marginal cost question, but some of the other prominent papers you've written and their implications for modern policy. Let's talk a bit about the marginal cost controversy first. In that paper, written almost 50 years ago, as I recall...

Mr. Coase: Yes. It was published in 1946 after the war had finished and essentially contained ideas that I developed before the war when I was in my 20s. I developed all my good ideas when I was young.

Mr. Smith: In fact you [indiscernible]. The marginal cost question was essentially industries that had declining costs that the cost from the last output unit was considerably less than the earlier ones. That the problems in traditional economics because if one were to charge that low price, then one would not recover enough to cover the overall cost that produced the item. And this led to a problem and I want you to explain how it was traditionally resolved and how you suggested it be resolved.

Mr. Coase: Well, the situation is one in which average costs are declining. If average costs are declining, the costs

of additional units of output are less than the average cost of the [indiscernible] output. Now economists saw that you ought to allow people to buy things at the cost. What is the cost? The cost of the additional units, that's the cost. And so they suggested that all prices should be equal to the cost of additional units. That is marginal cost.

The difficulty was it was that marginal cost was less than average cost. So if you did this, you couldn't cover [indiscernible] cost. Well, that's no problem said the economists. If you are in this sort of situation, the government will pay the difference. And so they suggested that you should allow firms to charge a price equal to marginal cost and the difference between the average cost and price or [indiscernible] cost and receipts should be born by the government. And then this way, everyone would be happy. Prices would equal costs and we'd get supplies at the lowest cost possible.

Mr. Smith: And you raised questions about the wisdom of that solution.

Mr. Coase: The wisdom comes about -- it's hardly wisdom, it's so simple. If the government is going to pay for this difference between [indiscernible] costs and the receipts when prices equal marginal costs, how is the government going to get the money? It's going to get the money by taxation. But, if

*it's taxes, it's going to raise price above marginal cost somewhere else. So you really aren't getting rid of the problem at all. We're just creating the problem somewhere else. For some reason or other, economists didn't see this. My argument was very simple. All my arguments are simple. And it's very hard to get them accepted.*

*Mr. Smith: The thing you suggested that there were alternatives to either going bankrupt or government subsidies.*

*Mr. Coase: Well, the alternatives were known to everyone who pays an electricity bill. It's noticed it's two-part tear or you can multi-part tears where you pay an amount, which is not related to your total consumption plus a charge, which is related to your consumption. Economists don't study what goes on in the real world. They live in an imaginary world. And in the imaginary world, there weren't multi-part tears and all things could be done, as I've said, on the backboard.*

*Mr. Smith: We have a series now, of course, of creating a multi-part pricings in telecommunications, electricity and elsewhere, but very little economic insights into them, because, as you said, economists rarely study these [indiscernible] structures.*

*Mr. Coase: Well, they don't need to, because they have their own imaginary system, which they study.*

*Mr. Smith: It doesn't need all these devices.*

Mr. Coase: It doesn't need them. Facts are not necessary.

Mr. Smith: To what extent do you feel that the economists are in a sense are [indiscernible] market don't deal with this reality, this necessary reality of multi-part pricing, there is among many political commentators on pricing a feeling that there's something unjust about this system, that is it discriminatory, discriminatory pricing is one of the ones that are charging different people different amounts for the same good and service, the feeling of somehow this is unfair and that therefore the pricing that the market demands not being legitimized by the economists and being misunderstood by populous and by politicians, somehow we're in trouble that we have to rethink.

Mr. Coase: Yes. Or people who don't understand it. With this discrimination, total receipts are higher and therefore things can be produced, which otherwise wouldn't be produced and the people who pay the low prices are better off than people who buy at the high prices are better off. So the fact that people are better off with this system isn't as important as the fact that some people get more going than others. My teacher, Arnold Part [phonetic] dealt with problems of intellectual property was on the whole opposed to patents and

copyright because he said if you introduce something new, you'll have a period in which you can get additional revenue.

Well, in his day that was no doubt true. But [indiscernible] so he was often opposed to patents. But these days, the copying takes place so quickly that people do not have the opportunity of getting additional gains during that early period. When there's very little copying, well, you may have ten years in which to and that may be enough.

Mr. Smith: In the antitrust area, do you feel that antitrust regulations, overall, antitrust, obviously were intended to improve the market, competitive with the market, antitrust regulations now have been around over 100 years, I guess. Do you have any feelings about their -- if we had to do it over again, should we strengthen them, eliminated them or done something different?

Mr. Coase: When you say what should we do, the question is whether you can do any of these things that you want to do. What has happened in antitrust is that the antitrust lawyers are anxious to bring cases and they find cases in almost any circumstance? As I often put it, if a firm lowers its price, it's predatory pricing. If it takes the price at the same level, it's collusion. And if it raises the price, it's monopoly. So there is variable -

*I once taught a course about antitrust cases. And I was reminded of an effect that in one case the argument was that this firm was monopolizing, because it was more efficient than the other firms and therefore had an advantage. And the defense lawyers said oh no, we're not efficient, we're inefficient, because you have to counter the argument. If you read the antitrust cases, it's really a laugh full the arguments on both sides are silly, because that's the way antitrust goes.*

*Mr. Smith: There are many more arguably people to answer and address these questions. Why is the economics profession bound to these questions so worthy of neglect?*

*Mr. Coase: Because they don't study the economic system. They study other economists' writings and the economic literature consists of a discussion of discussions of discussions and so it could go on. And it's not really dealing with what happens in the real world. It's dealing with this imaginary world that is economics.*

*Well, economics has become a theory driven subject. What is in a textbook is a theory. And people are not interested really in empirical work. A lot of people have to do empirical work in order to get a Ph.D. But once they've done it, they move over to mainstream economics, which is a theory, theoretical subject. They're going to look at the journals.*

*You can't even find any English there. It's all simple. Yes, economists are trained in techniques with analysis. Not in finding the real problems, which you could find if you went into the street. They don't go into the street.*

*Mr. Smith: The general course in economics, do you think it's beginning to become again aware of its political and empirical roots or is it still drifting towards the blackboard model?*

*Mr. Coase: Well, you have to distinguish between mainstream economics, which is rightly, a dismal subject. From work that is done, as it were on the outskirts, in development and economics you're getting interesting [indiscernible], interesting work done. In [indiscernible] economics. In fact, what is interesting is to see where the interesting work is being done. It's not being done by a large economic departments, it's being done in business schools, in law schools, in engineering schools.*

*Mr. Smith: If it was closer to the reality, the real world in a sense.*

*Mr. Coase: Yes, and one less subject to the control of mainstream economics. The journals after all, people say you shouldn't have peer review. The difficulty with peer review is that the peers have the mainstream viewpoints. Therefore will not be receptive to other views. I have been concerned with*

*the development of what is called the new institution of economics. This deals with real world situations and in order to deal with them, you have to take into account the laws that exists, the attitudes that exists, and this sort of sociological aspects, all of which effect how people will respond. If you think that the best thing to do in life as to sit as a hermit in a cave, they're not going to get very much economic development. And the rest of us who are not in the cave will suffer.*

*Mr. Smith: When we're talking to your successors eight years from now, what kind of world would you like to see? What kind of votes would you have for the policies of America and the world?*

*Mr. Coase: One that I'd like to see is for people to study how the actually economic system operates. They don't really study the economic system at all, which sounds ridiculous, but in fact what they do is they study problems. This problem, that problem, well, the economic system is like the human body. It has a lot of different parts, all interrelated and what we have to do is study how the economic system actually operates. We don't do that. Maybe in the 80 years you talk about economists will do that and I hope some of the people at your conference will do it.*

*Mr. Smith: Well, we'll do our best. We really appreciate your talking to us, and thank you very much for letting us interview and have our [indiscernible].*

[End of videotape]

Mr. Smith: Okay. All right. We'll move right into the next panel. Thank you very much. We'll take up Coase's challenge and see if we can do some good work at this conference. I'd like to start off by introducing Alex Tabarrok. He'll be moderating this first panel. Professor Tabarrok is in the economics faculty at George Mason University. He's also Director of Research at the Independent Institute and a Research Fellow at the Mercatus Center. He's authored various papers regarding Food and Drug Administration's drug approval process and has the Independent Institute's FDA review project. I'll give you Alex Tabarrok.

[Applause]

Mr. Tabarrok: Thank you very much. I'd like to have a very good discussion today. So I'm going to keep my introductions very brief. Despite the fact that we have a very distinguished panel, I think it's better that I prove why they are distinguished rather than I go through a list of accomplishments. Also, I'm going to introduce all of the speakers at the present time to sort of save a little bit of time. We're going to begin with Patricia Danzon. She's the

Celia Moh Professor at the Wharton School of Management, where she is also Professor of Health Care Systems and Insurance and Risk Management. She is -- simply put -- the world's leading scholar on the international comparison of pharmaceutical prices, as well as in a variety of other fields.

Second speaking today is Henry Grabowski, on the right. He is a Professor of Economics and Director of the Program in Pharmaceuticals and Health Economics at Duke University. He is one of the few people to have studied how varying the length of patents effects innovation. And along with co-authors, he is the leading expert on the cost of new pharmaceuticals.

Following Henry will be Jack Calfee, who is Resident Scholar at the American Enterprise Institute in Washington. He is an author of, among other things, *Prices, Markets and the Pharmaceutical Revolution*, which to my mind is the best short primer on these issues that you can find. And you can actually download that from the AEI website, which I encourage you to do. He is also the author of a classic book on advertising, *A Fear of Persuasion: A New Perspective on Advertising and Regulations*. And I also recommend that. So with that, I'll turn it over to Patricia.

Ms. Danzon: Thanks very much, Alex. Could I use the remote? Thanks very much and good morning everybody. I titled my talk "Differential Pricing in Pharmaceuticals, Preserving

Access in R&D" to simply draw attention to the point that in the case of pharmaceuticals, differential pricing is important not just for a sharing rate return on R&D, but there is a unique concern about affordability of drugs that probably isn't so much an issue in some of the other industries I'll talk about.

Okay. Let me start off by just reviewing briefly the cost structure of the pharmaceutical industry and Henry's going to talk more about this. Measuring R&D as a percentage of sales in pharmaceuticals is roughly 17 percent. It varies about from year to year for the research base side of the industry excluding generics. But that measure of sales estimate actually understates R&D as a percentage of the cost of bringing a new drug to market and marketing throughout its lifecycle, because it leaves out the opportunity cost of funds over the time it takes to develop a product. So it's a rough estimate for that total cost of developing a product at a percent of all cost over the lifecycle. We estimate that it's about 30 percent.

The interesting thing about [indiscernible] is that it really is a global joint cost. In other words, once a drug is developed, it can be used to serve consumers in countries throughout the world. And it's not the only global joint cost in the cost structure.

Primary production, which is the production of active ingredient, is also largely done in just a couple of plants around the world. So that too is very joint. And then as we go down or through the production process, really how much is marginal cost really depends on which margin we're talking about. If we're talking about the cost of producing another pill, it's literally pennies. But, if we're talking about a marginal cost of launching a drug in another country, then obviously that is more. So one can define marginal cost at different points in the production process and the distribution process and over the lifecycle. But, clearly, it is the case that pricing at marginal cost would not cover the cost of [indiscernible].

So, in pharmaceuticals, the traditional set up for recouping R&D costs was actually pretty good. In that pharmaceutical patents are perhaps unusually strong compared to other industry. There are competitive products for treating a particular indication, but usually they're not perfect substituted and patents have traditionally been defined along national lines so that the patent holder in a particular country could buy importation of the same product from another country and could basically practice differential pricing across countries.

This is facilitated by the fact that pharmaceutical spending is to a large degree now reimbursed by third party payment systems, either private insurance in the U.S. or national health care systems overseas. And these health care systems are generally defined along national lines in many cases they set their own prices. So this system has permitted traditionally, a reasonable system of differential pricing across countries. And one could argue that with free entry to the business of R&D, this sort of setup could result in basically the best of both worlds in which manufacturers are pursuing profit maximizing price discrimination -- if you'll forgive me Fred -- and that that would be a set of differentials that would be Ramsey [phonetic] optimal, in other words socially optimal.

But, in fact this system is breaking down very seriously for a number of reasons. First, these national governments in many countries actually exert [indiscernible] power and are paying prices that are probably below what we Ramsey optimal. Second, and even more threatening is the fact that in an increasing number of countries, the way that they regulate prices in a particular country is by referencing the prices in other countries. So for example, Canada's price for a new innovative product is the median of prices in seven other countries. And this was actually proposed in the Clinton

Health Care Reform Debate for the U.S. And so when that form of regulation is enacted, it basically imports lower foreign prices across the board for the drugs in that country.

Perhaps most threatening in the U.S. at the moment is the prospect of importation of drugs. This is accepted and standard in European Union, but just within the EU countries, there is actually importation legislation or re-importation on the books in the U.S..

[Tape 1, Side A ends]

[Tape 1, Side B begins]

Ms. Danzon: So, with this breakdown of ability to segment markets what manufacturers in the long run will tend to do, theory predicts, is simply move to a system that is pricing either at a single price or within a narrow band of prices such at the price differentials across countries would be insufficient to cover the cost of the parallel [indiscernible]. And unfortunately, in a sense, if that happens, the price that's likely to dominate is the U.S. price, because the U.S. has such a dominant share of pharmaceutical sales.

So the likely scenario in the longer run is an attempt to level foreign prices up to the U.S. price, which could, if it happens, result in significant loss of access and utilization in poorer countries. Obviously we don't have a lot of great evidence on this, but certainly within the U.S., the response

to the Medicaid [indiscernible] price provision -- I won't go into the details, but that was a provision that required that manufacturers give the best discount that they give to the private sector to the Medicaid public program, and the result of that was simply to dry up the discount to some extent to the private sector. And when you look differential across countries, lower income countries are now paying prices that are probably inappropriately high relative to their income.

So, to give you some evidence to support these bold discussions, this is the most recent data I've seen on basically sales distributed across major markets in the pharmaceutical industry. You can see that North America absolutely dominates at 49 percent of sales. Canada maybe 10 percent of that, but most of that is the U.S.

And compared to that, even the 15 countries of the European Union together are only 25 percent of sales. So roughly half the sales volume and the differences reflect both higher prices in the U.S., but also relatively high volumes. So that if manufacturers make the economic calculation, what is the optimal single price in the world? Well, that's a weighted average of the optimal prices in different markets. And the U.S. would dominate that calculation.

To give you some evidence on what the actual price differences are and the most recent study that we've done,

which used '99 data with these price indexes compare the price of a broadly based market [indiscernible] of 249 molecules in the foreign countries relative to the U.S. So 100 means the same price in the foreign country as the U.S. And there were two bars for each country. The blue bar is simply the price index, so the relative price converted to current exchange rates in the foreign country relative to the U.S. And you can see that most of Canada is at 33 percent lower than the U.S.

Most of the European countries are within 20 to 30 percent lower. But the purple bar basically normalizes that price difference through the difference in incomes. So in other words, if the relative prices have the same ratio as the relative incomes, the purple bars would be at 100. And you can see when we do that normalization for income, the foreign prices are generally roughly in line with the differences in income with the huge exceptions of Chile and Mexico where prices are just way out of line with relative incomes.

And arguably -- I mean I haven't done a detailed analysis, but just sort of intuitive reasoning why that is likely to occur is lack of ability to segment the market within those countries, so pricing from the small [indiscernible] submarkets within those countries and possibly concern about [indiscernible] prices to the U.S. But, I think what these data suggest is that since other countries are already paying

prices that are roughly appropriate for their income levels, in the attempt to try to raise their prices to U.S. levels is going to result in reduction and utilization and possibly launch in some countries.

A couple of closing comments, the argument is often made in favor of importation, but it's simply free trade. But I think that's a very mistaken argument in this industry. Trade is supposed to be welfare enhancing when you're sourcing a product from a lower cost country.

In the case of pharmaceuticals, low price countries usually have low prices either because they have relatively low incomes, sort of a demand effect, or because of regulation. And differences in labor costs play a very small role in manufacturing costs in pharmaceutical. I think that if re-importation or importation is enacted in the U.S. it could have very significant effects on sales overseas possibly slightly lower prices in the U.S., but the basic long run result is likely to be less revenue for manufacturers due to lower sales overseas, partly due to somewhat higher prices there. And increased costs due to the attempt to get around the provisions by re-labeling, by reformulation, administrative cost [indiscernible] and quality for the FDA and all of those associated costs.

So, what can be done about this? Well, in the best of all worlds we'd go back to the system where patents were defined along national lines. I think it would be naive to think that's going to happen. As I understand it, the provisions and trips for patents leave it up to an individual country to decide whether or not they're going to have national exhaustion or international exhaustion.

More promising to some extent is the notion that the higher income countries would agree that they will not try to import prices or products from the lowest income countries. And I think there, there is a beginning of a consensus within the EU and possibly within the U.S. about not referencing the lowest income countries. But that breaks down for the middle-income countries and so there's a possibility for [indiscernible] there. But the best approach is one in which price differentials occur through confidential rebates, where manufacturers are basically selling to wholesalers at a uniform price, but giving to the ultimate payers rebates or discounts that result in [indiscernible] price differences.

That's the system that we use for managed care in the U.S. It works pretty well, but in applying it internationally it is running up against a lot of resistance and demands for transparency concerns that confidential rebates will be abused with corruption and the like. But those things can be overcome

by appropriate auditing. So I think Henry's going to talk about this a bit too, but from an economic standpoint, that really is the best hope of a system that would achieve differential pricing across countries and basically eliminating the possibility for parallel trade and external referencing.

So, finally, a system like this would preserve incentives for R&D and make drugs more affordable in lower income countries. But, as a final note, I think it's really important to point out that this differential pricing will only solve the problems of affordability and access to drugs in developing countries for those drugs that have a first world market to pay the higher prices for anti-mamerials, anti-TB drugs, for the drugs to treat diseases that are not prevalent in the first world, this is not a sufficient approach and other sorts of subsidies will be [indiscernible]. I'm done. Thank you very much.

[Applause]

Mr. Tabarrok: Henry Grabowski?

Mr. Grabowski: Okay. Thank you very much. I'm going to talk about, in a snapshot way, of pharmaceutical innovation and R&D costs, patents and pricing. Just to summarize some of our work on R&D costs, basically we've done three studies now. I've been a co-author on two with Joe DiMasi and Ron Hansen. And we've looked at the issue of R&D costs and R&D costs have

been growing much faster than the rate of inflation, which implies the fixed cost component are growing relative to marginal cost in this industry. And the drivers of R&D cost include the probability of success, out of pocket expenses, both pre-clinically and clinically, the cost of capital and development time.

And one of the reasons you get such big numbers of hundreds of millions of dollars is because the probability of success are low. Basically in terms of thousands of drugs are screened in the lab for every one that's tested on animals and then hundreds are tested on animals for every one that goes into man and even with the best medical knowledge the success rates is about 1 in 5, a little above 1 in 5. So, the successful drug has to carry the cost of the unsuccessful drug.

Here's just a snapshot of these three studies. They focus roughly on the '70s, the '80s and the '90s. And there's been an increase roughly doubling after adjusting for inflation every ten years or so. So the earliest study focused on the '70s. The total costs were a little over \$100 million and then \$300 million, and \$800 million. And between the '80s and the '90s the biggest change was at the clinical stage, the clinical stage of more than increased four times from \$100 million to over \$400 million. And some of the important factors effecting the growth in clinical costs are more clinical trial subjects

and increased complexity and these are, in part, regulatory driven by the FDA.

But also, the type of diseases that are being investigated, there's more work on chronic diseases and degenerative diseases, cardiovascular, CNS, Alzheimer's and these require more patients, longer trials. And there's more studies that are head to head involved now based to get reimbursement. There's a lot more -- that's part of the process driving this.

And this just shows some data that we gathered from various sources on the mean number of subjects in a new drug development application for a new molecular entity. And it goes back from the late '70s you can see the average was \$1,500 and then it grew to over \$3,000 and in the most recent period it's over \$5,000. So this is consistent with why costs are more than doubling.

Another metric here that Data Edge, which collects data for contract research organizations, this is an index of clinical trial complexity. It's based on the number of procedures that are administered in asthmatic devices have improved. And there's more diagnostics the number of procedures have also increased.

The way competition develops in pharmaceuticals is around therapeutic categories or chemical classes of drugs. And there's been a lot of innovation over time. The high costs are

matched by successful new drug entries and this is just a list of new drug classes that have been introduced since the '90s. The Triptains [phonetic] for migraine, the Taxains [phonetic] for cancer, the macrolytes [phonetic], anti-effectives, the atypical antipsychotic for schizophrenia, Protease inhibitors for AIDS, which really revolutionize the treatment of AIDS, the biggest biotech drug, Nutropenia the Cox II inhibitors for arthritis and the selective estrogen receptive modules for osteoporosis.

And then there are some lifestyle drugs that also came along in the '90s for erectile dysfunction and baldness and et cetera, which a lot of people would say have social value too. But the competition develops around this. The first in class or the best in class captures a big market in these classes and the price competition and product differentiation occurs and then when patents expire, generics come into the market.

This shows the nature of the returns from another study we did, Present Value for Floor Samples of Drug Approvals. Which, the way to read this chart is the top decile is labeled number one of drugs. What percentage of the present value of net revenues for a cohort, a five year cohort and the top decile of drugs tend to have 50 percent of the value, so that's where the concept of Blockbuster comes. These are the drugs that are first in class or best in class. The second decile tends to

have about 20 percent of net revenue. The third decile about 10 percent and all the other deciles less than 10 percent.

Patents are very important in this industry for obvious reasons with this cost and return structure and much more so than other high tech industries. The length of a patent is important because you need the time to recoup this high fixed investment. And under the Hatch-Waxman Act, the cost of imitation, you just have to show bio equivalence. This is a relatively quick and easy process relative to the cost of innovation. Just some representative numbers for innovation, the gestation period is 10 to 14 years.

As I've said, the success rate is about 1 in 5, and the out of pocket costs are about \$400 million and in capitalized terms, it's \$800 million. For a generic, you can begin this process before the patent expires. There's a short gestation period and a relatively low R&D cost.

Here's what tends to happen in competition in this industry as the brands have between 10 and 14 years of patent life. And after that, you get very vigorous generic competition and it's gotten more vigorous over time. Firms have developed some strategies to try to preserve line extensions, shift to OTC, but these are three of the leading brands that came off patent in the period 2000 to 2002. Vasotec had about 14 year patent life, but then they lost 80

percent of the market within six months. Cestral Printaval [phonetic] another big anti-hypertension drug, lost 95 percent of the market in six months and Prozac, 86 percent. And what happens is the pricing generics come into the market with initial -- initial generic will be about 25 percent below the brand and then as more generics come in, prices are driven to marginal cost. That usually takes 10 or 11 generics over a few year periods to bring prices to marginal cost.

So, let me turn to the drug importation issue, give a few additional remarks. This is obviously a key issue that is affecting the industry at the current time. One of my senior honor students did a political choice thing that we may develop into a paper, but he looked at the bill from last July that was passed by the House, the Market Act, that's Pharmaceutical Market Access Bill, with Congressman Gutknecht from Minnesota, Republican, and Manuel, a Democrat from Congress -- these bills have strange bedfellows in importation. But, it passed, if you remember, last July and some people in the House said once we get this bill, we're not going to pass prescription drug benefit. And after adjusting for party and campaign contributions from the relevant individuals, we found that how a Congressman voted was influenced a lot by whether they represented a border state, whether you're a Republican or a Democrat that increased the probability of voting for the bill

by 15 percent and also by the percentage elderly in a particular state.

Well, the consequences of drug importation, I don't know if we'll have disagreement about this, but initially you get loss of market share and price pressures on drugs in the U.S., you're seeing this some from the internet already, the loss of market share. Then you get supply constraints on pharmaceuticals to Canada. Over time you get delays of new drug introduction. There's some evidence of that in Europe, in the EU in parallel trade, you get convergence of worldwide prices and you get reduced innovative effort. Now, I think the economics, legal and political how it plays out, how it sorts out whether at the end of the day this gets people so upset at the pharmaceutical industry that we have price controls remains to be seen.

And finally, strategies that facilitate market segmentation, country specific packaging and branding to the extent that product forms and strengths are different. That can help maintain segmentation. The confidential rebates to payers that Patricia talked about and then international agreements standing parallel trade and external reference pricing. So those are some of the things we can discuss in the discussion period.

Mr. Tabarrok: Okay. Thank you very much. [Applause]

Jack Calfee?

Mr. Calfee: Thank you, Alex. I'm here mainly to, I guess not as a critic, but to offer some comments and responses and spin out a few ideas rather quickly.

Regarding Henry's work, which there's no work that's more widely cited in this area than the work that Henry and Joe DiMasi have been doing over the years and that situation will not change. I'm now reviewing a semi-popular book entitled, *The \$800 million Pill* and that number is Henry and Joe's number, gives you an idea of the prominence of that research. There's one thing I think that's worth pointing out in connection with the R&D costs, which is well known within in the industry but I don't think gets as much emphasis as it should outside the industry. And that is the importance and the value and the quantity of the research that takes place after a new drug is approved.

If you look at one of the most important drug categories there is right now, which is the Statin Class of Cholesterol Reducing Drugs, the best selling drug category in the world, including the best selling brands in the world. There are, I think, six Statens now in the market and there was one other that was withdrawn from the market. They've been around for 15 years or so. But, I would guess that far more money has been

spent on research, after the drugs were approved for each individual drug than was done before the drugs were approved. We're now going at the rate of maybe \$50, \$100, \$150 million per year on the R&D on these various drugs and the result is we've learned far more about what the Staten drugs can do.

The drugs have proved to be far more valuable than anyone thought they would be. It's feeding back into basic research or in circulation. Which is, a journal from the American Heart Association recently published an article in their basic research section, which was the result of an empirical study on the Staten drugs in which they're finding that when you reduce cholesterol levels below certain levels that things are happening in the body which people didn't really expect to discover and we're learning something about the basic pathology and physiology of heart disease and especially heart attacks.

That's one example. If you look at oncology, I think it's pretty much the same story. Most of the research for the newer drugs is done after the drugs are approved rather than before. That's partly an artifact of the FDA approval system and oncology and cancer usually get a drug approved for a rather narrow indication because you need to run clinical trials. Clinical trials in cancer are very costly in human terms because of the fact that you're going to randomize people away from their treatments, which may prove to be extremely

effective. There are real problems with end points, mortalities is the best end point from some standpoints, but that requires longer trials and a lot of people die along the way, in many cases unnecessarily. The result is, you get narrow clinical trials and you need to do a lot of research afterwards.

A few things on the business of international drug pricing where I think probably the most basic question pertains to a matter, which I find very puzzling, which is why Patricia Danzon's work hasn't gotten more attention than it has, because what she's finding is that basically there are reasons to think that international drug pricing is always tended towards Ramsey pricing, that the prices are roughly proportional to per capita GDP. And if this is so, it raises two questions.

One, is it really a big problem and the other is, why do these European companies work so hard at price controls? Why do they take so long to register new drugs and so on and it causes some of us to suspect that the reason they're so slow is simply because they want to wait a while before they start paying for expensive new drugs. But it does raise the question of whether or not pricing is tended to be along the lines that one would think are reasonable and how much damage would be done if the system were disruptive, which is what a lot of people want to do.

There a lot of other thing that people could talk about in terms of international pricing, which I've just been notified I don't have nearly enough time to go through. But, I think Patricia's work, as well as Henry's are going to be the focus and going to be the foundation for most of the discussions that we have going forward. And certainly their work is an example of important exceptions to the situation that Ronald Coase was bemoaning, which is the fact that so much economics is being done theoretically rather than looking at how market actually work. And then he mentioned a lot of the best work comes out of the business schools, such as the Wharton School [phonetic] and certainly the work they're doing is an example how the empirical work is more or less dominating the theoretical work, at least in this particular market. Thank you.

[Applause]

Mr. Tabarrok: Thank you. All right. Just to open up the discussion. I'd like to follow up on something Henry mentioned, which is that contrary to some of the other industries we're going to be looking at a little bit later, electricity and transportation and so forth, in the pharmaceutical industry we do have marginal cost pricing. It just takes a little bit longer. So within 10 to 15 years, after these new drugs are approved, the generics come in and we do end up with marginal cost pricing. So that means that all

of the debates that we have on drug re-importation, on price controls and so forth are really all about saving some money for 12 to 15 years. They're not about an infinite timeframe.

It's really a quite short timeframe. Moreover, if we think about what savings we might have from these 12 to 15 years, well, people could save money and that's a good thing, but that's really not the right metric, because most of the savings is just a transfer. So, the real issue there is how much increased consumption would we have if prices were reduced and what the value of that consumption would be in those 12 to 15 years. And on the other side, what would be the effect on innovation.

So, my question, or to open up the discussion, my question is, do we have any idea on how much benefit would be had, how much increased consumption would be had by reducing prices, A. And B, what would be the effect on innovations if we reduce prices say 20 percent, how many fewer new drugs would we receive? What would be the effect on innovation? And I'll open it up to anybody, the panel and then we'll move to discussion.

Mr. Grabowski: Well, let me point out one thing that I think is easy to forget. And that is that these markets work very differently when you get a second, third, and fourth drug in a particular therapeutic category. And that's one reason

when the European countries do get prices that are quite a bit lower than U.S. prices, which they don't always do, it's because just like the PBMs in this country, they're able to pay off different brands.

And it's interesting that when you have some of the biological drugs, which are purely sole source drugs, the only drugs that can be used to treat certain conditions, often you don't get the kind of international discounting that you get in terms of multi-source, where you have a competition within the therapeutic category. And even within the U.S. price competition can be quite vigorous. And as Philipson and Lichtenberg have demonstrated, by the time a patent runs out on a path-breaking drug, a lot of that brand capital has already been exhausted as a result of competition within that category.

Ms. Danzon: There are two ways of approaching your first question. One is to simply try to estimate how much in budget terms resources might be freed up for other spending. In the U.S., the share of total health spending on pharmaceuticals is about 10 percent of the total. So it's a relatively small share of the budget that would be freed up. In other countries, some of the European countries, they tend to work with global drug budgets and so to the extent that they hold down prices, it frees up budget room for more volume.

I think the other way to think about the question though is, if prices were lower, from a behavioral sense, how much [indiscernible] might there be in the market. And there I don't think we really have any good evidence. What is true is that when generics come into the market, the volume, although the prices fall dramatically, generally volume does not increase, partly because people are moving on to newer generations of drugs. So, again in this market because most people have drug coverage and so third party payment, the price elasticities depend very much on how the payers react. So, you're asking a really tough question on that one.

And on the second question, how much might R&D respond to a 20 percent reduction in revenues, I'll pass and pass it over to Henry.

Mr. Grabowski: Yes, that we've analyzed in the context of looking at rates of return for the average drug of the top decile. And if you drop prices 20 percent, you have an enormous effect on net present value and on R&D incentives and firms may adjust to that on the margin and other ways. But, I think we have pretty good notion that if prices were to dramatically drop in the U.S., R&D wouldn't disappear, but it would be dramatically affected.

Mr. Tabarrok: So between the two of you, I think what I'm hearing is that the deadweight loss of higher prices is

very low and the reduced cost of innovation could really be quite high. So from an economic point of view, there's really not much argument. It's purely a transfer. Not much efficiency gained from price controls or anything of that nature.

Let me go to Jerry.

Mr. Ellig: I'd like to hear anybody's comment on the panel. What do you think would happen under the follow policy if re-importation of drugs from other countries were permitted, but also drug companies were also permitted to engage in the various strategies that most companies are allowed to engage in, in terms of limited resale of your product, giving exclusive territories to their wholesalers or retailers so that they might require them to -- if you have a Canadian wholesaler, they can only sell in Canada, those kinds of things that a lot of companies are allowed to do and don't get in trouble for.

Because I know in the current legislation, a lot of times allow re-importation, but it also prohibits pharmaceutical companies from doing all these private contractual things. What would happen if we just let them get what they can through private contract, but don't explicitly bar re-importation?

Mr. Froeb: Let me just add something. That's my understanding of how the European Vertical Restraints Law has

evolved. You're not allowed to tell your retailers or your wholesalers where they can sell, but if they don't do what you ask them to do, you can cut them off.

Male Voice: That was the latest ruling out of the EU, is that right, out of the European Commission. I forget what country was involved maybe it was Greece. You couldn't tell them what to do with it, but you could limit your supplies to those countries, or at least to those particular wholesalers. But that's exactly what the so-called bipartisan bill now in the House and Senate would prohibit. Manufacturers would not be allowed to restrict their supply. The law would declare it an antitrust violation, a per se violation as I understand it, to limit the amount they sell to the wholesalers that are servicing foreign markets, including Canada.

Mr. Tabarrok: Fred?

Mr. Smith: Two questions that sort of follows up on what you said. One of the ways of addressing the import problem is to work with the U.S. TR to try to create bilateral treaties and multilateral treaties that would recognize there is an overhead cost of R&D to be recovered and that trade treaties could demand that the wealthier countries share their burden, not just United States carrying it all. And the other is the monopsony argument, if many drug companies are selling to a monopsonist or a governmental agency could there be an

antitrust exemption given to drug companies to facilitate their bargaining more aggressively to a monopsonist? So antitrust reform on one side and more aggressive use of the trading rules on the other side. Would either of those be useful there and which may be the other?

Mr. Danzon: Well, I'm willing to comment on the first one. The ideas of trying to bargain up the prices abroad. And based on the result of my recent study, I'm really skeptical about whether there is a strong basis for that. First, we have to agree that the appropriate differentials are roughly proportional to income. There's a complication in all this in that the price differentials we measure at the single point in time are not really an accurate reflection of the total net revenue that flows to the manufacturer over the lifecycle of a product. So the norm in the U.S. as particular products launch up to a particular price, but then over the lifecycle, there will generally be at least a CPI increase. And volumes tend to be high very early on and then new products replace them later.

The lifecycle patent is very different in other countries. There's no price increase usually after launch and diffusion is much slower. And so really if one wants to say okay well, how much is each country contributing to R&D, one really needs to look at price and volume and over the total lifecycle of pharmaceuticals. And that's a much more complex calculation.

But just based on the price comparisons so far, I don't see that there's a strong argument to say that at least among the European countries we looked at that they're not paying their fair share.

Mr. Grabowski: But just to follow up briefly. This was tried with Australia, which is a country, it wasn't an atrocious charge, but the Australians have very low prices relative to their income. I think it would show that. And the Australians didn't want to hear this and I don't think it went very far.

Mr. Calfee: I'm dubious about injecting even more factors into international trade negotiations. I think the main goal would be to get rid of everyone's tariffs. And your second questions -- oh, that's right. Well, I don't about the rest of you folks, but I'm also dubious of these sweeping second best or third best solutions. If we think there's some monopsony power out there then we should give Pfizer and Merk [phonetic] and so on the power to negotiate their foreign prices for Staten drugs and so on. I'm personally very reluctant to proceed down that trial. I don't know what you all think.

Mr. Grabowski: I agree.

Ms. Danzon: Yes, I agree. And I would like to make one other more general comment about price controls in this industry. We tend to call them price controls, but they are

different in that really what's happening is that third party payers are deciding how much they're willing to pay for the products that they're paying for. And we accept that in the U.S. That's why private third party payers decide how much they're willing to pay for drugs. It's just that when the government does it, it does become price controls. But I think the idea that European or other countries might move to a totally free market for drugs, it's quite unrealistic in a world in which there's third party payment and it wouldn't be appropriate because of the moral hazard problem.

Mr. Tabarrok: There are two questions in the back. First on the right and then, go ahead.

Mr. Pierce: Yes. I wanted to try something out on you and ask you where I've gone wrong on this that perhaps we ought to be concerned about excessive spending on R&D, pharmaceutical R&D attributable to net government intervention that has a net effect of increasing pharmaceutical firm revenues when you combine the positive effects of third party payments with the negative effects of the price control/exercise in monopsony power, the net effect is actually the increase total pharmaceutical profits thereby inducing excessive expenditure on R&D. Where am I going wrong?

Mr. Tabarrok: You're saying essentially that with third party payments people are going to buy too much and therefore there's too great a payoff from developing...

Mr. Pierce: Yes. Or to put it another way, if we return to the pre-World War II regime where everybody paid out of pocket for their pharmaceuticals, total pharmaceutical revenues would go down, R&D spending would go down and that is arguably where we should be.

Male Voice: I think there's some validity to that.

Mr. Tabarrok: There's certainly some validity with respect to health care over all. It seems though that actually pharmaceuticals are something of an exception that the studies indicate, particularly Frank Lichtenberg's work, but others as well that pharmaceuticals have a very high payoff, much more than their price. The social benefits exceed the price considerably.

Male Voice: The question is, what kind of consumer willingness to pay would emerge. And one of the things I find interesting and it's hardly ever mentioned in connection with this debate over the Medicare drug benefit. If it's really true and apparently it is, that 30, 40 even maybe 50 percent of the Medicare patients right now don't have drug insurance. They've still been buying a lot of drugs. They've been paying for a lot of drugs. The willingness to pay seems to be fairly

substantial, at least for an awful lot of the drugs that we have out there. I still think that some people are buying stuff they wouldn't buy if they were paying for it themselves.

But I think Alex has a good point. There's a lot of stuff that the payoff is sufficiently large that the willingness to pay might be fairly solid. It's very hard to know when you have only a tiny sliver of the market that's really a cash market.

Ms. Danzon: I think that the point is true in general for health care because we have third party payment. We buy too much of it. I think the general economist position on this is that the real inefficiency in the U.S. health care market is the tax subsidy to imply contributions to health insurance. That is what leads us to over demand health insurance. But, having health insurance for things that are risky and high cost in general is good. But distortion is that the tax subsidy is leading us all to have too much and too generous health insurance and that's distorting all the health care markets, just not pharmaceutical.

Mr. Gattuso: There's an interesting twist on this price discrimination issue that handed out in Fred's questions and Jerry's question I think. This group is probably more favorable towards price discrimination than the general public, I suspect. The discussion at the beginning of the conference

and the videotape from Professors Telser and Coase and Fred's comments and the materials in the conference really are aimed at -- the written materials -- look to be aimed at how do you get rid of governmental barriers to price discrimination.

The discussion here is much more focused on whether you want a governmental mandate or a governmental barrier to protect price discrimination, sort of a mirror image. And it occurs to me that doesn't just happen in pharmaceuticals, that issue has come up in airline pricing as well. You put in rules to protect market segmentation there. It's come up a generation ago in fair trade laws in a sense, laws to protect retail price maintenance.

I guess maybe as a general question for the panel is, do I read the panelists correctly in that you are supporting the bans on re-importation as a government regulation? And if so, where do you draw the line between that sort of intervention and intervention that we generally believe is harmful to consumers? How is that type of government regulation justified whereas in other situations we see the regulation as being harmful?

Mr. Calfee: If the Pharma firms could freely write contracts over the disposition of the supply they ship abroad, I think that would solve a lot of these problems. They could write contracts with the Canadians and say this is the volume

you get; you can distribute in this providence, maybe you can distribute an entire nation of Canada, but that's it. I think contracting would prevent any necessity of government regulation and so we're back again in the second or third best situation in which Congress passed a law that says that no one can import except for the pharmaceutical firms themselves. But, of course, that was done purely for safety matters rather than anything having to do with...

Male Voice: Well, at the time I think that was true. That was the motivation with safety rather than anything to protect drug prices.

Male Voice: And it strikes me that Canadians should be really worried about this...

Male Voice: They are.

Male Voice: ...because if this plays out the way it's likely to, they're going to be the biggest losers, unless their laws are written in a way to prevent that. And so therefore, they should be taking some action here. You're not going to let 5 percent of the market drive -- they're 5 percent of the U.S. market.

Male Voice: Yes. I think there's a bunch of scenarios about bargaining games and Canadian limitations and so forth. But the bottom line from everything is that this naive view, which is really driving this partially [indiscernible] if you

want to be nice, that the Canadians have prices 20 percent lower, therefore if we have importation, we're going to have prices 20 percent lower too. That's from an economic point of view, that's crazy. But that's what the public thinks and I think that's what driving this, not any of these [indiscernible] arguments about bargaining.

Ms. Danzon: I absolutely agree with everything that's said. Permitting importation really is the worst thing we could do. The other really bad policy, government policy that is on the horizon is requiring more transparency on the discounts that are given in the U.S. For the Medicare discount card, the discounted prices are posted on the web and some of the proposals for the Medicare drug benefit would have required more revealing of discounts given to PBMs.

Fortunately, I think CBO cast that out as actually costing money because they realized that it would reduce the discounting. But that's the only one I think we really have to keep an eye on in terms of an obstacle to using differential pricing in the U.S.

Male Voice: Doug raises a question, which occasionally occurs to me, if Congress does pass the kind of re-importation they're talking about right now, which essentially would require Pfizer to sell to say Greek or Portugal wholesalers at the prices that they specify there.

And then, if what would happen is that the Greek authorities would get together with the pharmaceutical firms and then would agree to dramatically increase their price levels, the statutory price levels in Greece and then engage in all sorts of secret rebates and discounts as you suggested. I could imagine that we might end up with a very tricky enforcement regime, because essentially Congress would want someone to investigate to find out what the true prices are of the drugs are that are being sold to those countries and we could end up with a very, very intrusive regulatory system.

Male Voice: There is also one other alternative, which is that some of these countries may void the patents.

Male Voice: Well, but also [indiscernible] going much further and allowing greater differential pricing inside the United States. So even if you have third part payers, you could have America telling the insurance agency for Competitive Enterprises Institute, you have wealthy employees, you have lots of money, we're going to charge you so much for our drugs to the Medicaid patients who give them out for one-tenth the price or so.

Ms. Danzon: No. That is already a flourishing system of differential pricing to different managed care companies within the U.S. It's not so much, I believe, along the lines of income precisely, but it's driven by the different

restrictiveness of the formularies. So to the extent that lower income people choose plans that have more restrictive formularies, they get lower prices. Higher income people tend to choose plans that have less restrictive formularies. They're not going to get those big discounts. Unfortunately, the big exceptions are that the uninsured pay the highest prices because they have nobody bargaining for discounts on their behalf.

Male Voice: Fred, are you folks hiring right now? I was intrigued by that question.

Mr. Smith: [off mic]... from someone to us, we'd be happy to see it, but it hasn't happened. Just a follow up question to what Joe said. This idea of sort of selective rebates seems to be a very effective way, even in the third world it seems like a good idea, because it bypasses the corrupt government officials or the greedy ones in the United States, theoretically. They pay a full price, but then one tries to get a system on the ground to make rebates to the poorer customers.

And we have something like that in coupons in supermarkets, but of course it's not income differentiated there. It's who in the system is most willing to clip out coupons and so on, but it allows dual pricing in a world, which seemingly has standard bliss prices.

Male Voice: But I'm not sure it would bypass the corruption opportunities. It might be just the opposite.

Mr. Smith: For example, let's suppose if there was some NGO out there we trusted, which is a big 'if', but imagine if one, maybe Africa Fighting Malaria can get into this, but the idea that we would charge full price for AIDS drugs in Africa, but then one would have a team that would go through and provide vouchers directly to the people who were AIDS infected. So the government would be paying full price, but then the individual would get a rebate on that.

Male Voice: Do you mean just send cash to the customers?

Mr. Smith: Well, that's the way it works. Isn't that the way it's been proposed? Patricia, you were...

[Tape 1, Side B ends]

[Tape 2, Side A begins]

Ms. Danzon: ...has worked in some European countries. For example, after the reunification of Germany, rebates were given to the East German government because it was realized that basically it was a common market. And so the wholesale price had to be the same, but rebates were given to the East. But at the government level, I think it's prohibited. The transaction costs are prohibited at the individual level.

Mr. Tabarrok: Do we have five more minutes?

Male Voice: Well, actually we're out of time.

Mr. Tabarrok: We're out of time?

Male Voice: [off mic]

Mr. Tabarrok: Let me just mention something, which we haven't talked about. Michael Kramer has this sort of radical idea of patent buyouts. Just briefly for those of you not familiar. The idea essentially is that the government buys the patent and puts it out into public domain so you...

Male Voice: At what price do they...

Mr. Tabarrok: Well, that's what I'm getting to. So that's where the clever part comes in. So what Kramer suggests is we have an auction. We open the auction up to anyone to buy this patent, any private bidder. The only difference from a normal auction is that the high bidder will only win 10 percent of the time. The other 90 percent of the time, the government will use the bids, efficient market theory and so forth; will use the bids, which are produced in this auction to figure out what the thing is actually worth. And the 90 percent the government will pay for the patent at the high bid or perhaps even a little bit more. So, in this way we use efficient markets to figure out what the thing is worth. We buy the patent, we put it into public domain, have marginal cost pricing right from day one.

Male Voice: So this is Ronald Coase's problem. Where does that money come from?

Male Voice: Tax money.

Male Voice: You give marginal cost pricing..

Mr. Tabarrok: To the extent...

Male Voice: ...with a huge subsidy -- that's the purpose is to sell the drugs at marginal price after they've purchased the patent. So, I shudder to think of what the bid price would be for the Lipator franchise. It could be many billions of dollars and that money would have to come from somewhere, I mean it's extortion out there.

Male Voice: [off mic]

Male Voice: No, but the company doesn't know that either so that's not a problem.

Male Voice: But you may have removed the incentive for someone to find out what that drug is going to be worth. I mean what is Gleevec worth right now? No one knows what it's going to be worth 5 or 10 years from now.

Male Voice: You put out an auction for it. Just like anything you put on EBay for what it's worth.

Male Voice: No, but I mean once the government has taken over that patent, their goal is to sell it at the marginal cost, but what incentive do they have at that point to research the drug and to find out what it's really worth. After all, they didn't develop the drug in the first place because they lack incentive.

Male Voice: Right. Or even to diffuse it generally the physicians...

Mr. Tabarrok: All right. Well, thank you very much. Give a round of applause. We will be taking a ten-minute break right now and getting things set up for our next industry panel on transportation.

[Break]

Mr. Tabarrok: Okay. Just a quick reminder for those in the audience, if you have one of those microphones where you have to push the button first, sure say your piece and then cut it off afterwards. Other than that, we hope to continue the great conversations that we had that we could spend many hours on with the pharmaceutical panel and extend that into the transportation panel. For moderating, we have Wayne Crews. Mr. Crews is Vice President for Regulatory Policy and Director of Technology Studies at the Competitive Enterprise Institute. And I'm proud to say that he has joined CEI just recently and will be my colleague in the project on technology innovation. With all due respect, here's Wayne Crews.

Mr. Crews: Thanks a lot. I'm Wayne Crews. I just came back to CEI from KATO Institute where I've been for three years. I spend a bulk of my time these days on tech policy issues, the ones we'll be discussing this afternoon.

But, years ago at the College of William and Mary I took what we called a 'Trucks, Trains and Planes Course' on the transportation issues from a famous professor Marvin Stanley at William and Mary who died a few years ago. And I remember of all of the things in that class, as I was leaving that class I told Dr. Stanley my desire to buy a motorcycle. And he looked at me and he said, "Wayne, motorcycle riding is non-habit forming in the long run." And in a way, the marginal cost pricing issues are quite similar. So, I'm going to introduce our speakers similar to the way the last panel went. I'm going to introduce them all now. Each one will come to the podium to speak, if they'd like, or speak from the chairs. And then we'll open it up for general discussion.

Our first discussant is Kenneth Button. He directed the Center for Transportation Policy, Operations and Logistics in the School of Public Policy at George Mason since 1997. Prior to George Mason he was Conseiller in the Advisory Unit to the Secretary General of the organization of the OECD where he headed work on international aviation policy. And his Ph.D. is from Loughborough University.

Lou Thompson, our second speaker, is currently with Thompson, Galenson & Associates, a consulting firm that works with the World Bank Group providing guidance on railroad and transportation matters. He previously served as a railway

advisor to the World Bank where he won the President's Award for Excellence through his work in leading the concession of railways. And his MBA is from the Harvard Business School.

And finally, Ioannis Kessides is currently a lead economist with the World Bank specializing in competition, regulatory and privatization policies and network utilities, industrial organization, market structure and firm conduct. His PhD is from Princeton University. And without further ado..

Mr. Button: Thank you very much. I'm going to talk about airlines. Before doing so, I have some PowerPoints as you see. I always give a health warning: I very seldom use PowerPoints. My first experience was a conference in Krakow, Poland. A projector caught fire as soon as I started. Six hundred people evacuated in the building. So there are emergency exits, should you require one.

When [indiscernible] deregulated the U.S. airline industry back in the late 1970s, it quite properly described aircraft as marginal cost on wings. I think what we find in the subsequent experiences we have is he was absolutely right. An airline is basically marginal cost and the problem is recovering the full cost. We've now had 25 years of deregulation in the United States and in many other countries pretty much somewhat shorter. But no less we've learned quite a lot about it. As Warren Buffet said, "Don't put your money in aircraft." They

essentially are not doing too well globally from the perspective of the supplier, although I suggest the consumers actually are doing quite well in this situation.

Let's just consider what's happened to the airline industry since deregulation very briefly before moving on to look at how airlines attempt to recover their full cost of operation. Now this is where it gets dangerous. These are the figures for fares and cargo rates. Interestingly they're not American. When I talk in America, I always use European figures and when I talk in Europe, I always use American figures. The reason I do this is to simply show the generality of the types of problem, which are encountered.

Also it may give you some additional insights, but I think the point is these are general problems, not specific U.S. problems. They are general problems to the airline industry. From a consumer perspective, this is the index of an average yield bill fares and also cargo rates. Cargo rates are actually more important, sometimes believed somewhere in the order of 35 percent of world trade is carried by air by value.

Most economists I believe in value, not tons. There's a problem. These are the operating margins of the airline industry. There's three sets of figures there and if there's a column missing, it's simply because comparable data's not available [indiscernible]. These are operating margins for

three markets: the U.S. market, the European market and the global market.

What you'll observe is volatility, trade cycle effects perhaps, but also the long period of deregulation. The average operating margin is actually round about zero, maybe marginally less, marginally above. These incidentally are from the larger carriers [indiscernible] comparable figures. What would you expect an operating margin to be for the airlines? It's difficult to say, because clearly as accountants tell me, upon the capital mix, the equity financing and so on, but probably round about 6 percent would be a sustainable long term level of a normal profit type industry. So the airline industry is not covering its long-term costs. It's basically a lost leader and as Warren Buffet said, you shouldn't invest in airlines.

An interesting question is what's causing this and what the airlines are trying to do about resolving this difficulty and trying to capture some of the non-marginal costs in their customers or from government indeed. In the past, they used to get the recovery from subsidies. In Europe, airlines are publicly owned and they got government subsidies, either explicitly or implicitly. In the U.S., regulation guaranteed a certain rate of return, indeed rate of return regulations in place. In other cases, also some hidden subsidies, the Fly America Program, for example, captures U.S. civil servants

flying, which gives a sort of monopoly power to the airlines in the United States. And that still persists. The U.S. talked about deregulation. I find it a rather strange term. There are plenty of regulations existing for the airline industry. And I don't just mean environmental. I mean economic regulation.

But, interesting enough, the airlines may be losing money and again I stick to European data, but other industries offer supply trade providing the services the airlines lose seem to be doing quite nicely, thank you. These are figures for York, if you look at figures from the United States, figures globally consult the dumbness like McKenzie, and journals like *Airline Business* have done these things. You can calculate them in different ways.

Basically the rate of return further up the supply train is positive. It may need to be positive for different types of industry, but most people argue they're excessively positive. One reason for that is further up the supply train there's demonstrable monopoly power or demonstrable regulation or demonstrable public ownership. These are European figures all three apply. In the United States, public ownership is perhaps less important. But, everyone else seems to be doing well except the airlines because they are basically regulated. What you'd expect.

One could argue that the problem with the airline industry is that it's been in the past stifled from competition. New entries in fact simply forcing down the rate of return. But indeed, if you look at Europe, this is the inflow of low cost carriers into Europe. If you take the 2003 figure, which is not there, that was 10,500 feet is available for the low cost carriers. An interesting feature of this is that the European market, as indeed the U.S. market, is actually dominated by a low cost carrier in each case, which was a first mover. Southwestern United States, Ryan Air [phonetic] and Europe. I'm not quite sure what to make of that, but it does suggest that there are some first move advantages in some markets.

Why are they low cost? Well, they're low cost for three reasons, but first of all they manage to squeeze more efficiency out of their productive factor, the parts fly more and so on. Secondly they are bundled and don't provide certain types of service -- there are no jet ways with Ryan Air and Europe, you think Southwest is luxury compared to Ryan Air. And thirdly, they manage to reduce a quality of service to some extent, which pushes the price down.

Ryan Air, for example, did not provide refreshments on the plane. You have to buy your water or buy your Coke-a-Cola as the market works quite well when people buy less Coke or buy less water, therefore of course, the airlines have to provide

fewer restrooms on the plane. They save costs. So the point is very efficient and certainly pulling down the cost of the traditional carriers. But they really only entered the market in the latter part of the period. They were not a significant player to start with.

Well, here the large carriers tried to cope with these problems. These are the ways in which airlines try to recovery their full costs. And some of you would debate with Michael Levine, who's at Yale. He used to be the head of the business school there about whether you need a monopoly power to do this. He believes that you can have a gaming situation and the airlines can recover their full costs as a result of a game.

My view is that if you go to Las Vegas to play a game, you need some chips to start with. And the chips in the airline business are some degree of short term or even long-term monopoly power. Some control of some factors so that you can price discriminate, not to use Fred's words, price discriminate. Incidentally, Fred Collin, of course follows you in the sense he also likes consumer friendly jargon when he describes inflation of bananas just so people wouldn't panic too much.

But there are these options. Yield management. The problem is -- this is where you have differential fares for different customers, Ramsey pricing essentially. We all know

about this. We all know people who get different fares on aircraft. The ability to do this was possible in the past, simply because of asymmetrical inflation. Some users knew more about the market than others.

The possibility of doing this now is much less. We all know what is available in the market through computer systems. All [indiscernible] in this country [indiscernible] in Europe are actually run by the airlines themselves, but of course there's Travelocity and other schemes. People actually know what's being paid, what's available and when people know choices, they tend to pick the cheapest. So yield management is not something, which yields quite as much as it did in the past, price discrimination.

There is some control over CRS system, the booking system. That was dealt with legally in this country by simply not permitting it. The problem with computer reservation systems, the system by which you book your seat, is not the technology so much, but the fact that the travel agents rewarded bonuses for giving seats to particular airlines. That was controlled by the regulation in this country. In fact, it doesn't need to be controlled in the last few months; every move was controlled over CRS. Europeans remains there.

Frequent Flyer Programs, customer loyalty. If you can retain customers, first of all it reduces your cost, because

you have some idea of what your revenue flow is going to be, but it also gives you a guaranteed revenue stream as well. That's being devalued. It's a little like green shield stamps. Frequent flyer miles ubiquitous. I keep getting emails telling me how many millions I have.

Of course, I could never use them, because the planes are now 80 percent full. So there's not a great deal of value to people these days. When they first started, they were a clear attraction, plenty of empirical work, but businessmen in particular would use them, because of standard principal agent problem. The work didn't pay; the company did, so there's no reason to economize. The ability to do that now is less and the attraction of doing that is less. Indeed, many companies like ICI now force employees to justify why they took the particular form of transportation.

Public [indiscernible] operations, they were common and that gives an airlines control over particular terminal facilities. We see these in the United States regularly. If you go to Minneapolis, it's all Northwest. Detroit's the same. Thus breaking down as the low cost carriers providing point-to-point services. In Europe it's broken down to the extent that people are flying between airports no one has ever heard of and probably never want to hear about either if you've ever been to them.

But, nevertheless, they lay cheap fares. The net breaking down, that happens in both systems. If you talk to the major carriers -- and Coase was right -- you need to see what the players in the game actually do. What was happening as a result of flying to these secondary airports is not the major carriers are losing passengers, they're basically pulling down their yield because they have to compete on fare.

Adjusting capacity to revenue, that's what charter airlines do. Charter airlines in Europe are basically wholesalers. They put their services up for the market six months to a year in advance. They sell the seats, and then they adjust the capacity accordingly. So in a sense, they recover their cost. Not through the pricing mechanism, per se, but rather like changing the product they actually supplied. The ability to do that is now being diminished because of the [indiscernible] to the low cost carrier. Charter operations in Europe are about 20 percent of the market and that's small.

Chapter 11 is a way of recovering your capital costs. You basically forget them. I left the [indiscernible] so I know. I believe this is one of the big problems in the airline industry and many other industries. If you don't like having fixed costs, just forget them. My perspective on this is, A, it's not necessarily a good idea economically, but as a practical proposition, sooner or later, despite the fact you do

find some pension fund putting money into you there, which I find interesting, you are getting into a situation where confidence and investment decline if you're losing your assets. And indeed, we've never had Chapter 11 with the sorts you have in America. It doesn't exist in Europe. If you go bust in Europe, you're out.

Subsidies, there are subsidies still available. They're implicit and hidden subsidies. You'll fly American system in America, there's a subsidy. In some cases, the subsidies are given by cities. We have Wichita, which actually subsidizes low cost carrier operations from there. In Europe we've had this where a number of cities have done it. The European Union has declared in Europe that the subsidy is illegal if given by the state, but it quite legal if given by groups or individuals. The definition of subsidy here becomes a little vague where there's group purchase or subsidy is a little murky. But they do exist. I think that they're not going to last for longer.

Alliances are important. Alliances, however, basically control the market by forming a cartel. In the case of airlines, the big advantage with it is you provide network services. You enjoy the benefits of network [indiscernible] by providing a comprehensive range of services. The difficulty with alliances is they break down pretty regularly. We've

recently seen the alliance between KLM and Northwest collapse, for example. But even the smaller ones collapse periodically. On studies these things, you notice several hundred alliances are formed each year and several hundred vanish each year. They're unstable. One of the reasons is, like any cartel, you may find it advantageous to leave the situation, to remove it. Also the technical problems of airlines are very different animals and joining together to do anything is extraordinarily difficult.

Again, I cite US Airways, which is effectively in an amalgam of airlines, which over the last 15 or 20 years has not really pulled itself together. Finally, the one I find most interesting and the one, which I think is a way forward, because I think all of these, have had their lifespan. The airline industry is inventive. It's very creative. And it's developed all these mechanisms over the years intuitively to recover its costs. The one where I think moving forward to now is vertical integration. The first steps further up the ladder, where there is some degree of revenue to be obtained, they just start moving up there. The airlines are doing this in several ways. They're doing it in terms of information systems. They're going into [indiscernible]. They're involved much more closely with the airport activities. They're getting involved much more supplying services.

One of the largest suppliers of catering services, for example, in Europe is owned by [indiscernible] and moving up the supply chain. So, in a sense, they've innovated over time and I think Coase made the point is what you do is scramble around, grab the cash where you possibly can, if you're a business, businesses don't go around doing Ramsey pricing. Naturally, you don't sit there and cover blackboards with equations. They grovel around; trace around to get money to cover their fixed costs. But over years, airlines have managed to survive by doing that. Just about. My suspicion in the future is vertical integration will give them a few more years of life before you need to find something else. But, groveling around, they are, because we all know, because they're not making a positive margin. Thank you.

[Applause]

Mr. Thompson: Thank you very much. I was amused when I was invited to speak here as a thought that someone from the World Bank, which I am from, could speak in eight minutes. Normally in the Bank you can't say anything at all in less than half an hour or possibly a little bit longer, but I'll try to stay within your strictures. I was also interested in the discussion that we've had about data, and what data do for discussions.

I used to argue in the World Bank that no one should be allowed to draw a demand and supply curve unless they put actual numbers on the axis. And I figured that that would be, as Harry Truman said, that he wanted a one armed economist because he wanted somebody who actually only had one opinion. If you force people to put numbers on the axis, that would be disarmament in a sense.

I'm going to talk very briefly about railroads and I'm going to focus on the U.S. experience in railroads, but I do want to say briefly that the U.S. railroads, although they are very large and very important, by no means are the entire world's railroad industry and much of what I'm going to be saying today will be said about the United States and it will be based on a particular model of railway organization, which is vertically integrated railways competing with each other. That is not the model, which is now emerging in Europe, for example. It is not the model, which is now being implementing in Russia, as an example. I don't know what the Chinese will do, but we should keep in mind that everything that I'm saying about this is based on a vertically integrated railway.

The arguments change, rightly or wrongly, the arguments change if you're looking at railways in which, for example, the infrastructure, which is the source of much of the fixed cost of the industry. If the infrastructure is no longer allied

with the operating company then the economics and the behavior of the industry can change.

The first chart that I've shown you here is data for the U.S. railroads in 2002. On the left axis and the blue bars, that's the revenue per ton-mile that U.S. railroads charge by major commodity group. I have about 96 percent of their ton miles in these commodity groups and what you can see is that the revenue per ton mile, i.e., arguably the same physical service, the revenue per ton mile varies dramatically by commodity in the United States. On the right hand side, what I have is the revenue to variable cost ratio. This is the ratio of the revenue per ton-mile divided by the variable cost as calculated by the regulator. Per ton mile and you can see that that also varies pretty significantly and in an interesting way.

For example, coal, which has the lowest revenue per ton-mile of any commodity in the U.S. railway system, also has almost the highest ratio of revenue to variable cost. The question is who's coming out better or worse on this commodity. The railroads naturally emphasize the revenue per ton-mile. The shippers naturally emphasize the revenue to variable cost ratio for this.

But what is clear is that U.S. railroads are pricing the way you would expect them to price. That is, demand sensitive

pricing and the prices vary pretty significantly. But you also see that because that red line is not the same as the blue revenue per ton-mile, to that, the [indiscernible] per ton mile in commodities also obviously differs pretty significantly. So that, for example, they're charging 11, almost 12 cents a ton-mile for transportation equipment. But the revenue to variable cost ratio for that commodity is a good deal lower than it is for some of the other.

There's basic agreement on this approach, but there are an awful lot of problems with it and I think I've been struck by the similarities in what I've heard on the other industry. One of them is multi-product pricing. The railways literally have trillions of products, because not only are commodities different, but shipments on one day as opposed to another day, shipments on one line as opposed to another line, and one direction as opposed to another direction, September versus January, all of these things enter into the equation, so even this kind of presentation gives you no good idea about what the real complexity of the multi-products are.

Even that is simple compared with the issue of costing, because on multi-product costing, the joint income and cost in railways are much more difficult to deal with, because you can have one train with 20 different commodities in it. Now, how

do you tell what one commodity costs versus another commodity in a case like that? It becomes very, very difficult.

The third issue is data. And as I suggested in the beginning, in the United States, we actually have the best data of any railway industry in the world. Nowhere else does there exist data even remotely like the information that we have looking at what we're doing in the United States. In many countries and I've worked in almost all of the countries in the world with the railways, if you asked for this kind of data what you'd get is a blank stare. That isn't because they don't want to tell you, it's because they don't know. So when you begin to ask questions like well, how do you do your pricing if you don't know what your costs are, you get the continued blank stare.

Well, it was what it was last year plus 5 percent. There's nowhere near the kind of thinking about demand elasticities and price elasticities that there is here. There is another complication, however, in the United States and that is that we have the division between private versus public. So that there's a lot of information about costs and revenues, which is known in the private sector, which is not known in the public sector.

Let me go to the next slide then, because my time is going to be -- can we go to the next slide? Okay. I just wanted to

show you in this data. What this shows is the cost per ton-mile in the United States over the past 20 years or so, but computed on two different bases.

One is the operating cost of the industry divided by its ton-miles and the other is the variable cost calculated by the regulator per ton-miles as it calculates and what you can see is that they have converged. That really means is that the regulator's variable cost is the same as the industry's average operating cost, which is nothing, like a marginal cost. So that to the extent that we're really talking about, Ramsey pricing, which is in theory based on marginal costing, we haven't got it. A very average variable cost is much higher than anybody's calculation of a marginal cost.

Could I have the next one, please? This shows you an interesting different phenomenon in the U.S., which is the revenue per ton-mile on the industry's basis in red and on the regulator's basis in blue. And the reason for that is that since the regulation U.S. railroads have had the right to sign contract rates and they do not reveal the tariffs on those contracts. So the STB's cost [indiscernible] revenue per ton-mile is false revenue. It doesn't include the effective contract tariff making on the freight side. And there's quite a difference between them.

Let me see the final one. What this then leads to is a significant difference between the calculated regulated revenue to variable cost ratio, and remember, this is the basis for regulation in the United States. The barrier, the level at which regulation is presumptively possible is about 1.8; below that, there shouldn't be regulation except when market power can be shown. The actual behavior of the industry is far below that. The STB's number shows a little bit higher, but they still are showing an overall industry, which is below the regulatory levels.

So, I came close to the eight-minute limit. And I presume Ioannis will do as good a job as I did.

[Applause]

Mr. Kessides: Well, actually I will not do as good a job because I have not prepared a presentation. But, I will just focus on two or three policy issues that we are confronted with almost on a continued basis in the World Bank.

The first issue refers to the airline industry. Whenever at the World Bank we discuss the issue of the regulation with our clients, with our client countries, the immediate response is that if what happened to TWA three years ago and what happened recently to United is going to happen to our own national airline industry, and then we certainly don't want

regulation. So that's one issue that I would like to address with our previous speaker.

However, given the characteristics of the financial performance of the US Airline industry of the last few years, whether or not antiregulatory policies are appropriate for many developing position economies, especially given the weak institute, the weak financial institutions that they have and the inability of such institutions to perhaps support the airline industry given their normal [indiscernible] down term study the industry is confronted with every now and then, as the financial institutions have supported in the past, the industry in the United States.

A second issue that perhaps I'd also like to raise with our first speaker is about the equilibrium structure of the industry. There were predictions that were made a few years ago and again, given the financial performance of the airline industry that the ultimate equilibrium structure would evolve only a very small number of carriers. And we have not seen that yet and I would like to discuss why we have not moved over that structure yet.

With respect to the railroad industry that Lou has addressed, again, there are a couple of issues that we have confronted very frequently at the World Bank when we discuss [indiscernible] with our client countries. One is the recent

focus on vertical separation. Basically the almost new model of organizing the rate of industry where the ownership of infrastructure facilities are separated from other rail functions and operations. And again, I will not bore you with the [indiscernible] separation. I am sure you're all familiar with them.

But one specific characteristic of our client that creates some special problems with respect to vertical separation is the need for significant [indiscernible] infrastructure. The infrastructure facilities in many of our client countries are in disrepair. There is need for significant investment and there are problems that arise with respect to investment when we have vertical separation. Especially because the provision of many market responsive and innovative range of services requires fairly specific investments at times in infrastructure. And the problems of course, arise and the operator faces different incentives with respect to those reimbursements, as does the owner of the infrastructure or facility.

So, given again, the need for significant investment, given the problems with respect to investment that arise under vertical separation, the question, the broad question again is whether or not the vertical separation is an appropriate policy for many of our client countries.

The second issue that we were asked to provide advice on is with respect to price and policy. Now, of course, in many countries, given the obvious length of freight movements and also the strength of inter-model competition, there is, in general, agreement but there is really no need for any detail scrutiny of prices, especially given the strength of inter-model competition.

However, there are some countries, perhaps countries like Brazil or Argentina or even Russia, where one could make an argument that there are still shippers that are captive to the railroad, that the railroad has questionable market power for those shippers, for example, like a mining company in Brazil that is in the middle of nowhere and there is only one railroad that serves that mining company for its transportation. But there are no roads and therefore there is no competition coming from [indiscernible] when you consider the [indiscernible] from Brazil, perhaps the distances are too large and the railroad would have the distinct [indiscernible]. And therefore then, the question is if there is a legitimate concern about providing some regulatory protection to captive shippers, especially during the period of transition to the regulation, what types of principals would economic software in order to provide sufficient protection.

[Applause]

Mr. Crews: Okay. You raised a number of points. Do you want to start, as a starting off point, we could address on this questions, captive shippers shut in, the question of equilibrium number of airlines, do you want to hit on some of those and then we can open it up to the audience?

Male Voice: [off mic]

Mr. Crews: Responding to some of the -- the captive shipper questions...

Mr. Thompson: Well, captive shipper tends to be in the eye of the beholder. My experience as a Ramsey pricing for example, we generally aggress with that as a matter of economic theory, but politics is far behind that. And I never have found a shipper who was voluntarily captive and I never found one that didn't contribute to his congressman to try to do something about it if they thought they were. There is this difference between economic and efficiency discrimination and political version of what discrimination means and you run into that in every industry and in every case.

The issue of equity versus efficiency struck me in the pharmaceutical discussion. It's exactly the same thing. We do not believe that the market produces an equitable result and so it may be efficient, but it certainly doesn't meet our view of equity and so what we're really trying to do is interfere in the market or shape the market or change it in a way to produce

something that we think is more equitable. Exactly the same result. There's no farmer who ever thought he shouldn't have the lower drain rates, none that I've run into anyway.

This issue in the United States, I believe the results since the Staggers Act has shown that what's happened to drain rates, what's happened to all railroad rates in the United States is so spectacularly favorable that I think it's hard to argue that competition in the United States actually worked and worked very well, deregulation in the United States worked and worked very well. But the point that Ioannis Kessides made that we can't make that assumption in Russia is absolutely valid. In Russia the railroad carries 80 to 85 percent of the [indiscernible] is ton kilometers and almost every shipper, certainly in Asian Russia is captive. And they have no alternative. Interestingly enough, what the Russians have done to attack that model is to separate infrastructure from operations with the hope that the infrastructure company will become neutral and they'll have competition on the same tracks. Now, whether they will or not is a different issue, but that's one of the reasons why they did that.

Mr. Crews: Okay. Professor Button, you mentioned several ways that the airlines were working on recovering costs, but there seems to be flaws with just about everything, especially at the end with vertical integration and alliances. Part of

what we're talking about today is what legal barriers there are to making the kinds of alliances, whether it's vertical or horizontal that companies might need to make to harness costs. So are there legal barriers in the way now that put it in perspective?

Mr. Buttons: Can I tell you in one second? I'd like to respond to one of the points that you raised about aviation in developing cultures in the reluctance of those countries to liberalize their market. Let's look at Africa. Africa is [indiscernible] with 800 million people, with GDP less than [indiscernible]. It is the only global market where airfares have risen in the last 15, 20 years, with the exception of [indiscernible].

If you look at aviation in Africa, about 35 percent of the air traffic market is within Africa; 65 percent is outside of Africa, the trips into and out of Africa, freight movements into and out of Africa. And it seems to me, you can't do a great deal worse than that, quite bluntly. If you want to fly from one country in Africa to another, you normally have to fly by Europe. It's that bad. One of the big problems is simply the airlines themselves are badly managed, but the airlines also find it's very, very difficult to attract private investment.

There's an issue of governance in Africa. And until we can solve the government's issue in general, privatization, deregulation simply doesn't work. Coase wrote stuff on marginal cost pricing. He also wrote stuff on property rights. Property rights are simply not accepted and adopted and reinforced in Africa. And until that's done, you have essentially a situation where markets don't work anyway and deregulation is not going to serve the usual purpose. So perhaps I could just make that comment.

In terms of equilibrium, perhaps I can comment to that. I don't know where equilibrium is. Equilibrium is a static concept. It comes from partial equilibrium analysis. I'm not altogether sure how you get equilibrium in the airline market. It's a dynamic industry. It involves quite energetic people. It involves changing technology, changing markets, changing management structures. I'm not quite sure what your equilibrium turns out to be there. What you need is market clearing with a normal rate of profit in the long term. And whether you have that or not, I doubt at the moment. You certainly have market clearing in the sense of airplanes that are pretty well full, about 75, 80 percent full at the moment, which I would say is an efficient level. You could have empty seats or relocation of aircraft from divisibility. Nothing is necessarily earning a long run normal rate of return there.

The issue about legal barriers and legal barriers are interesting. My view is that when it comes to mergers in particular, airlines are network industry. I find it interesting at this meeting; transport is separated from network industries. Airlines are network industries about connectivity and interconnectivity. I think you may want to review the current legislation regarding mergers and antitrust activities in the context of what's appropriate market in particular when it comes to aviation. Much of the legislation, what you find in the world, is really on OD basis, origin/destination basis rather on network basis. And that itself is an impediment to efficient mergers. Having said that, I think some of the mergers that have taken place had been absolutely ludicrous. Not from a technical perspective, but simply because of the management structure of the airlines involved. They're just not comparable.

The second problem at the moment with the general merger issue, the second problem of the international one, we do have open sky policies pursued by the United States, except of course, when it applies to government employees of the U.S. who fly American aircraft and American carriers, which is a mind impediment, but the U.S. believes in free market, except when the U.S. is involved, of course. But, there are barriers in

many markets. We do have those bilateral agreements still pertaining.

The North Atlantic being the classic case where you have the U.S. at the moment negotiating with Europe. Europe believes in a free market. They want a total free market with European carriers allowed to operate in North America, looking at the cost structure and labor efficiency of Ryan Air, I can understand why carriers like Southwest are reluctant, a little on United or American. I can understand why the Union is reluctant to accept. If you look at Ryan Air, they can pull 900 flying hours a year under their pilots.

Look at the productivity of U.S. airlines. So there's reluctance on the U.S. part of genuine open markets. What the U.S. does want is simply the ability to fly between the two areas, Europe and America, which they have a comparative advantage of; therefore they want to do it. So I think in those terms, there's a lot of impediment on the international side, which has to be overcome.

But finally, I think there's an interesting impediment regarding the way some of the government operates in the country regarding things like safety and security. They're important issues, but there are questions about whether they're being done in a way which is a defective form of regulation of operations. There are various ways [indiscernible] in terms of

how much money is put in, the measures taken, the consultation with airlines, et cetera and so on. I think that's an area, which needs some exploration in the future. Most of the work on security and safety to date has a minimal amount of economic content and very little analysis effects on the industry and the competition.

Mr. Crews: Okay. Good. Let's get some questions out from the audience here in the back. And just state your affiliation and your name.

Mr. O'Neill: Dick O'Neill from the Federal Energy Regulatory Commission. I heard a news report that GE was going to finance USAir's next generation of airplanes. I assume that's vertical integration, but which way?

Male Voice: [off mic]... have had a legacy that goes back to regulation of cost and inefficiency and they almost have to go bankrupt to get rid of that legacy.

Mr. Button: I'll reply to that. I mean if I was Warren Buffet...

[Tape 2, Side A ends]

[Tape 2, Side B begins]

Mr. Button: I think that's true. But the interesting question is let's suppose we get rid of the inefficiency help the airlines compete. These are scheduled airlines. They put down the schedule and a competing airline puts down a schedule,

what they try to do is they simply try to flip their aircraft and they flip their aircraft of marginal cost. They've try to reduce their cost by unbundling, become virtual airlines like Value Jet was basically. But essentially, ask yourself the question, supposing you got rid of all these legacy inefficiencies, what would be the basis of competition between airlines? It would be they're put on a schedule; they would then compete for customers down to the marginal cost. And therefore find it difficult to recover their full costs.

Mr. Kessides: I thought there was a question related to the previous one about GE financing USAir and so on. I think by now, probably more than half of all the airplanes are owned by majors, at least. I guess you showed us in the chart, leasing companies have been doing very well.

Now, leasing companies are intermediaries. They compete. How come they are profitable? It seems they are in a much worse situation as the airlines, because they only have a small number of sophisticated customers, the airlines, a very small number of suppliers, et cetera, where do the profits come from?

Mr. Button: The leasing business is essentially [indiscernible] that they are market power. They're far more market power than the airlines in that sense. They are intermediary, they can buy from Boeing at certain times and

sell at other times, but there is a limited number of suppliers, major leasing companies, a small number.

Mr. Kessides: But [indiscernible] are low. Why don't Boeing and Airbus intermediate them?

Mr. Button: Well, they do. Boeing and that do lease their aircraft and so on and so forth. I think the interesting thing is when you look at the financial institutions controlling some of these activities further supply chain, you have some major financial houses involved in this. And that gives them the control, which I personally don't think it's been researched fully. But there clearly is a certain amount of financial down streaming -- or is it up streaming them?

I'm not a business expert, but it's basically financial up streaming or down streaming further up the system. It's been looked at a little bit in Europe, because the European Commission is interested in it. But nothing's been fully explored. But I think that might answer some of the questions, some of the points you've raised.

Mr. Crews: Okay. Right here in the back.

Mr. Duffy: Yes. John Duffy from GW Law School. I was wondering if the calculations for the airlines being non-profitable. How sensitive is that to which time period to do the calculation? Obviously if you did it in 2001, since they've had losses the last few years, they must have been more

profitable. I'm just wondering what the percentage would be, what the return on investment would be then.

Mr. Button: Well, if you take the entire period since 1980, they made a net loss.

Mr. Duffy: Okay. But about if you take out the last few years?

Mr. Button: If you take out the last few years, because prior to 2001 they made significant profits in those years. But they were turning down in the business cycle. We have a business cycle effect. If you take any snapshot, they may be making a profit or loss. But over the long term, they can find large unprofitable [indiscernible] investment.

The reason people invest in airlines is clearly, as you pointed out, there are winners and losers in that market and you're playing a Roulette wheel trying find number 32 to win to you get the investment, but it's probably [indiscernible] low as a result.

Mr. Crews: Right here. The button on the front.

Mr. Grimm: Oh, that button. Okay. Curt Grimm, University of Maryland. Returning to the railroad industry, the Staggers Act in 1980 for the U.S., largely, but not totally deregulated the railroad industry. We're currently approaching the 25<sup>th</sup> anniversary of that transition to deregulation. And my view as laid out in a paper a couple years ago with Cliff

Winston of Brookings proposed that it's time to totally deregulate the railroad industry, where currently the regulation that does exist, the maximum rate regulation for captive shippers, as we've talked about is very onerous, it's \$3 million a pop to bring one of these cases.

There are many, many cases pending at the Service Transportation Board that have taken years to kind of win their way through. In my view, the status quo situation is not particularly desirable and it is time to totally deregulate and I guess I'd like to get some reaction to that.

Mr. Thompson: If I get the first crack at that, you wouldn't get any argument from me. The remaining market power on the railways appears to me to be pretty restricted, given competition from other railroads, from trucks, from supply, all kinds of other possibility of competition. But that's an economic statement, that's an efficiency statement, that is not political or equity statement. And so you always have to - this is like every other regulation that there's a lot of political myth and there's a lot of political power and a lot of political contributions that are weighing in on the other side of the argument and you never completely win it.

Mr. Crews: Fred, it looks like you were...

Mr. Smith: Actually to follow up with Ken and a general question for the panel. Ken mentioned that in a sense it's

networks that are competing, these network industry cases and the tendency is to go to origin/destination and I remember when I was with the railroads many years ago and the railroads always believed that they were the low cost carrier, so if the truckers put up any rate, they could always match that rate, since they were the low cost carrier and they were losing their shirts on shipments from Washington State down to LA and finally someone came in and looked at it and said the truck in Seattle had a limited value, the same truck in LA, because of strawberry season could earn a very high premium, so in fact, it actually was a much lower cost because of the capital reposition. That's one question.

The other one is for the rest of the panel; there was a mention of the cities, both in Europe and the United States paying a lump sum to attract airlines to theirs. In a way, that's sort of joint venture to handle the fixed cost problem. That exists in some other industries. I believe it was the car manufacturers at one point in history essentially set a minimum price for the carbon and black manufacturers and for some reason they didn't vertically integrate. They instead paid them a fee to stay in business. But both of those questions as they relate to transportation.

Mr. Crews: Anyone, go ahead.

Mr. Button: Let's go back on the network thing. Working out cost is really difficult on any link in the network industry. And what you probably want, what you do find is interesting, just looking at the smaller networks. You may be inaccurate in your cost, but it's useful to have a good idea what your cost and revenues are quickly. In Europe, Ryan Air knows within 24 hours what its revenue was the day before in each route. That has a rough idea of what its costs are in each route because they're predetermined. You take British Airways, because of the size of its network, six weeks to get that information.

So there's a certain amount of nimbleness you get from the smaller carriers, which are not picked up, I think, in much of the literature. I think that applies to many other industries as well. We tend to assume that they -- but we get all the important information in terms of management. I think that's important.

If I could just answer your second question before moving on, I think you're absolutely right. They're joint ventures. The issue becomes -- this has to do with the subsidies in places like Wichita and in Europe you have Sharwa [phonetic] and Strasburg [phonetic] from the cases in Europe where the European Union deemed the subsidies of Sharwa, Brussels was illegal and the subsidy of Strasburg were illegal for slightly

different reasons. The subsidy in Brussels was a direct subsidy from a local government and that was deemed not to be commercial.

But, strangely enough in France, as the Strasburg case, it was the Chamber of Commerce who was subsidizing it, which in this country would be fine because it's private. But everything in France, the Chamber of Commerce gives the French money. So I think you're absolutely right. It's a joint venture when it's done privately. It's when the public money gets involved. I think these joint ventures occur indeed with things like GE and the airlines and so on. And that might be a way of recovering the costs, the costs of system of activities in the industry.

Mr. Thompson: Very quickly on that. When you say they're the low cost carrier, that's easy to say in general, but when you start looking at individual shipments on individual circumstances, it becomes much, much, more difficult to say whether they really are the low cost carrier or not. Even if they are the low cost carrier in terms of A to B, in many cases, railways are not the lowest logistics cost when you take everything else into account and that's been always the problem in the industry is well, that's fine, we're the low cost carrier, we offer the low tariffs, why don't we have any

business? And the answer is, because you're not really offering the lowest total logistics cost.

And the other point that I always want to add here is that the costs, on the railway side, are by and large private costs and you know what they are. They're not private costs on the side of many of the other carriers. And so, the railroads are not paying margin -- they're paying a lot more than marginal costs, whether they collect it in revenue is a different issue, but they're sure as hell paying it. But many of the other carriers are not even paying their marginal cost. So you have an additional twist in the calculation. What's the real market situation?

Mr. Crews: Okay. Did you have any comment on that also? Okay. Are there any other questions on it?

Mr. Lyon: I think maybe I am just trying to simplify things to kind of wrap up, but in listening to Ken's comments about the airlines, I was hearing in there this old term that nobody has mentioned called destructive competition. It sounded like pretty much none of these clever mechanisms that you listed are really going to do the job and you didn't actually come out and say therefore I think we're going to have to re-regulate these, but I wondered if you could just sum up in the simple fashion, what's the savior here?

Mr. Button: Because I think [indiscernible] was right. You have a choice. It's not the public money, the sector fudges it and I like the private sector...

Mr. Lyon: But I thought from what you were saying before, you were saying that none of the private sector methods worked. And vertical integration only helped for a little while.

Mr. Button: They work for short periods. Then they -- you need a degree in monopoly power for a short period, maybe because you have the technology, you have the management skills, you have control of the market, and you're lucky. But basically that does allow you to have some money in the short term to cover your fixed costs.

What the government has to do is not stifle artificially this short-term monopoly power, which I think it does with some of these regulations. Giving governments subsidies, Coase is absolutely right. I'd put another argument on his; it's not just inefficient, it's inequitable. You're taking money from nonusers and giving it to users.

Mr. Crews: Richard, I think I saw you there.

Mr. O'Neill: I've heard the use of the term Ramsey pricing thrown around all morning and coupled with efficiency. And in theory, Ramsey pricing is only efficient if you either have contestable entry and if you don't have contestable entry

and you can segment markets, you can exercise market power and become inefficient in each one of the segments.

So it sort of puzzles me when we try to equate Ramsey pricing with efficiency, because the conditions don't seem to hold exactly. And it's especially true in the pharmaceutical business when I walk into a friend of mine, who's a doctor's office and I see his office is stacked up with trinkets that he has from the drug manufacturers that are just unbelievable; some of them very valuable, some of them maybe a pure waste of money. And so I understand Ramsey pricing, but I don't like to equate it with efficiency all the time.

Mr. Crews: Any comment? Go ahead.

Mr. Kessides: Perhaps we should refer to the earlier comments on the railroad industry and whether or not it would be desirable to continue with some of the regulatory protection capital [indiscernible]. But, as I understood it, in the mid 1990s when the ICC introduced constrained market pricing where basically you had a price ceiling that was based on stand alone cost and then you had a price based on incremental costs and that the carriers found the railroads basically were then free to price between those two and they were permitted to in [indiscernible] and I'm surprised that that actually worked very well.

Mr. Crews: Okay. You.

Female Voice: I think the commonality is that the profit maximizing price, discriminative free prices will have the same relativities to the Ramsey optimal prices. The levels may be at inefficient levels if there is not contestable entry. But at least the relativities in theory would both be [indiscernible] related to demand elasticities across sectors. So there is that relationship in relativities, but levels may be wrong with that contestable...

Mr. O'Neill: I was arguing against differential pricing. Is that right, Fred? I was just saying that equating differential pricing in efficiency needs a couple more connecting dots.

Mr. Kessides: The levels that were [indiscernible] were precisely the focus of the standalone costs and incremental costs that [indiscernible] constrained market pricing. So even that issue was addressed, I believe successfully.

Mr. Crews: Okay. Other questions? I thought I saw a hand back over here?

Male Voice: Could I add one more thing? Ramsey pricing, classically, is one part pricing.

Mr. Smith: Yes. Fred Smith, CEI. Ramsey pricing is all based off of the demand curve, directly and indirectly. Things like subsidies or a joint venturing are outside of that content and I believe [indiscernible] not just the mandate pricing, but

also all of the financing mechanisms that might play a role, including joint ventures and things like that.

Mr. Crews: Okay. We are out of time. We have to wrap up, so join me in thanking the panel.

[Applause] [Break]

Male Voice: ...that I want to introduce, our luncheon speaker who is a man who needs very little introduction. It is Tom Hazlett, who is now with the Manhattan Institute and has been with the American Enterprise Institute in the past and the Federal Communications Commission and I think is a person who I think is continually -- well, he's sort of like Fred, sort of a despairing optimist in that he always thinks that things -- he can point out at great detail all the mistakes in the past, but I think he continually hopes that they will indeed get better in the future. And so with that, I will introduce Tom Hazlett.

[Applause].

Mr. Hazlett: Yes. I'll be having a PowerPoint presentation today. I owe the optimism to cheap Canadian drugs. And thanks very much for having me as the luncheon speaker today. I got the call relatively recently, which of course indicates that somebody cancelled at the last minute. I can only imagine or fantasize about who that might be, but I remember a year ago I was in maybe a similar position. I was putting on this conference with Larry Les down at Stanford Law

School and we had this moot court set up. Well, Larry had it set up. And at the last minute one of the three judges, which was Michael Powell, the Chairman of the FCC cancelled. And we had to scramble to find somebody else.

So anyway, we went down the list of people who would be prominent enough to fill in. And we're calling the week of the conference in California. So these are not calls you want to make every day, so you say, well Milton Friedman's at Stanford, let's call him. So I called up Friedman, which is always pleasurable and I said truthfully, we're in a crunch here we need somebody on Saturday. "This Saturday?" "Yes, this Saturday. It's at Stanford, it's right there." He said, "No, no, no. I can't do it this Saturday. This Saturday I'll be in Mexico."

And I thought that was a good answer. When I'm 90, I want somebody to call me up and ask me to do something on Saturday and I hope to hell I remember that answer, right. I'm in Mexico on Saturday having a margarita and having a good time on the beach. Then we called Vernon Smith. "Vernon, need a favor. We need somebody at Stanford to be a judge at this moot court." "This Saturday?" "Yes." "No, I can't do it. I have to give a speech in Florida." "Oh, that's too bad." He said, "Wait a minute. No, that's on Friday." He said, "But then I have to be -- then Saturday night I have to leave for

Australia." I said, "Perfect. That is right on the way. You'll be in Florida, the Saturday you can go to Stanford." He said he had to leave at 10:00 PM from LAX to go to Australia. So, I said, it's right next-door.

And he actually did it. And you know from dealing with Vernon, he's just a sweetheart and he was the best one of our three judges, with Alex Kasinski [phonetic], who was very confused and Harold Demsetz, who was my old professor. Anyway, it was a fun time. And I did get a kick that last thing last night, that parting shot about Vernon and Fred talking about Coase's -- he wrote a limited number of very important articles and he had a very high percentage of Nobel Prizes to pages published. But I did catch Vernon Smith's comment at the end, he said, "Yes, it's embarrassing." And I said to myself, now let's wait a damn minute here.

You know, Vernon, if it's embarrassing to you -- he's complaining, I had to write all this crap just to get a Nobel Prize. I don't know, I think that might have tempered his embarrassment. But, I guess he has higher standards than some of the rest of us. But and then the other thing that I remember in fact at this thing last year we had Demsetz at a judge, he did, uncharacteristically have a very good line. And Harold said that he had actually told Coase that in fact, he deserved the Nobel Prize, because he had published the Coase

Theorem so many more times than had Ronald, which is absolutely correct, Harold. That's another major Nobel Prize winning injustice.

Anyway, if you go back and you read that wonderful lucid explanation of the marginal cost controversy by Coase, you're struck about how contemporary the argument is, particularly if you work in some of these areas today where fixed costs or [indiscernible] cost in particular are quite important in providing network services. And the basic argument is simple. Markets are failing when you have this divergence between the efficient and marginal pricing conditions and what it takes to invest, to create the opportunities over time. And that conflict or divergence creates this problem that the old neoclassical economists were suggesting could be remedied by taxes and subsidies.

And Coase had some very cogent comments to make about that and even drew on public utility regulation as developed through experience by regulators as sort of an offset to this theoretical conclusion by the economists. And so, I thought that today, I would maybe just round this out, some of my experience and maybe it's similar to some of what you folks look at. But three experiences in the wonderful world of spectrum that has to do with pricing issues that are very, very reminiscent of what was occurring in this so-called marginal

cost controversy or declining costs, what the special market failure situation is with respect to declining costs industries. So the three stories are from cable television and the ala carte pricing issue that's hot today.

Secondly, from the issue of cable allocation of its radio spectrum, that is to say the spectrum in a tube that is created and brought to the customer through investments of the cable operator. And the allocation of spectrum access rights in wireless services. Those are the three things.

So, the issue now in the cable television industry is what they call ala carte pricing. Should the channels be priced individually? And I'll give you just a little bit of background by this. In the mid 1990s you had for the first time important network entry in the cable television services. That was by satellite, Direct TV 1994, EquiStar in 1996 and we were talking a little bit last night at dinner about predatory pricing.

I actually have seen predatory pricing. I could fill you in, but they took me for a ride in a spaceship and I don't know if you really want to hear the whole story. But, I've actually published on this and -- it happened in Mississippi -- but I've published on this and I believe that there is predatory strategic behavior by incumbent firms in particular situations. And in fact, the entry by satellite was done in a very

strategic way. The satellite operators came in which a lot more programming at higher prices.

And that was exactly the right way to spend a few billion dollars to try to compete with the incumbent cable networks. That is to say you don't want to get into the price wars that have caused lots of problems for cable entrance over the years. What you want to do is create a much bigger platform and provide a much better package of services. And in fact, cable television has responded to the entry in a very dramatic way. The erstwhile cable monopolists, if you will, has spent about \$75 billion since 1996 to upgrade their systems for two-way digital services, most importantly in terms of the short run revenue stream, digital cable. And that digital cable is specifically designed to combat what they call the Death Star satellite television.

So, what you have is increased competition and higher nominal prices. They've actually had price increases about two to three times the rate of inflation over the past several years. This is, by the way, under rate regulation and after rate regulation. The actual rate of increase does not seem to be effected by the regulatory standard in place. So, you've had higher nominal prices and a lot more quality in the actual price per channel and particular the price per viewing hours is actually declining in the cable television world as you get

more product, better product and of course viewers being migrated from the old broadcasting market to the new cable television market.

And of course, the migration will accelerate tremendously now that Al Gore has a channel to produce. I don't know if you saw Senator McCain's comment. He said, "Well, if Mr. Gore brings the warmth and personality of his debate demeanor to the new channel, this is going to be a huge breakthrough for viewers coast to coast."

So, speaking of McCain, McCain is actually the policy maker that is flacking this ala carte pricing issue and what's the issue? Well, the issue is nominal prices are going up. People are upset, right? Well, not really, but it's a political issue in Washington. And sure enough, you can produce CPI numbers that show that the prices are going up. If you don't adjust for quality, that looks like there's a problem.

And so the solution to the problem is not rate regulation, that's been almost discredited enough for Washington policy makers to drop it, through bitter experience. But now there's a new instrument called ala carte pricing. And you can tell by looking at me, I'm preferential to the buffet. But, the ala carte issue is whether or not the customers are being forced to pay for these new big packages. Now, you just have to step

back a minute. I've already told you what the general pattern of this industry is. They're giving customers a lot more product at a higher price.

And of course we're all thinking in terms of this bundle of services that comes to you on the basic cable television package. But the solution in Washington to the higher nominal price is to break down that package and to start giving you individually priced channels where you'd have to select exactly what channels you get.

Now fit this into the marginal cost controversy. The cable industry is quite adroitly figured out that the efficient way to sell 60 basic channels, which is -- well, two years ago was the average. The FCC can't keep up with the market, but that's what the FCC published two years ago was the average number of basic channels.

The cable industry has figured out let's give everybody a package of 60 channels. They're going to be very heterogeneous preferences here, household to household, but if we give them the 60 channel package for basic and price it at \$38.99 or whatever the basic price is, we can probably optimize over that. We save a lot of transactions costs and people don't have to select at the beginning of a month or a beginning of subscription period what exactly they're going to watch for the month.

We just throw everything in there and then we price at what we estimate to be the profit maximizing -- and so what happens is, of course in every household, they watch 10 or 12 or 15 of the channels and not so much the other ones, but the other ones are then thrown in for free and everybody pays their demand is driven by those 10 or 15 channels that you like to watch, are they worth the package price? And so that turns out to be just a hell of a nice way to price this service in light of a marginal cost condition. And the social cost, the marginal cost, of distributing the network to an additional household is zero.

And so this is a very nice way to actually get these -- and if you want to call it, it's a two part-pricing scheme. It's a fixed monthly fee to be a subscriber, that's just a zero one. And then it's a zero marginal cost for those channels up to the total bundle and these are 24/7 packages. So lots of viewing. You get this big package at one fixed price, the marginal cost, the marginal price of the customer is zero, which is the marginal social cost.

But not in Washington. Okay. So now the issue is ala carte pricing and this has become quite an issue now. And the funny thing is about it; the Congress actually went to the General Accounting Office and the GAO, which takes these issues

from Washington very gingerly from Congress. They get directed to study these things.

The GAO, to its credit, in October put out a report that said, "an ala carte approach would require additional technology in customer service, and some customers' bills might increase." Now, in GAO speak, that's equivalent to saying "This sucks." Okay. That's going out on a limb. So if you really read it for what it is, that's quite a statement. And in fact, there's some very good analyses in that GAO report about the fact that there's no guarantee that when you say that the individual channels are priced, your total bill is going to go down. And certainly when you add in the transaction cost of actually checking off the list of stations you want to watch ahead of time, that's a problem.

Now, by the way, I should say that you could read a lot from what happens to the reactions of the interest groups. Of course the operators, the cable operators don't like this. They're pricing optimally right now without the constraint. But the programmers are really the ones that hate it. The basic programmers and particularly the fledgling programmers, because to be a fledgling programmer, you have to get shelf space and get in there and then have people who don't know about you flip through and channel surf and see what you're

about. It's a very important thing to get on that basic cable package and they hate ala carte.

And so in fact the cable industry just had its annual convention down in New Orleans this week. And they dragged out 19 female programming execs to urge Congress to reject mandatory ala carte proposals; Lifetime's Chairman Carol Black and MTV's Judith McGrath was among the more than two dozen execs to sign the open letter to Congress as women TV execs we have strived to create quality programming, blah, blah, blah. So this is what people get paid to do in Washington. And it's rather interesting that the industry is iterated on quite an efficient way to package a big bundle of service with a lot of uncertainty by the customers as to what they're going to watch over the course of not just a month, but over a long term subscription life. And now the political reaction, sort of the non-market failure kicks in to try to undo that.

The second thing I want to talk about is how the cable industry allocates spectrum in a tube. What I mean by that is the basic proposition in the cable television business is to run a wire to your house that gives the operator a chance to deliver you communication services in that wire. That's just creating spectrum. And in fact, the whole thing is based upon regulatory bypass, the fact that the broadcast TV ban has been

artificially restricted in terms of entry since day one by regulation in this country.

And it's funny to see this. If you go on the website of the Canadian regulator, they boast that they have the -- they say they have the highest cable TV penetration in the world. It's actually not true, but it is very high; it's over 80 percent. And they brag about this. The Italian regulator also has a little note on his website in English about also boasting. They boast that they have the lowest cable penetration in the world; it's about 1 percent. And they say that the reason it's so low is because they've been very liberal in giving out broadcast TV licenses, which is true. They're most liberal in most broadcast stations per capita anywhere in Italy.

And the Canadians, of course, have had a lot of cable TV. Why? Because there's been a limit to how much American programming you can get without cable. And of course the war against the satellite dishes, which were made illegal because to bring in American programming. And as soon as the Canadian regulators let some American network programming go on cable in the early '70s, cable took off. You see, anything to get out of Canadian broadcast corporation programming.

So this cable in many respects -- in the United State as well, is regulatory bypass. We have this network triopoly

under the 1952 TB Allocation Table. So anyway, the cable companies finally jump in. Of course that was resisted for 20 years by the regulators at the FCC and finally in the late '70s, early '80s they get deregulated and get to wire the country for cable. So what they end up with is this wire to the home that gives them their own spectrum. Again, this is privately owned spectrum, so there has been privatization to spectrum. It's in that tube, the coaxial cable.

And how does the cable operator allocate that spectrum? Well, there are lots of ways to look at this, but today the standard architecture of a cable system is 750 megahertz, which means that using sort of the normal technology for analog distribution, you'd have 125 video channels, 125 video channels, 6 megahertz each. So the cable operator gets to allocate those channels. How do they allocate them? Well, they take one channel, 6 megahertz and devote that to high-speed broadband access, cable modem service, which they sell for \$40 a month. Then they take 124 channels and put them over to video.

Now, by virtually any measure, they under allocate spectrum based upon the value of its marginal product. They under allocate spectrum to high-speed internet. But cable companies could give you a lot better, cheaper, faster high-

speed internet access than they do, but they choose not to. And the question is, why don't they?

Andrew and I talked about this last night. Here's my theory. Andrew has a different theory. His theory is different and I'll call it the Lesig [phonetic] Theory. The Lesig Theory is that cable operators don't want to give you more internet access at higher speeds, because that would cannibalize their video business. And indeed it would cannibalize, but the problem with the explanation is that it arithmetically doesn't register on the bottom line properly. If in fact you do cannibalize and it's efficient to do that, customers that is to say prefer to go and get video streaming material and replace video content from the cable system, then you can charge for that.

There's no regulatory constraint on that. And you can charge for it and customers, if they're better off, will pay you more for it. So cannibalization is not an explanation of why you don't do it. It would be an explanation of why you might do it. And my explanation for why you don't do it and for why you way under allocate spectrum within the cable system, is that allocating spectrum to two way, high-speed internet access is inherently dangerous in a regulatory sense. You bring on what is called open access common carrier regulation. Common carrier regulation is, in fact, already

materialized in the threat of applying open access requirements on cable television systems. And why don't you like that? Isn't that good? Won't that force marginal cost pricing? Well, to some extent it does.

Now remember, when the operator gives you access to the internet, they charge you just a fixed fee for that on a monthly basis. And that's it. There's no marginal -- they don't charge you download cost or anything up to the limit. And if you're running a business operation on it or running a website and getting a lot of traffic, using up what they consider to be too much, then they will shut you down. But they don't want to price the individual bits. It's expensive to price them and they don't want to discourage you from using them if they're plentiful, if they're abundant.

So, they actually have quite an efficient two part pricing system for the internet access. But they don't want the government pricing internet access. They don't want common carrier rules. The simple things, they don't want to be a phone company for Christ's sakes. If you look at the phone companies, the queue ratios are about one.

If you look at the cable company, it's queue ratios about three. You don't have to be a rocket scientist to figure out the cable industry is very good at capitalizing profitable opportunities and they don't want to move their very

profitable, regulatory environment for being a private cable carrier into a potentially more profitable, more efficient internet access business that now gets regulated like they're a phone company providing passive access. Believe me, they have fought for 40 years not to be common carriers in cable.

This is the long- running, decades-long regulatory minute, as one telecommunication puts it in terms of trying to stay regulated like a cable carrier. In fact, the FCC actually makes these determinations now. Is cable a cable service, a telecommunications service or an information service? Now, I hate to tell them, but information service and telecommunication service, those are just synonyms. They mean the same thing. But of course in a regulatory world, they mean completely different regulatory models.

Information services means you're free and clear to set your own pricing structure and bundle, as you will. And telecommunication service means federal and state regulators get to unbundle your package and potentially regulate the rates. So that's not the world they want to be in. So now you've come to a situation where not only can the private sector here, not only can they avoid market failure with a two part pricing scheme that in fact gets the marginal price down to marginal cost, can encourage \$75 billion to be spent, because some of the incentive and certainly a lot of that use

of that \$75 billion investment since 1996 has been for high-speed -- 90 percent of the homes in the U.S. now have the ability to get high-speed internet access through a cable operator, absolutely no regulation directly on that. And so the private market has done very well to create that opportunity, but again, you have the regulatory overhang discouraging, discouraging spectrum from being allocated to network development.

And the last thing I'll say about it is there's a lot of loose talk about the internet being developed because of open access standards. It's completely wrong. *The internet does not exist.* There is a network of networks and most of the important networks are developed and thrive on the basis of profit incentives. And it's the profit incentives that drive the investment and you can see it so clearly in the cable sector where the profit incentives have driven enormous development for millions of users of the internet and the overhang of common carrier regulation discourages more spectrums from being allocated in that way.

The last thing I'm going to mention in hopping through this is to talk about spectrum access pricing. In a wireless world -- we leave cable and go to wireless. Let's just talk a little bit about the U.S. wireless market and forget the rest of the world. We have what's called the CMRS market,

Commercial, Mobil, Radio Services, which was developed by the Division of Acronyms at the FCC. And it encompasses cellular, PCS, and SMR, which is the Nextel side of this. And so we have, in essence, six national carriers. By the way, how many licenses were issued to get down to six, if six is the correct number? How many licenses were issued to get to six? Come on, Chris. Nobody knows this.

Chris: Two.

Mr. Hazlett: The other side. The last time I counted -- it actually changes, but 50,866 was the actual number, but there has been some consolidations. Now we're down to six. We were just at our table talking about how good the government's been to some of us and this is the brokerage business gets about 3 percent on these transactions, so that's good.

So, we have six national carriers and this spectrum that they get to use under their operating licenses is the most liberally defined spectrum in the marketplace today. They get to choose their services and very importantly their technology and business model. And that's actually been a tremendously important aspect to the efficiency that they're able to provide to the market and we do have 163 million subscribers and talking over 800 billion minutes a year, most of which of course is inside the beltway, and revenues this year about \$90 billion, \$90 billion for that sector.

Now, how is access priced by these companies that do have quite effective control over the spectrum and there's about 170 megahertz that's currently being used, about a little less than half of the TV ban. We won't talk about that today. But, there's very little spectrum that's been allocated, this 170-megahertz, but is extremely, intensely used. How is access priced? Well, we certainly have a declining cost issue here. Once you've put in a wireless network, which essentially is about 20,000 bay stations all over the country costing somewhere around \$25 billion. Once you put in that network the marginal cost of a call is pretty darn low.

I should say the other side of it is to distribute millions of handsets to people who make calls. So you have to distribute the handsets, which are also known as radios. So you have several million radios, you have 20,000 bay stations and you have maybe as a network, somewhere around 25 megahertz a spectrum to play with, how do you price access?

Well, once you have all the pieces of capital in place, the marginal cost, of course, is essentially zero up to capacity. And so how do they price this stuff? Well, they sell you a monthly subscription fee, typically -- we'll talk about the footnote in a minute -- they sell you the monthly subscription fee and then a big bucket of minutes.

And then while you're using up your bucket of minutes, the price is essentially zero. In fact, they will induce you to pay the monthly fee, remember that's the monthly fee that covers the network cost. They will induce you to pay that monthly fee by dangling all kinds of even extra free minutes to you, like free weekend minutes and free on network minutes and all that other stuff.

Now, if you don't want to pay a monthly fee, you can actually buy minutes. You can go into 7-11, buy a phone, start working it 30 minutes later and in my case, 45 minutes later, and it's pretty simple. But you can pay a lot for those minutes, because you're not contributing to the network. But, if you want to buy the minutes cheap, you contribute to the network and you pay a big fixed fee. And that actually works pretty nicely. And you get this very intense use. Millions and millions of customers of a very limited amount of spectrum that's been allocated for that.

Now, there's this argument that's arisen that this is actually an inefficient way to do it. That in fact, it's better to have unlicensed spectrum. In other words make spectrum access free with the big footnote being government rules are going to come in to regulate the equipment you use, essentially powering everything down making sure it doesn't go too far to interfere with one user to the other, but that the

government can now figure out how to set these rules to coordinate spectrum use and avoid conflicts. That argument runs into exactly the issue that Coase was talking about in terms of allocating your capital, allocating your resources or your fixed inputs in the marginal cost controversy. You don't get any market. You get government command and control.

And this argument that I was talking to Drew Clark, the fellow from the *National Journal* yesterday and we were talking about it late, it's absolutely the regulators, many of the journalists have drunk the Kool-Aid on this, property rights are passé, we don't need, there's no congestion, there's no interference. This is the very same time that people use unlicensed spectrum are petitioning the Commission that it's too congested, they need more, more, more.

And in fact, the people who are doing wireless broadband over wide area networks, locally you can get some decent use, but the wide area networks where you do have the conflicts and you need to pay for coordination, those people are in the Commission actually asking for property rights, for homestead rights to kick out all these idiot 2.4 gigahertz wi-fi [phonetic] users who they condemn as being spectrally inefficient. And they want property rights and they want registration and they want all kinds of things. They don't

call them property rights. They call it a registration system or homesteading and things of that nature.

[Tape 2, Side B ends]

[Tape 3, Side A begins]

Mr. Hazlett: ... of pricing and the tax and spend substitute for market allocation and that's exactly where the unlicensed argument has gone and we'll see how far it is before the regulatory system wakes up and is able to in fact extend property rights and extend market competition and extend the very rational allocation you see through the limited CMRS market, where in fact, the marginal cost pricing issue is solved every day and in fact every year over 800 billion minutes per year. So that's essentially what I have to say. Well, even if it's not, I've been told I'm out of time. So, I guess by definition I guess that's it. So thanks very, very much.

[Applause]

Male Voice: [off mic] In terms of competition between wireless and the local phone companies, it might actually impact a little bit there [indiscernible], but right now the real substitution is in long distance [indiscernible], for the long distance minutes on your wireless phone, because if you're home on the weekend and you start to make a long distance call on your home phone, you say, opps, and you pull out the

wireless. I know George had a heart attack making a long distance phone call on his wireless [indiscernible].

But, so you have that substitution already taking place and maybe it'll be a little [indiscernible] over time, but I'm telling you when this thing went into the big fanfare when it went into effect in November where you could take your phone number from one carrier to another and it really [indiscernible]. They did take some measures to try to batten down the hatches to give people good deals and not to leave them [indiscernible]. But, to be honest, some of us actually like to switch companies and get a new phone number. It could mean a whole new group of telemarketers.

Male Voice: We do have to adjourn and go back into the sessions, because we're running behind.

Male Voice: Okay. Everybody, we will begin the Network Industries panel. First let me introduce James Gattuso, your moderator. James handles regulatory policy issues for the Heritage Foundation. Prior to joining Heritage, he was Vice President for Policy at the Competitive Enterprise Institute. In that position he oversaw CEI's policy work and supervised over all management of the organization. He's from California and got his JD at UCLA.

Mr. Gattuso: That's a little bit unfair. Those of you who know CEI know that there is no management of CEI; it's a

free market organization. Our panel for this session covers the telecommunications and electricity industries. So far, I've been fascinated this morning and so far this afternoon that the number of different industries we've covered going from pharmaceuticals, railroads, airlines, cable TV and if you think those were fun and the rules bizarre and complication, you haven't seen electricity and telecom yet. Now things are really going to get interesting.

One thing that's different about these two industries, in addition to having, as we were talking just a few seconds ago, in addition to having more acronyms is the fact that as the couple of the industries we've talked about so far, cable and railroad are two that come to mind, have fought off the dread of forced access, mandated access regulation. In electricity and telecom those were implemented, which means that competitors can come in under various schemes to use the existing infrastructure of the incumbents or share the infrastructure. I know it's different in the two different areas, which means, in turn, that the government must come up with a system for pricing and providing access, which gets policy makers square in the sites of the marginal cost question.

I'm actually personally more familiar with telecom and I know that's been solved very simply and directly through an

eight year three appeal process through the Court of Appeals and Supreme Court. A system called TELRIC, Total Element Long Run Incremental Cost, which is as easy to implement as it is to say, suffice it to say and I'm sure as I get more into this, it's a system where the proper price is determined by putting enough economists together in a room to come up with the incremental cost. As analysts debate about whether it's too high or too low, suffice it to say that there are examples of the TELRIC price being determined to be zero. So that sort of prejudices me towards there being perhaps a problem.

To make things even more complicated, these rules were repealed in part by the FCC for broadband because of the investment problems. Surprise, there was a lack of incentive to invest. And then called back by the Court of Appeals this February so these rules may be gone completely, throwing telecom into even more turmoil. Electricity, of course, has a similar story, but of course, as you probably all know, it's gone much smoother and easier.

With that substantive introduction, I'll introduce very quickly our speakers. Our first will be Rich O'Neill, who is the Chief Economic Advisor at the Federal Energy Regulatory Commission. And from 1988 to 2000 he was the Chief Economist and Director of the Office of Economic Policy at FERC.

Following him will be Jerry Ellig, who is now a Senior Research Fellow at Mercatus. He previously and periodically serves in government, I think a couple of times at the FTC and at the Joint Economic Committee. He has experience from several sides of the fence and is familiar with a number of these issues.

A third will be Timothy Brennan, who is now a Senior Fellow at Resources for the Future, a faculty member of the University of Maryland, Baltimore County and I don't think it's mentioned in your materials, he also served as an economist for some time at the Department of Justice and as a senior economist at the Council of Economic Advisors.

And then batting clean up for us will be Richard Pierce, who is Associate Dean and Lyle professor of law at George Washington University Law School and the author of the book *Economic Regulation*. Richard Pierce has a JD from the University of Virginia.

So, if you'd join me in welcoming our first speaker, Richard O'Neill. [Applause]

Mr. O'Neill: Thank you. It's a pleasure to be here. I guess I have to relate my own Coase Theorem experience, which comes to me secondhand. A friend of mine and a colleague for many years was a graduate student and got his PhD at Chicago and he said that they would have seminars at Chicago and there

was no shortage of egos there. And they would get into debates about what the Coase Theorem said and Coase would be right there and he would say nothing and he would just simply watch the debate.

I've put a lot of slides together, because usually when you go to these meetings, you don't know exactly where things are going to end up or how they're going to progress. And so I will go through some of them very quickly, because I couldn't edit them on the fly. First of all, let me say that I started out at FERC working in natural gas and I am somewhat proud to say, although some of the lawyers don't like this, that I worked myself out of a job at natural gas.

We've now, arguably, reduced the regulatory costs somewhere between 25 and 75 percent and deregulated over 50 percent of the market. And I think it is arguably working reasonably well and we're now focused on electricity, trying to get the same gains, although there are significant states' rights issues -- at least that's the way they argue that have come into screw things up so to speak.

So, we started out with Edison so we've been in the business about 120 years. JP Morgan removed him from Edison General Electric and his name when he didn't understand how to be an economic monopolist. Then came his bookkeeper, Sam Insul [phonetic], who essentially argued after -- there's some

technological progress so Sam had a big investment and some Midwest utilities, so he went to the state commissions and said that he was willing to only recover his cost if they would give him a franchise monopoly and the rest is history. We've been doing cost of service regulation for 100 years. So it was Sam Insul who moved the system that way.

Like I said, we started out with competition, but Sam sort of closed that off and people sort of fell in love with the administrative ability to do cost of service regulation. It's a very decentralized process. You can have somebody doing depreciation, somebody doing equity, somebody doing dead equity ratios and things like that and so you can completely build a huge bureaucracy around it.

Fuel choice. Well, these are my two favorite fuel choice issues. One of them is the nuclear quote that nuclear power would be too cheap to meter, it turned out to be the most expensive to meter. The other one is that the natural resources are exhausting and I think the classic now is the Simon Airlect [phonetic] bet, where Airlect chose five and lost on all five. So, we're not very good at fuel choice, but used to be one of the reasons why we used to regulate electricity.

If you realize how the industry got to where it was, it was through franchised monopolies and beginning in 1990, there were 50 different owner operators of nuclear plants.

Industrial organization theory would have told you maybe eight or ten. But, that was because each one of them had a franchise and each one of them built, owned and decorated their own nuclear plants.

Here's my alphabet soup. We won't go through that very much. We even have numbers in addition to acronyms; we can speak in just sentences with nothing but numbers in them. I'll skip that.

The basic paradigm change that we've been trying to implement is transitioning from planting and dispatch to auction models and incentives and market power litigation. This is Nikko Machiavelli in paradigm shifts. It's in your handout, so I won't go through it very much.

This is an important slide and I think Coase actually made some reference to this and it's Williamson's Taxonomy. We can get to the resource allocation market very quickly. It doesn't take anybody very much time to switch. But the most important thing is changing the culture. You offer residential customers choice in buying electricity or buying gas and they don't exercise it. It's not a ten-year history.

And so one of the biggest things is trying to get people to budge off of the way they think. And for example, getting the industry to accept auctions as opposed to cost of service regulation, is very difficult. And in natural gas and

electricity, if you have the high price, you don't switch to another supplier, essentially you go complain to your public utility commission.

I'll skip over this; this is an externality's issue. Property rights, a very important issue, but one of the things about these networks is entry isn't easy. And entry usually starts off in this business by expropriating property from somebody else. So you have a real problem. One of the interesting issues about scale economies is the system, if you were around on August 14<sup>th</sup> has to maintain [indiscernible] reliability, which brings scale economies into really serious question. One of the most important things in this business is unlearning neoclassical economics.

Oh, by the way, here's the pedigree for regulation. It's Adam Smith saying that he actually prefers regulation of the network. There wasn't an electricity network at the time, but you can make the inference.

Here's a question: who said this? I'll give you a hint. It's somebody who talked earlier today. Ronald Coase. Let me just briefly, our approach and I guess open access has gotten a lot of bad press today so far. It's actually to separate what he believes the competitive part of the business is from the network. Make the network open access, give the system incentives to be efficient, even allow the network contracts to

be tradable in a secondary market and let the system rip. It's worked well in natural gas. In electricity, the state regulation becomes a real wild card. As you open the system up, it's not necessarily that the market comes in, it's that the state fills the void.

Auction markets are something that we've made significant use of and one of the interesting things about the auction markets is we now have the technology to do two part auction markets. That is to say that you don't have to have a single clearing price, you can have a two-part charge in these auction markets and they are actually operating today in the electric industry.

This is a story -- well, I'll skip over about Juliann Simon and Milton Freidman. It's a story about FERC-ing the internet. Let's see; let's just keep going.

Oh, this is my favorite slide about the California market design, which essentially set us back ten years. If you want, you can ask me about the tomato in the question session. Here's some lessons we've discovered. On my computer, that little hand over there is pi.

Here's a market design that has been rather successful and works and it's called the Standard Market Design, although there's a bill in Congress right now to outlaw it.

Market power is a big issue here and especially now since we've actually caught a bunch of people red handed exercising market power. But, when you try to talk about it, you don't get anywhere. We found out that these markets can be very risky, because actually the marginal cost in this industry dips down and actually goes significantly higher at high demand levels and so the prices can get very high.

But the politicians won't let the market clear. If you remember before 9/11, the two things we worried about were people talking on cell phones and shark attacks. Here's what happened in the industry after they basically all bought into the Enron model. You can see that there was a huge loss in equity because of the way people followed Enron. It was basically because Wall Street asked them to.

Looking forward, the interesting things are using iterative non-convex internet auctions -- did I get all the right buzzwords there -- where you end up with multipart prices. There are some other issues. One of the things, because we have always been paying all the insurance through our retail rates that there's no insurance in this business to speak of and so we have to basically develop some insurance markets. And I'll just end with a quote from Max Planck.

[Applause.]

Mr. Ellig: Well, I'd like to start with a quote from Mox Plonk [phonetic]. I don't know if that's good place to start or not. Actually, I'm going without PowerPoint slides here. If you feel the need for a visual aide for what I'm talking about though, just imagine your telephone bill, because that's about all I'm going to talk about. It's always dangerous to be talking after lunch and it's especially dangerous to be talking about telecommunications after the group has already heard a talk from Tom Hazlett about telecommunications. Fortunately we've segmented the market and we're going to talk about different things.

I'm going to talk about the pricing in the area that Tom didn't really talk much about, which is mostly ordinary wire line telephone service and sort of where we are on that in vis-à-vis the marginal cost controversy. I'm going to talk about retail pricing, so I'm not going to talk about the wholesale or unbundled network element prices that James alluded to, because that's too painful. So, I'll go head and start.

Local telephone price and telecommunication pricing.  
Okay. We have large fixed cost, small marginal cost, the same as a lot of the industries we've talked about here today. In this industry some combination of the interplay between the industry and regulation has produced about three and a half solutions to the marginal cost problem in local telephone

service. One is there's some differential pricing. There's also two part pricing with flat rate and fixed monthly charges. And there are subsidies, subsidies to high cost providers, subsidies to rural providers, both federal and state.

And then the half of solution is also subsidies for low-income users. Differential pricing; well, where do we see differential pricing in local telephone service? Principally we see differential pricing when states establish the structure of local telephone rates and they frequently use not cost based pricing, but at least what they think is demand based pricing or what they call value of service pricing. And this is typically a situation in which the state regulatory commission looks and divides the state up into places, more or less based on population or the number of telephone lines. They then assume that the more telephone lines you have nearby you for local calls. The more valuable telephone service is to you, therefore, you will pay a higher price if you're in an area with a lot of phone lines. And as a result, we end up with prices that are pretty much the inverse of costs for local phone service, where essentially if you're in an urban area, you will frequently pay more than folks would pay in the rural area, because the value of services is presumed to be higher in the urban area.

Now why the value of my telephone service is higher because I live in Falls Church and there are all these people in Arlington and Fairfax that I don't want to talk to that I could reach with a local phone call, I'm not sure why that makes the service more valuable to me. And it's not clear that this kind of value of service pricing is necessarily following demand elasticities. It's arguable that a lot of folks in urban areas may have somewhat more elastic demand than people in rural areas. Since you may have more substitutes for local telephone calls if you're in urban areas, such as walking down the street to the grocery store to find out if they're open, that kind of thing.

Nevertheless, we do have a certain amount of differential pricing that goes under the name value of service pricing and its principal affect is to cross-subsidize rural users by charging urban users more. However, some differential pricing is prohibited in the telecommunications industry. Long distance rates have to be uniform across the 48 states. They have to be uniform within various states. And local rates are usually the same for similarly situated customers.

So while urban dwellers may subsidize rural dwellers, all the urban folks in the same rate area are going to be paying the same rate. That is, all the residential folks or all the folks in various small business categories will be paying the

same rate. Okay. That's where we are with differential pricing.

Flat rate or fixed monthly pricing. Well, there's some interesting progress here, interesting improvement in the way that pricing has occurred here in telecom. Because traditionally, the way that we paid for a big chunk of the telecom network was to overcharge people for long distance service on a per minute basis and use those revenues to artificially subsidize local telephone service.

And over time, of course, the story that most folks are familiar with, competition in long distance service has squeezed out those subsidies or rather has forced federal and state regulators to find some other way to deal with this and the way that the FCC has chosen to do it is through the creation of the federal subscriber line charge, which essentially has the effect of increasing your monthly fixed charge so that we're paying something that's closer to the actual cost of providing this local phone network to us and then we get to pay lower per minute long distance charges as a result of the fact that the subsidy from long distance to local has declined.

I should note though that on a state level, intrastate, the subsidies from long distance to local are still relatively high and typically the access charges that the long distance

companies have to pay the local companies for intrastate long distance calls are much higher than the charges that they pay the local companies for interstate long distance calls. So in this regard, the federal regulators have gotten us closer to something more like a two part pricing system than the state regulators have.

High cost and rural programs. These are some of the outright subsidies that help cover the fixed costs, either because the telephone company is inherently high cost or because it's serving a rural area. The good news is, at least they don't try to make telephone service affordable to rural residence by mandating that everybody in the state pays low prices for telephone service, so they don't distort the prices of the entire market that way. On the other hand, these subsidies are frequently funded by surcharges on telephone bills that everybody pays. So everybody's prices are a little bit higher to help subsidize high cost in rural areas. And often these subsidies are hard to justify on equity grounds.

A famous example, Brenton Woods, New Hampshire's phone company has received a lot of subsidies under the high cost program, even though it's not exactly a neighborhood that you would think of a needy people. A lot of telephone co-ops that are located in areas that used to be rural but are not Oceanside resorts get various kinds of benefits out of these

programs. It's hard to justify on equity grounds, but that's the way it works.

Finally, low income and lifeline type subsidy programs. These are also kind of a good news, bad news story in terms of pricing, closer to marginal cost. The good news is that these programs are targeted assistants rather than a market-wide distortion of prices, giving everybody artificially low prices in order to make sure that some group that we feel is needy can afford it. On the other hand, these are usually funded by surcharges on phone bills as well, so the cost of providing this subsidy ends up resulting in somewhat higher rates for everybody else who's not getting a subsidy.

Now, it's interesting to contrast local wire line phone pricing with the way that pricing usually occurs in the less regulated parts of the telecommunications market. If you look at wireless telecom, if you look at broadband, DSL from the phone company, cable modem service from the cable company, if you look at internet services, typically how is that stuff priced? You typically have a monthly flat subscription rate that gives you the right to use a certain amount of capacity and if you want more capacity, you pay a higher monthly subscription rate, or in some cases, like wireless telephones, you may get hit with a per minute charge if you exceed the amount of capacity that you paid for in advance.

A lot of times these charges are not very sensitive to distance anymore. I don't know about you, but when I signed up for my wireless phone, I think it cost an extra \$5 a month to get long distance thrown in. They might be giving it to you free now. I haven't checked recently. And prices tend to be pretty uniform for similarly situated customers. Whether we will actually get to that kind of pricing model for local telephone service, probably depends on whether the competitive forces that have squeezed out some of the cross subsidies and price distortions are allowed to continued or whether the new competitors that are challenging those cross subsidies just get brought under the tent and have their services taxed in order to perpetuate the subsidies. Thank you.

[Applause]

Mr. Brennan: That's definitely a predatory action on Jerry's part. It's okay. Don't worry about it. To make [indiscernible] I wasn't going to dignify my remarks by standing. Now they're even less dignified than they were before apparently.

First, I just want to thank Fred and Braden for organizing this and having me here. A lot had to be done at the last minute for this for me and I especially appreciate that. Also, I'm particularly happy to be here because I'm -- well, I consider for myself a unusually libertarian mood for reasons

which I won't go into. I was given a totally unjustified running a red light ticket from the District of Columbia's photo service as I was going to the National Airport a couple of weeks ago. So, I'm with you on the [indiscernible] cocktails now when it comes to the police state.

I also thought about how I should be trying to say outrageous things here, but I realize that trying to say something outrageous here, I mean there's the quintessential Coase and New Castle and I don't have to worry about that. I'm going to say a few things on electricity and a little bit on telecom. I actually worked on telecom for much of my career before working on electricity stuff lately. And when I first got into electricity I thought it was much simpler than telecom. You plug something into the wall, flip on the switch and the light goes on.

How complicated can that be? And I have since reached the conclusion the electricity is way more complicated than telecommunications for lots of reasons. Many of which Dick alluded to.

What I want to talk about though mostly is not so much what's been called the decreasing marginal cost, we call it the decreasing average cost problem here. It's hard find things by decreasing marginal cost, although you have that, I think we're talking about high fixed cost industries and that's really what

the problem is. Be that as it may, I want to focus on the knowledge problem, I guess, when policy makers get in this. I want to talk about this in a couple ways. Mostly on electricity generation and then a little bit on some of the pricing things that both Jerry and Jim talked about in telecom.

On the pricing side, there's a problem to me, in that there's lots of studies about what's going on in the electricity markets. In order to reach some conclusion about this, they have to make some determination as to how prices compare to what is "marginal cost". What is almost always, if not always, done in these studies is that the proxy for marginal cost is the average variable cost of the most expensive generator brought in a service. And there are some real problems with that.

This is an industry where the dynamic problems that people have been talking about yesterday and all day today, they're extremely important. You can have capacity in this sector, which may be brought into service only one percent of the time, maybe even less. How many hot August afternoon hours are there? The quintessential thing about electricity is you have to generate the electricity when it's used. You can't store it up. So there are enormous capital recovery problems in this sector.

And so if one implicitly endorses the principal that the most expensive plant, perhaps one of these units brought in to service only in these very limited times, the price of the variable cost of that unit are all that in some sense going to count, then one might have some problems with capital recovery. In fact, at one point, following the California crisis, Dick's employer actually issued a rule endorsing that and I don't have the cite in front of me, but it had a line in it that said essentially these plants don't need to recover their capital cost because they're owned by generation companies that have more efficient units and they can use the profits from those to cover the costs of these marginal plants, which is a good way to encourage people at generation to be built.

However, the reason I think of this as a knowledge problem is that when I first became familiar with this problem, it wasn't in all these studies that followed the California crisis. It kind of hit me when I was at a conference at Berkeley -- a lot of these studies come from Berkeley on this -- at an electricity conference there, maybe four or five years ago. And I was there talking about something unrelated to market power or pricing or anything like that, but someone on the panel who's done a lot of these studies gave a talk where at the time he concluded that there was market power in the California electricity business, even in the 1990s, before the

crisis period. And his evidence of that was that on some hot August afternoons, the price out there was 17 percent higher than the price he thought it ought to be.

And he concluded market power. Now, I confess. I'm someone who thinks that empirical economics is a one significant digit enterprise at best. So when I thought that something was within 20 percent of what somebody thought, I thought this is the most competitive market you've ever found. Go home and it's only gotten worse from there. So, I think there are a lot of risks in going about and thinking about things this way.

The one last thing I want to say about electricity generations, to follow on something Dick said, is something that really is true in this industry. It's hard budging people from the way that they used to think. And this is an industry where you're still surrounded by people who are just aghast at the thought that there might be some noise in a market.

One of the things that electricity regulators have been obsessed with, I'm sure for decades, has been least cost dispatch. We have to make sure that plants are put out there in the least cost order, no matter what. Now, we don't have least cost dispatch of anything else in the economy, really, but there's an obsession there and I think that that's one of

the problems that I think has made it very hard for people to let go.

Just a couple of notes on telecom pricing, some things that Jim in particular talked about and just to mention again on the knowledge issue. The government's supposed to set the prices of these little sort of network elements or whatever that people are supposed to be able to buy in order to compete in local service. Merits of that aside, one of the fair things about the statutory [indiscernible] that I've always enjoyed, is that those rates are supposed to be cost-based, but without reference to a rate of return.

Now, a rate of return, either that means you're supposed to ignore capital costs, which I guess fits in with the theme of this thing, or as someone from the FCC basically told me, the way the FCC solved this problem -- he told me this and I think with a bit of a laugh, one of the cynics there -- said that the way to rationalize the [indiscernible] proposal, was basically, well we interpret this as saying we can use real costs, we have to use fake costs, hence the economists in the room story. But there are some things on the legal side of this, which are just worth mentioning.

One is that right now there's impairment standard about when these things go into effect. And I've heard someone recently actually give a talk on this, a talk about one of the

ways of this impairment standard is they ask a question well, could we enter and compete without access to these things. It might sound good, I suppose, but what it means is that a person is demonstrating when this works and when it doesn't. In order to do that, now the regulator has to know what all of the entrance costs are to make this determination. So you've really added on to the knowledge requirements with that rule.

And the last thing I'll say is that I'm glad that Dick cited the Verizon case or the Trinko [phonetic] case for some of us. And I'll just say that I agree with his characterization of it. I think it's a terrible case. If Bill Baxter can spin in his grave, he probably is and we can talk about that later. Thank you.

[Applause]

Mr. Pierce: I'm going start with a quote from one of my favorite people and one of my favorite quotes, the one I try to drum home to my students in regulated industries every year. The central policy prescription of microeconomics is the equation of price and marginal cost. If economic theory is to have any relevance to public utility pricing, that is the point at which the inquiry must begin. That's Brad Kahn [phonetic] in his classic 1970 two volume work, *The Economics of Regulation*, one of my bibles, in fact my only bible. And that was normatively accurate when he said it in 1970. It's

normatively accurate today to me. The good news is, it is increasingly descriptively accurate.

Regulatory agencies, particularly Dick O'Neill's regulatory agency had become much more sophisticated over the years and have come to rely to an increasing extent on marginal costs, as their basis -- at least their starting point -- for pricing. Now there's some context in which marginal cost can be both the starting point and the ending point for pricing. Indeed, if it weren't for the political problems created by California, pricing electricity generation could be based exclusively on marginal cost. Unfortunately, the political climate created in the wake of the California mess is one in which it's impossible to resist imposition of price caps.

Once you impose price caps, then you have to have some supplemental means of earning revenues or you just don't earn enough revenues. But the problem there is not with marginal cost pricing. The problem is with price caps. If you have price caps, then you're going to have inadequate revenues and you have to do something to supplement it.

Now, let me illustrate in one particular important concrete context, the way that this works, at least in some parts of the United States, including where we are right now, the middle Atlantic states, of excellent market based mechanisms for pricing electricity. The basic principal is

that electricity is priced at locational marginal costs and what you're pricing is two different things. You're pricing electricity itself, that is the cost of the generation or the value of the generation and you're pricing the transmission. When it comes to the generation, were it not for price caps, you could have prices based solely on marginal costs. When it comes to the transmission that would not be sufficient to cover total revenues because it is a declining marginal cost function.

And so there, the marginal cost base price of transmission has to be supplemented for revenue adequacy purposes by either postage stamp rates or what are called license plate rates. And this is just typical of what is happening in quite a few regulated industries, including all three of those that FERC regulates. Where you use marginal cost pricing and then you combine it where necessary with multipart pricing and/or Ramsey pricing. I was actually surprised to hear Dick say earlier today that Ramsey pricing only applies in a one part pricing context, because as I read the...

Mr. O'Neill: Classical. Classical [indiscernible].

Mr. Pierce: Okay. As I look at gas pipeline pricing, and perhaps more importantly as the DC Circuit looks at it, it is a combination of two part pricing and Ramsey pricing where one of the two parts is designed in accordance with Ramsey principals.

Now of course not strict literal precise Ramsey principals, based on surrogates for Ramsey principals, but it works reasonably well.

Now, to me there are a couple of [indiscernible] that follow from what I think is still the normative, and I hope, increasingly descriptively accurate statement from Fred Kahn. One is whenever possible use market mechanisms rather than administrative mechanisms to set prices equal to marginal cost. That's what's done in electricity in the Middle Atlantic states and to some extent in New York and in New England. It's damnably hard to determine marginal cost based on application of some administrative mechanism, but quite easy to determine it based on creation of a structurally competitive market and allowing that market to produce prices based on marginal cost.

Another important thing to keep in mind is that marginal cost includes opportunity cost and scarcity rents. In many circumstances that could get your marginal cost up way above out of pocket marginal costs and be plenty adequate to cover your fixed cost. A third, I already mentioned, but it bears mentioning again and again. Price controls or caps imposed on a structurally competitive market are totally inconsistent with marginal cost pricing. Once they're imposed, you cannot base prices on marginal cost. You have to do something else and

that something else is always dramatically inferior to using marginal cost as the basis for the prices.

And then I'll just close with a couple of descriptive points. One is that regulatory agencies, particularly Dick's, rely increasingly on marginal cost pricing, supplemented by multipart rates and application of Ramsey principals in various forms as their basis for setting rates applicable to all of the functions that are within their jurisdiction in the electricity industry, the natural gas industry, in the oil transportation and oil product transportation market and that ports increasingly, not only uphold those methodologies, they strongly encourage it. I teach every year in economic regulation two decisions issues by the DC Circuit. One involving a surface transportation board, the other involving federal energy regulatory commission in which the DC Circuit goes on at length about why agencies should use a combination of marginal cost plus two part rates plus Ramsey principals in designing their rates. And it even goes into considerable detail on the better ways to do that. Now, it's written by Steve Williams, a judge who's a bit more economically sophisticated than the average judge, but there's not disagreement on that cord about the issue. So the courts are not standing in the way of this. The big obstacles, frankly, are just the political environment.

One final point. I have been discussing all along in this and been focusing primarily on the markets that Dick's agency regulates. I have not mentioned the SEC. And there's a reason for that. Whatever the hell TELRIC is, it is not marginal cost pricing. What I am tempted to call it is just plain outright theft. It says I get to take Dick's stuff and sell it to somebody else as mine and I did it at half of Dick's price and then I get to sell it twice that price and that's just plain old theft. It has absolutely nothing to do with marginal cost pricing.

Steve Brier [phonetic], I thought did an excellent job of characterizing it and in a lot of detail in his concurring opinion and one of the three Supreme Court cases that have already been provoked by that bizarre pricing experiment and so I just want to throw in a caveat that I'm not saying anything good, I hope, about TELRIC. Thank you.

[Applause]

Male Voice: You didn't have to put in that last part just to please your host.

Mr. Gattuso: I know we just have a few minutes. Okay. We have a few more minutes. Good. Then I get to ask a question. If I could take the moderator's privilege and ask the first question and I'm not sure if anyone has a specific answer for this. This is something that's potentially being

considered by Congress over the next year or so. As Jerry mentioned, there's lots of differential pricing going on now in telecom. Not necessarily efficient differential pricing, just prices that are different. It's not just true at the retail level, but at all levels if you compare the price it takes to connect to the network is calculated one way if you're a customer, a retail customer.

Another way [is], if you're another telephone company, if you're connecting a call from one telephone company to another, Verizon to SPC.

A third way [is] if you're a long distance company, if you're AT&T passing on a call to Verizon, there's an access charge that's quite sizable. Another way if you're an ISP, and so on, I think there's five or six different ways...

Male Voice: Many more than that.

Mr. Gattuso: Many more. The -- where was I? The specific issue that's been coming up is voice over internet protocol where there's been arbitrage going on, people are providing phone service through internet systems where they don't pay this rather large access charge that long distance companies do. So this is really cutting in to this whole differential pricing system going on in telecom. My question at the end of all this is how do we resolve it? Should there be one price for connecting to the telephone network or should

we try to preserve some sort of differential pricing? If so, how and how do you do that in a political environment? I'll just see if anyone can take over that.

Male Voice: Good question and the FCC has an open proceeding on it. I guess at least tentatively, the FCC has made one ruling that says, if it's voice over internet, but if you're connecting with someone else who's doing voice over internet and that's the business model, then that's an information service because it's pretty much just like email, it's just that you're turning the bits into voice at each end of the computer -- or at each end of the wire -- rather than turning the bits into email messages that you would read.

The real challenge is when you have these folks who are setting up phone lines...

[Tape 3, Side A ends]

[Tape 3, Side B begins]

Male Voice: ... the danger is that ends up essentially being brought under the tax and cross subsidy tent and treated like part of the telecom network rather than being treated as an information service. Intentionally or not, the FCC has created this opportunity to almost create a parallel telecom universe as long as you can get it considered information services that are not regulated. And if the Commission can be persuaded to do that, yes, it's conceivable, but can you see

the local phone companies try to sell everybody DSL and then get people to use DSL to make telephone calls and all of a sudden they've levered themselves out of the old monopoly into being some sort of less regulated information services companies and one of the services happens to be voice service. But, whether that will happen or not, I don't know.

Mr. Gattuso: That was a very good answer. I was hoping we'd come up with a specific solution right here and save us a year of debates, but I don't think we can do that.

Are there any questions from the audience?

Mr. Tabarrok: Yes, Alex Tabarrok, George Mason. Separating the conduit from the content seems to make a lot of sense, but I have a question about transmission, specifically with regards to electricity. When you do that, you need to find some way of providing the right incentives to maintain the conduit and in fact, to invest appropriately in expanding the conduit where necessary. In theory I guess locational pricing will do this, but I wondered where are on actually making locational pricing work, given the issues of the different systems, states' rights issues and so forth. And in particular, we don't have big problems as indicated by the blackout we had recently in providing maintenance and investment in the underlying conduit.

Male Voice: Let me address the blackout first. I think most people who studied the blackout believe that if they had had better markets, the blackout would have never occurred. It was a huge information failure and huge incentive failure on the part of First Energy. First Energy had no incentive to inform people that their system was basically about to go under. And they didn't. And also, they behaved the way they had the incentives, but they behave very inappropriately from a social point of view.

Male Voice: Transmission pricing is a tough nut to crack. It suffers from empty core problems. It suffers from free rider problems, but the basic locational, marginal cost market is doing well in the Northeast, to a great extent, but there's still a bunch of investment problems that need to be solved. And as Dick pointed out, one of the problems we have is not letting the market clear. And there's this tension between letting the market clear with what are appropriate scarcity rents when you run out of capacity and exercising market power. And in California and in Enron, given the fact that we now have transcripts of phone records and everything else of people exercising market power, people now see market power everywhere. And they see scarcity rents as market power. So we have now a long reeducation process to convince people that arbitrarily cutting people off, as opposed to letting them see

the price and decide whether they want to leave the system when it's very hot in August is now a cultural thing that we have to work through, because the cultural issues in California and Enron had set everything back, probably ten years and we'll go back and have to reeducate people.

Male Voice: I just wanted to add something quick to that, just to embellish what Dick said, I think it's absolutely right. [Indiscernible] complicated in a static sense on how to price transmissions. It's very complicated in a dynamic sense. And one of the problems with congestion pricing of locational marginal pricing is, is that in some sense if you let keep the money, what incentive do they have to expand the lines because they're getting congestion rents.

Now the one way of dealing with this, which I don't entirely understand -- just my own limitation of it is that basically generators have claims on the congestion rents so the transmission owner doesn't get them. Which I suppose has some incentive problems, but then of course where is the investment money going to come from and so on and trying to figure out some way to handle all of that with these massive indivisibilities, the lack of core problems that Dick has talked about. When big generators are going to built and when lines are going to go out to those big generators, whether it pays to wait, pays to be the first mover or not, it's a really

hard problem. And I think it's so hard that I believe Jerry Taylor and Peter VanDoren from KATO have a piece saying that maybe this whole thing has just been a mistake.

Male Voice: Interesting.

Male Voice: Let me add a little on that, if I could. I agree with everything that's been said so far. What locational marginal cost pricing will do will give you the price signals that let you know where congestion is imposing a bunch of costs and hence where an investment in expanding transmission capacity makes sense. That alone won't get you the investment, however. And we haven't worked that one out yet. There's a whole bunch of debate about the best mechanisms to use to get the investment, to induce the investment and then in many areas, they're just enormous nimby problems, because the states control this and when you talk about Connecticut, for instance, forget it. The literal Banana Republic built absolutely nothing anywhere near anyone and if you have built it, we won't let you run it anyway. So you get these big nimby problems that affect transmission, the ability to expand transmission capacity at the time that demand and hence, demand for transmission capacity is going up continuously. And then, you just get a combination of political obstacles. I'd start with three very fat and happy ineffectively regulated regional monopolies in the south, Duke Energy and Southern who say

competition's awful, awful, awful, we need to keep this from happening. Why do they say that? Guess why they say that. But then, when you get the combination of California and Enron, wow, they then just grab that and run with it and go with states' rights and there's nothing important that happens in the electricity industry on the state level. It cannot be regulated by states. It's silly. But, you combine the knee-jerk states' rights crap with the power, the muscle of the three ineffectively regulated regional monopolies and give them on a silver platter all that the Enron scandal and the California debacle, I'm afraid that Dick's ten years may be underestimate of how many years we've been set back in trying to get it right. But, in this part of the country it's working just fine.

Mr. Gattuso: All right. Let's try to go through quickly with as many questions as we can and the next one we have is Chris.

Mr. Barnekov: Chris Barnekov of FCC. If we can go back to your original question about telephone interconnection, the open proceeding that Jerry mentioned is a unified -- it's called the Unified Inter-carrier Compensation, NPRM. And the thinking behind it is actually outlined in the paper -- my paper, if I may toot my own horn -- at the bottom of this page..

Mr. Ellig: I set that one up for you.

Mr. Barnekov: And I'm hoping it's going to be online at that link. They said by May 1<sup>st</sup>, but there's been a little regulatory lag. The other point, TELRIC. TELRIC is not marginal cost. TELRIC is average cost. And the statute actually says -- and believe me, I'd be the last person to defend TELRIC, I'm just saying the statute says that the network elements are to be at least at -- the language something like forward looking cost. And there's a very important rule at the FCC imposed by our division of acronyms, which is that any time we put a label on something, that label is never what it actually is. So when we say long run incremental costs, what we mean is every cost.

Male Voice: That helps me a lot.

Mr. Gattuso: By the way, I was warning the panel before we started to reduce to use of TLAs and the three letter acronyms so we'll try to [indiscernible]. Are there any other questions? Fred?

Mr. Smith: Two things. Fred Smith, CEI. One thing is that the fixed rates argument has been both in electricity and in telephones are a real red herring. There's confusion, I think. I think fixed rates to at least economically oriented conservatives and libertarians means that each state has the right to do foolish things to its own citizenry and subject to its own citizenry. But that doesn't mean it can interfere with

interstate and commerce and it seems to me that that difference is in part one of both electricity and telephone services.

The other is, you all talked about network, but in a way, and I've been arguing for some time that a network is a two-part system the flows, the things that move around and the grid, the infrastructure for which is moves. Because we had allowed the grids to grow up in a noncompetitive format, I'd argue because of the progressive era, but for whatever reason, we didn't have competing grids in electricity or competing grids in telephones until technology gave us one in telephones.

We still have none in electricity unless we learn how to broadcast power pretty soon, although we have elements of it in dispersed power, the onsite generation. But, we are now in a situation by leaving the grids either under government control or regulated, we have no incentive to do anything to allow an expanding grid to be in an expanding flow system. We get more electricity generation, but it hits a [indiscernible] grid. Shouldn't we be thinking of a transitional rule that allows competitive grids to emerge in electricity as well as in telephones?

Male Voice: No. It's massively expensive. I mean you'd have to have -- they're only valves on these grids. So you'd have to have completely separate grids. And if you think you have Nimby problems, right now, we have loads and loads of

areas where there's a clear demand for more capacity to move from this spot to that spot and there's already a preexisting over high voltage line. And it is absolutely impossible to overcome the state regulatory barriers to expanding the capacity on that line. Think about what would happen in a world in which you tried to replicate the present grid with a second competing grid. Who in the world would give you permission to construct anything?

Male Voice: Well, I'll just follow up two things there. One is, in my lifetime, indeed I've seen it done, the cable television systems came into Washington and ripped up every street and created a right away to homes throughout this city - - and many other cities in the United States -- despite nimby problems. And on the other side in electricity, when we did deregulate the generation of electricity, we found, despite nimby problems, a massive amount of capacity they include in a system. So it seems to me nimby problems are real. They certainly do create higher costs and more skillful negotiation strategies. But, it looks like when the economic incentive is there in cable and electricity and generation that they happen somehow.

Male Voice: Let me give you two contrasting examples. In electricity, the states cite all the transmission and there's a bill in Congress right now to give the federal government some

authority. The FERC position on citing is, is that they're not franchise monopolies and if in fact an alternative grid could arise we would probably allow people to build it, but I think the cost issues are significant. On the gas side, the federal government has been citing -- or FERC has been citing natural gas pipelines since '38.

And recently in the '80s we had a pipeline called [indiscernible] that proposed to build a line from Wyoming to California. An enterprising company came in and took essentially a crayon and traced over the same route and said we want to build that also. And you FCC folks will remember the Aushbauer [phonetic] Doctrine that people claimed that this was an Aushbauer violation that you couldn't permit two pipelines in the same trench. And we said we're going to permit two pipelines in the same trench. We don't expect them to be built, we expect them to go out and chase after customers. And in fact, a year or so later, one pipeline comes in, has all the customers, the other pipeline basically ended up with none. We permitted it. The rates were essentially negotiated.

In some sense, yes, we did a cost of service calculation based on the negotiated rates. But, I'm not sure that that was anything more than Performa. And we have now, I think, a reasonably competitive entry system in the pipelines and it's

working reasonably well with the exception of the nimby problem.

Mr. Gattuso: So we have pipelines and telecom somewhat competitive and one more to go. And speaking of one more to go, we have time for one more question. So who has a good one to close the panel? Okay. Thank you very much. [Applause] We'll be taking a quick five-minute break before our next panel. Thanks.

[Break]

Mr. Cox: ...your seats. We're about to begin our final panel. By the way, actually there's plenty of handouts that you want to take before you leave, publications and articles that are relevant to this topic and the folders that contain the agenda and the list of citations that have already been referred to that have some articles that you can find online or on your online journal source.

We're going to do a little bit of a shift with this panel here. We're moving to the online world. However, I'm going to challenge this panel eventually to make some analogies to what we've already discussed and to what we can find that's relevant in the offline world when we're speaking about digital software and property panel.

First, I'll introduce myself. I'm Braden Cox. I'm an attorney at Washington. I'm in here in Washington with the

Competitive Enterprise Institute. I work specifically on the Project on Technology and Innovation. I like to describe my work as kind of an intersection of law and technology relating to e-commerce and intellectual property and there's telecommunications and cyber security. It's all blending right now even though the regulations haven't been keeping up and still try to make arbitrarily distinctions.

Now, I had a tough time actually trying to name this panel. Digital Software, Digital Property is not quite it, but neither is just calling it Intellectual Property. Obviously intellectual property is an over inclusive term, includes pharmaceuticals and a whole other host of industries. Some people use it generically to speak of when they're talking about software or any kind of online computer games and things like that.

What it does mean though and what we are talking about with this panel is something that's intangible and it's inherently intellectual. And it's even been described by Alan Greenspan as one that is inherently in declining marginal cost industry in a speech that he gave at the Economic Policy Research Summit at Stanford in February of this year.

I was going to read a little bit of this hear to kind of tee things up. He says, "More generally in the realm of physical production where scarce resources are critical inputs,

each additional unit of output is usually more costly produced than the previous one, least eventually as characterized by increasing marginal cost. By contrast in the realm of conceptual output, much of the production is characterized by constant and perhaps even zero marginal cost. For example... "he says, "... though the setup cost for creating an online encyclopedia may be enormous, the cost of reproduction may be near zero if the means of the distribution is over the internet.

The emergence of an electronic platform for the transmission of ideas at negligible marginal cost may therefore be an important factor explaining the recent increased conceptualization of the GDP. The demand for conceptual products is currently impeded to much smaller degree by rising marginal cost than is the demand for physical products."

Well, some might even go in saying that perhaps we have a market failure when it comes to informational goods. An article on *Financial Times* Online from that they do, which Tom has with us, also participant between Richard Epstein and Eli Nome [phonetic]. Eli Nome actually says, "that a market failure exists when market prices cannot reach a self sustaining equilibrium. Market failure of the entire information sector is one of the fundamental trends of our

time. With far reaching long term effects, it is happening right now in front of our eyes.”

So with that, I'd like to introduce our panel. I'm sure they'll expound on the issues that are facing the digital media property area. First, immediately to my right is Jim DeLong. He's a Senior Fellow at the Progress and Freedom Foundation where he directs the Center for the Study of Digital Property. Prior to this, Jim served as a Senior Fellow at the Competitive Enterprise Institute, as well as General Counsel at the National Legal Center for the Public Interest. He's authored a book on this area, *Property Matters: How Property rights are under assault and why you should care*.

And I'll introduce the rest of the panel too here. To his right is John Duffy who is Professor at the George Washington University Law School. Prior to joining George Washington University, John Duffy was on the faculty of the College of William and Mary Law School. His interests include patent intellectual property law and he's authored numerous publications in this area, including, *The FCC and Patent System: Progressive Ambitions, Jacksonian Realism and the Technology of Regulation*. He has a paper that was on the citation list where he's actually written a paper called *The Marginal Cost Controversy in Intellectual Property*.

And then, finally at the end there is Andrew Odlyzko is Director of the Interdisciplinary Digital Technology Center and is Assistant Vice President for Research at the University of Minnesota. Prior to assuming that position in 2001, he devoted 26 years to research and research management at Bell Labs and AT&T Labs. He may be best known for the first bunking of the myth of the internet traffic doubling every 100 days. The myth that...

Mr. Odlyzko: A little short on that information.

Male Voice: [off mic]

Mr. Cox: Which, is a myth that he ascribes as being inspired by much of the internet problem. He received his PhD in Economics at MIT, where he was a Hertz Foundation Fellow.

All right. Thank you, Jim.

Mr. DeLong: While Braden talked about shifting gears here, but I don't quite see it that way. In a way on this topic, we're just returning to our roots, because there were two roots to this whole long years of discussion now that have gone on at CEI over this issue. One was the discussions of the Microsoft case and of course, trying to come to grips with the whole problem of what should the antitrust laws be in the digital age. And of course when you get into that, you get into network industries and winner take all theories and all that sort of thing.

And then the second was intellectual property. And I began working a lot on intellectual property when I was at CEI and working on it almost exclusively now. And very early you run into the argument, which is, essentially that intellectual property that's digitized should be distributed at zero. And the reason is economics teaches us that prices should equal marginal cost, the marginal cost of distributing intellectual property over the internet is zero.

QED. And then looking at this, you begin to think, well, wait a minute. That can't be. Grasshoppers, ants, all that sort of problem, you do have to produce the stuff. How can economics teach you that? And so you begin looking at what the economists actually said about it and you discover that in fact there is a great deal of talk about how price should equal marginal cost in that narrow sense.

And I might add, I'm not quarreling with Professor Pierce here, but his view of marginal cost is considerably more sophisticated than that the one that's running across in the literature, in the common economic literature, in the textbooks, or in most economic writing these days, which does indeed look very much at short term cost.

But, as you begin looking at this, to things came obvious immediately. One is that intellectual property, which was being treated as quite different from anything else, saying

well, we've had a paradigm shift, it's not like physical goods and everything. That, in fact, is not quite true. It's a continuum in the whole problem of is marginal cost the appropriate pricing mechanism applies to any investment heavy good.

And, for example, the airline is a great example. An airline, if you think about it, when I walk up to the gate in Chicago and say I want to go to San Francisco, if they have an empty seat on the plane, they should sell it to me for I think it was \$15. That's the marginal cost of the fuel.

On the other hand, if you're talking about putting another airplane on the route or flying a whole plane, then another marginal cost. If you're talking about setting up an airline, you have a totally different one. The question is and the thing people fail to mention when they discuss the idea of efficiency requiring the price equal marginal cost is which of those are you talking about. You wind up with a temporal dimension of the whole issue, which really is very rarely discussed and many of the discussion become sort of amusing paradoxes, sort of like the old saw about Achilles and the tortoise whereby you prove that Achilles can't catch the tortoise just by chopping the time down. And so you wind up saying, well, if you take a very static snapshot of the whole thing then at this one point in time, allocative efficiency is

served or the allocative efficiency requires marginal cost pricing, as long as you don't consider the past, the future and nobody has any memory.

This, of course, is not a very productive way of inquiring into economy empirically. And we've been discussing today many of the various areas in which it is not productive. But, I do want to make the point that I think this a very general problem and a general problem with both the professions of law and economics.

If I go to an auto plant in Detroit, you don't say that because it would cost them, what, \$500 to produce one extra car on the assembly line that day that economics teaches us that the price of cars should be \$500. If I go to a stationary store, you don't say they should sell me the pencil for two cents, which is probably about what it should be, because of marginal cost. It just doesn't compute. So then as you begin thinking about it, and of course, I began pitching to Fred about all these things, which of course, gave his usual answer, "Well, you have to read Coase." And then he'd say, "Well, have you read Coase again or did you read him carefully enough?" And all that sort of thing "Read him a few more times."

And by the way, I would like to say there is one article that is not on your list that I think should be because it's George Bentlymyer's piece on the economic problem of fixed cost

and what legal research can contribute. Now, this is prehistoric, it's 1989 and so it's not on the internet in any way, shape or form, but I certainly haven't seen anything that I've found more interesting on the whole topic since, unless you've been busy lately, George. So, if anybody wants a copy, email Braden and he'll send it to you. Or if he's out of town, you can email me and I'll send one to you, because I think it is a very valuable piece that I've always been grateful to George for writing and for talking to me about this.

So what we have wound up with as we work on the intellectual property issues is that we're trying to figure out what is a viable approach that you can defend, because this whole thing has turned into a moral normative argument that it's somehow evil for people to charge money. And you've heard that this morning in the pharmaceutical context.

And so from an economist viewpoint, as somebody said and as I've heard my son, an economist at Berkeley, say, "The system's pretty good. You have the rich U.S. people paying high prices and subsidizing the research. Then they're selling to the poor rest of the world at sort of marginal cost. We'd be subsidizing it anyway for our own sake. And so you can you sell to the poor at marginal cost.

What's wrong? What's your problem?" The real problem is you can call the greed of the rich or anything else you want

to, but the American consumers don't like it. And as we hear, they think well, gee, we ought to get it as cheap as anybody else and they are about to screw up the system quite royally. And people tell me those bills, the betting is, they will pass in some fashion or other and the results may well be disastrous. I'm also hearing stories that people regard the production of open source software, which is software produced on a voluntary basis.

Well, that's the theory actually. There's several billion dollars of IBM money in it, but the myth is that it's voluntary basis. The idea is well you can produce drugs that way. And that will be a substitute for the market.

But, what's going on in intellectual property now and particularly in music and movies is that they're fighting a three front war. One is they're simply trying to defend their right to charge money at all, as against the idea of zero cost files for sharing. The second is they are trying desperately to establish mechanisms for differential pricing. And that too is creating a stir, because people, again, don't like differential pricing. And you will get like from the Library Association and such, you will get all sorts of charges about what they're trying to get is per use pricing instead of you just buying the thing.

Well, from my standpoint, and I'm not an economist, I've been accused of that sometimes, but I'm really not. But I used to hang out with them in Budget Bureau years ago and sort of after a while they're babbling began to make some sense. And from my point of view, if I, instead of buying a book for \$25 could buy a right to read it once for \$2 or if I wanted to read it ten times, \$50, I'm better off. There are very few books I read ten times. A lot I read once, a lot I read half of. I think per use pricing is fine. People are objecting to it. We're getting a lot of debate about this, especially from the academic left.

And then finally, you have this odd phenomenon called the Free Culture Movement, which is profiled in the *New York Times Magazine* a couple months ago now. And they really do buy off on this philosophy that you should distribute things at zero cost and then find some other way of funding it. And the latest way of funding it is you'd levy a tax on hardware or maybe connectivity and then the government would divvy up the money among creators, possibly according to how many times things were downloaded.

There are problems with this scheme I might add and check our website. Our website is [ipcentral.info](http://ipcentral.info), by the way. And we have an article out by Stan Leibowitz now, which discusses this. There's one on the KATO website that Wayne Commissioner

Adam by Robert Mergus [phonetic], which discusses this. But, it's a very live issue at the moment and a very important one for people who are trying to find alternative schemes. All of which somehow involve the government. And if this is enough to depress you, read one of Tom Hazlett's articles on the FCC in its 50 years of suppression of new technology and just imagine what would happen if the government were in charge of music and movies and that sort of thing.

My time is about up, so I will stop there simply by saying that the issues here, I think there is a strong continuum between just the ones we've talked about in the IP and other issues as well. And I also think that one topic that hasn't been discussed much here is the problem that was seen by the 19<sup>th</sup> and early 20<sup>th</sup> Century Progressives, which was in fact the phenomenon of destructive competition, which was these people are going to get driven to marginal cost, they're going to destroy each other; therefore, we have to regulate.

And there still is a problem in that it may well be that people, like in the airline industry example, that people will get driven to destroy each other and that perhaps we need to rethink the antitrust laws so that in fact people can avoid that in some fashion. And we might want to -- instead of the thinking of the antitrust laws as an alternative to regulation, you might want to think about serious modifications in the

antitrust laws as a way to avoid regulation, because otherwise, we're going to wind up with it in many areas. I'll stop there and let the real scholars discuss things now.

[Applause]

Mr. Duffy: I think I have a PowerPoint presentation. It's supposed to be coming up. Hopefully it will keep you awake a little bit, because I know it's getting late. I'm going to talk about intellectual property and natural monopoly. I think actually I'll really be -- at least the initial points I'll be making are just followed directly from the talk that precedes me.

The most basic points are, I think, quite familiar to everybody in here. You might think of the 20<sup>th</sup> Century natural monopoly problem as just electricity is some sort of huge fixed cost of so-called heavy industries, lots of money for that and then that gets transmitted somehow. And there's actually a very small cost for each additional unit. That's a sort of 20<sup>th</sup> Century natural monopoly problem. It may no longer be true actually.

Dick Pierce has said that electricity is largely competitive for a variety of reasons, because the fixed costs basically aren't that heavy anymore compared to what can happen here. Nonetheless, that I think was the 20<sup>th</sup> Century paradigm. The 21<sup>st</sup> Century paradigm I think is thought, right. That's

what we've just said here. The thought. But once you make thought, you spread it out as Chairman Greenspan said, spread it out on the information highway and then of course to be used by industry and this is slightly different, perhaps actually at zero marginal cost, very close to zero marginal cost.

Now, what I'd like to do is or I think what we're trying to do is actually include intellectual property into this general discussion that has been going on now for probably about a century is to come up with a grand unified theory. I actually majored in physics actually in college. And I majored in it originally because gut was actually slang for an easy course and I heard that physicists were really interested in guts.

So I thought this would be good, but then later, several years later I found that it wasn't the same kind of gut. But anyway, I did learn enough to say if you're going to construct one of these things, the first thing you should is look for similarities, symmetries is what physicists like to call them. Things that are the same, they look the same. And I think we've outlined basically the declining average cost aspect, the low marginal cost aspect, which actually is the same between 20<sup>th</sup> Century industries and 21<sup>st</sup> Century industries.

Now, actually if you want to come up with a grand unified theory though, you can't just come up with symmetries actually,

because then you'd say everything looks the same. And then you'd be immediately pressed with the question, "Oh, yeah? Well, then how come we've regulated these two fields in radically different ways?" So you have to come up with some broken symmetries or complexity where things just don't look the same between the two fields. And that I think is as interesting -- I think this problem is as interesting, the broken symmetries are as interesting as the more general similarities between the fields.

Now, we all know from possible solutions to the natural monopoly problems. I think the best summaries, of course, probably the best thing you can look at in many things is go to Freidman. And you have state ownership, private monopoly with price regulation, or just unfettered private monopoly. Those are the three choices.

Freidman, of course, favored the third, being somewhat [indiscernible] where state ownership was generally thought to be the European solution and private monopoly with price regulation more the United States solution.

I'd like to make just a slight -- you may need to generalize Freidman just slightly actually to discuss intellectual property. There's still state ownership or equivalently public domain, which I think is equivalent to state ownership with a subsidy. And that's what a lot of

scholars have actually suggested recently. And then actually regulated or I think the best way to think about this is partial property rights. Actually, regulation being only one form of a way in which property rights can be restricted and there are several other ways I'm going to talk about. And then there's unfettered private property monopoly.

I think actually the choice; the most interesting choice in intellectual property is the choice -- for me -- is the choice between two and three. The question of why don't we have just simply absolute property rights in intellectual property? Why aren't copyrights infinite with no fair use restrictions? Why aren't patent monopolies infinite? And there is also a fourth choice, which is no property rights. And that course is actually the very beginning of today's talk actually by Coase, who actually said that Arnold Plant, his teacher; whom you might think was probably a pretty good teacher, right, if he taught Coase whatever he knew.

Arnold Plant actually thought this was the solution for intellectual property because he thought that there's always a first mover advantage and maybe, maybe that would work things out. And I think you don't hear that too much anymore. Mainly because it would be surprising if nature just worked itself out, that just so happens that the first mover advantage, whatever it was, and it varies in time, whatever it happened to

be, that just happened to be the optimal period of exclusivity in order to provide for the efficient level of investment in intellectual property.

No property rights, people do talk about that today, but usually they're talking, usually they do at least address a subsidy is needed. So really that pulls folds back into the first illusion. I should say, and this is just a small footnote, but actually since we're talking about Coase so much today, in fact, actually there is a solution in which no property rights actually works out.

There are a few times in intellectual property when no property rights is actually the efficient solution. And this is just perhaps a footnote, but you might find this interesting. But, actually if you live in a Coasian world, no property rights is an efficient solution. You don't need intellectual property rights in a Coasian world, because of course, transaction costs are zero so you can simply contract with all the users, both today and in future for your intellectual property and they will provide you the efficient incentive to actually do and they can also contract with competing inventors and you'll get an efficient solution. That of course, actually tells you that that might just be a theoretical solution.

Now, there are various schemes of partial property rights. There's price regulation and I think that temporally limited -- well price regulation, an interesting thing is that we see this in both heavy industries of the 20<sup>th</sup> Century and you might think that we don't see it that much in intellectual property. We do a little bit. It's still there. But one of the sorts of broken symmetries of these two fields is that we don't see too much price regulation.

I throw up the Canadian flag here because in fact, part of the reason why drug prices are cheaper in Canada is in fact, because Canada, like other nations, has a patented medicine prices review board or something similar to that, some sort of administrative price regulation directly on pharmaceuticals, which is a type of intellectual property price regulation. Temporally limited franchises that are the patent solution. There are some symmetries here. Actually you still see the old 19<sup>th</sup> and 18<sup>th</sup> Century bridges. Actually the Euro Tunnel is actually temporally limited franchise that was given to this company in exchange for building the channel tunnel in Europe.

Note that there's symmetry here or extensions. The problem with getting continuous extensions of your temporally limited franchise, which has most recently occurred in the copyright area. That's actually a problem that plaques the bridge cases and the Euro Tunnel, the Euro Tunnel has been --

its franchise after its initial grant was expanded several times, mainly because the investors were losing their shirts on this. So there's a symmetry there that actually the temporally limited franchises a solution, but it has this problem that in fact, actually the extensions seem to be a problem, except in patents. Now, I don't know exactly why that's true. Maybe we can discuss that a little bit in the discussion period. But I'm not exactly sure why extensions don't seem to plague a patent area.

Finally there's auction franchises. I actually have the Demsetzian Proposal, "Why Regulate Utilities?" a very famous proposal that you can actually auction off the exclusive franchise instead of actually engaging in price regulation. In general that's been viewed as a failure in cable TV and other areas, C. Williamson.

I have an article coming out. It's actually at the printer right now, which actually says that patent races, there is a symmetry here. Patent races actually are a lot like under some fairly modest assumptions, they're actually a lot like the Demsetzian auctions, because the key insight is by racing earlier in time, the monopolist is actually also racing to diminish the royalties, the stream of royalties, because the earlier in time is also the earlier termination. It also pegs the termination of the patent. So there is actually a system

of auction franchises in the intellectual property and I think it actually is patent racing.

But the key question and I'd like to actually just close on this. The key question for me, is why not permit unfettered private monopoly or in other words full property rights? I think the traditional reason in the 20<sup>th</sup> Century in sort of regulated industries has been the static reason, which is we're trying to minimize deadweight loss. That is the key reason why we engage in price regulation and all these other tricks that we're trying to actually diminish the deadweight loss.

One problem with this is that price discrimination would also accomplish this goal. Maybe that's not a problem; maybe that's just an observation. But in the patent and intellectual property field, there is a large literature, which suggests even if you have a perfectly priced discriminating monopolous, you still actually want to have a limit on property rights. You still want to have actually a limit on property rights and this is really the dynamic reason.

In fact, actually, you have to limit property rights, because otherwise, you'll get excessive racing. This goes back to the destructive competition point. It's not actually that people will be driven out of the industry; it's instead that there will be over investment in trying to capture the monopoly. And patent racing is one example of that. Another

example is, of course, gold rushes in psychical property. So this is actually, I think, a separate reason why actually we want to limit property rights.

Now that's not to say we should give no reward for intellectual property, but it is I think interesting that the one reason, static reason seems to dominate in the traditional regulated industries, but the dynamic reason seems to be more important in intellectual property. Thank you.

[Applause]

Mr. Odlyzko [non-native English speaker, hard to understand]: Being the last speaker of the last panel, I expected that most of the thoughts I might want to mention here might have been made by others. That seems that was indeed the case. So I threw together a few ideas that I might mention and also race through them. But first I'll raise up another issue, which I didn't put down on my slide, which arose today especially in Tom Hazlett's presentation, also in other discussions and this relates to the discussion that Tom and I had last night, the dispute about cable TV networks.

Basically his view and I don't have time to go into the full details of where we did vary in our evaluation, but his view is these guys are really brilliant, they've built up \$300 billion market capital of the companies, they really have optimized everything. Of course, my attitude is well; people

often make mistakes, often very stupid in what they do. Moreover [indiscernible] free markets can be inefficient for very long periods of time, when people don't realize what's going on.

And let me just cite an example. It's not an argument for regulation, because I'm not claiming that regulators are smarter necessarily, unless of course you make me the dictator, then that's a different story. But, if you just remember Tom's presentation about cellular carriers, he mentioned some statistic number of users and volume of usage. If you do the mental arithmetic, you discover that in the United States, the average cell phone is used for about 15 minutes per day.

The interesting thing which hardly anybody is aware of and fewer people are aware of the significance of it, if you look elsewhere in the world, typically the average usage per cell phone per day is about 5 minutes. That's true in England, that's true in Japan, Finland, Denmark, et cetera, South Korea is somewhat higher and so on.

Another interesting thing is, if you look at statistics of daily usage in the United States, say through the early '90s, it was about five minutes, maybe trending down, up until the middle of 1998 when finally something happened and units started going up. And basically it has tripled over the last six years. Okay. What's the significance of it? Well, one

significance is now substitution. Why is substitution for [indiscernible] is becoming [indiscernible]. Typical household wired phone users about one hour per day, 20 minutes is internet access and that's over several people et cetera, but as long as you're using your cell phones 5 minutes per day, you're not going to substitute for your wire line phone, which is used for an hour per day. When you're up around 15 minutes, it now becomes feasible.

Why this big difference? I said hardly anybody knows it. Even wireless industries usually don't know it. In Europe, the wireless industry managers who do know about it, in general seem to think that American carriers are irrational by giving out their minutes too cheaply. Now what's going to happen, what happened six years ago, AT&T Wireless introduced additional one rate plan.

[Tape 3, Side B ends] [Tape 4, side A begins]

Mr. Odlyzko: ...introduce a plan. They didn't realize what they were doing. It was very controversial inside. They thought maybe there might get 100,000 users for that plan. It totally changed the industry in ways that most people are not aware of. This is an example of what I regard as irrationality. [Indiscernible] has great precedence.

Go back and look at history. I see the same mistakes being made by industry over and over again going back to first

centuries, [indiscernible]. The true value of flat rate or semi flat rate plans like market pricing plans have never been truly absorbed by the industry. AT&T, my former employer in particular has had at least half a dozen incidents where it had to relearn from scratch this lesson.

They learned them [indiscernible]. They relearned this in the 1970s when they tried to measure charging for local service. They learned it again in the 1980s with the Reach Out America Plan. They learned it again in the 1990s with the World Net Internet Access Plan and AT&T Wireless Additional One Rate Plan and more recently with Flat Rate Long Distance calling. Basically markets are going to stay rational for quite a while. So, that's kind of a main argument that I have with Tom Hazlett's approach.

But now let me go on to some of the other issues. So in talking about intellectual goods and declining of industry, my view is yes, there are some problems, but I'm not sure they're all that serious, because while there are some difficulties that we're facing, sellers are increasingly in possession of very powerful tools. In particular, [indiscernible] let's look at one particular industry, [indiscernible] intellectual goods [indiscernible] goods, and mutual funds. Okay. What are they selling? Well, they're selling their ability to shuffle

[indiscernible], necessarily what your investment represent.

[Indiscernible].

Over the last 25 years, the industry grew about 100 fold in terms of volume of investments. The number of mutual funds grew about 10 fold. So the average size of a fund grew about 10 fold. It's several thousand, over 5,000 or 7,000 mutual funds to very competitive industry, lots of data available in newspapers about not increasing the online. There are all sorts of services, which will let you compare and all sorts of modeling comparative [indiscernible].

An interesting thing that even if you disregard these really fraud [indiscernible] market timing or [indiscernible] and other kinds of things, the [indiscernible] average expense ratio during that period while the size of the fund has grown and the [indiscernible], average expense ratio went up, almost by 50 percent. Where's the problem? Okay. Here you have declining marginal cost industry with buyers supposedly having all these powerful tools as [indiscernible]. Industry seems to be doing quite well. What's the problem?

In general, kind of my argument is that as we move on towards greater predominance of intellectual goods and also greater predominance of declining marginal cost industries, you have your tools developing in particular price discrimination is becoming easier. Yes, people can find out about it to some

extent. On the other hand, the sellers have tools, [indiscernible] that can find out about who needs to pay and moreover they can prevent arbitrage, having more control of what is done. And that is certainly true in the software industry. So, in areas such as software, what we increasingly have are tools such as additional rights management, which controls what you can do.

And moreover, moving increasingly towards services. Just think of Microsoft. Microsoft, well, they sell you these [indiscernible] and there are all these [indiscernible] out there, or the bad guys. If you leave your system without patches unexposed on the internet, they can quickly [indiscernible] it. So therefore you had better buy one of the service plans.

Well, so therefore now you're supplying a service. Now you have to be in constant communication. Piracy of Microsoft software, well, it's a problem in offline worlds. You buy a disk; install it on a bunch of machines that could be dangerous. But if your machine has to stay in constant communication with Microsoft to get all the security patches, every day or every hour, et cetera, it becomes much less of a problem. Moreover, in this environment, how much they charge you for a service can start varying, because now they can say, ah, but your daughter has been looking out for Britney Spears

videos that she's been downloading all these nasty viruses, et cetera, we're going to charge you more for that. Well, is it because they're going to charge you more because it costs them more or because they think you can afford to pay more? It's much harder to tell. It has much more control and do a lot more.

Some other things to mention, in the online world, especially with information goods, signaling have become much easier. Just a number of things that already occurred that were noticed about 15 years ago with airlines. This was pre-internet era, but in the era when travel agents had online access to fares. But it was observed that some airlines would be announcing say at 2:00 Sunday morning for about 15 minutes they would advertise that [indiscernible] from Washington National to Boise, Idaho. What was the fare doing? They have extra capacity to Boise just for 15 minutes or were they doing other things? And so FDC stepped in and imposed some rules about these online fares having to be available for a certain number of hours for a number of seats, et cetera, et cetera.

And more recently we've seen it with [indiscernible] California, the electricity problem. There was a lot of signaling and a lot of it may not truly have been illegal. And this is particularly clear in spectrum auctions. In the record that we have and people have started it and you have started

its effect, it's very clear that the various players -- I actually worked for one of these players who in basing these games can do a lot of signaling. Think about ten years ago if you observed [indiscernible] for a particular spectrum license, which would be \$95,100,723.51. Where does that 51 cents come from? Well, it turned out that they called it license number which was sending a signal to a competitor's [indiscernible] unless you cough up these licenses I care about, I'm going to hit you where you really care about. And so if you look at the more recent auctions of rules, they are increasingly elaborate. The British don't get to choose how much they bring [indiscernible]. And it's an ongoing game between the FCC and the bidders as to what can be done and the problem is it's very hard to do.

It's hard to stop people from doing things [indiscernible] own interest. Certainly they go into a smoked filled room in a hotel and agree on how to [indiscernible] not to bid against each other. You can put them in jail. But if they develop a language inside the system that you have set up, without any direct communication between them, is that illegal? Can you possibly make it illegal? It's very hard to do.

So, let me just end that basically the conclusion is yes, we are moving into a new world. Declining marginal cost [indiscernible] enforced us towards greater price

discrimination, but technology is offering a lot of tools, so even without any changes in laws, I think sellers will be able to do a lot [indiscernible]. So thank you very much.

[Applause]

Mr. Cox: Well, thank you very much. I'd like to start off by asking a question to the panel. It seems to me that it might not be so much that intellectual property laws themselves are being challenged by the ability to copy individual media technology that exists right now. It's the ability of companies to be able to package their products and to price discriminate or differentiate and do to so in a way that consumers will accept.

Let me just say that I'm a pioneer when it comes to downloading music. In the earlier and mid '80s I sat with my tape recorder listening to Casey Casum Top 40. And they would always say well coming up next is so and so's song and that's the song that I wanted to hear. And I would dutifully try to get -- and I got really good at knowing when that song would come on and try to cut off all the overplay that the announcer would say. And to this day I'm very good at Name Your Tune, because I knew right away when to push the record button.

However, the record companies weren't interested in me at that point in time. It was hard for me to make a copy of that. The sound quality was not that good and inevitably I made

mistakes. I taped the wrong song and I'd have to rewind and record again and while I was doing that the other song would come on. And I couldn't mix. I couldn't share on mine. I can do all that now if I want, and more.

The laws have changed in some ways. We have now the digital updates of copyright, which they call the Digital Millennium Copyright Act. And the more and more I look at that actually, the more and more I think maybe what the Digital Millennium Copyright Act is intended is to allow companies to price differentiate and to package their products. One way of doing that and this is brought up in the courts and I actually don't even know the resolution to this. It's the inkjet printers.

There was a case, I think was actually filed in court, where the consumer group had sued saying that -- or I think it was Epson had sued a manufacturer that made refillable inkjet cartridges that would fit into Epson printers, but weren't Epson owned and weren't produced by Epson and they filed under the Digital Millennium Copyright Act and I'm not sure of the resolution, but I'd like the panel to talk about that. But, in particular, there are specific laws that exist in intellectual property that I think that are still untested at this point and I'd like to see what the panel's view is on that, given that we have two lawyers up here, on how products might be getting to

consumers and the different ways in the future utilizing the laws that we currently have.

Male Voice: Well, could I take first crack here?

Mr. Cox: Yes.

Male Voice: It was Lexmark, not Epson.

Mr. Cox: Okay.

Male Voice: But that's just the old Xerox tying case, which all the antitrust lawyers know. And that is Xerox had the idea of tying supplies to the copiers. And the idea was that they could sell or lease the copiers cheap and then you bought all your paper and so they price discriminated according to usage. And the printer cartridge case is essentially the same thing. They want to be able to sell your basic machine cheaply and then charge you price discrimination prices by tying printer cartridges.

And you get the same problem going on with games where people want to be able to sell the games cheaply and then charge you premium prices on the different cartridges that fit into them. And it's really your question is whether you want to force people to simply have one price, to raise their prices on their printers and then have open competition on the cartridges or whether you just want to leave people alone to do what they want. And then somebody else can sell printers however they want and Lexmark can sell it how it wants. I

suspect I know the CEI answer to that one. And on the price differentiation issue; yes. First they're trying to charge it all. That's one issue. And the second, they are trying to manage digital rights management so they can price discriminate.

Mr. Odlyzko: Yes, I totally agree. So this was Lexmark versus static controls. And basically Lexmark [indiscernible] and so on. So by law, Lexmark could not require users of their printers to use Lexmark cartridges. They try to do the same thing for technology. And it goes very much along with what I was explaining, and you have technologies offering sellers ability to do things, which they could not do otherwise [indiscernible]. And I think that's quite common, contract lock and the [indiscernible] to do it. And we have examples were it's certainly beneficial.

One example is the movie industry and Blockbuster where by the change in leasing system, so instead of Blockbuster having to buy videotapes, they can essentially lease them from Hollywood and there people have demonstrated that everybody has the benefit, both Hollywood and the public, as well as Blockbuster.

Mr. Tabarrok (?): I just have one small comment on that. I think one important point that people should take from, actually Andrew's talk here, is that in fact, actually,

although people on the internet often like to say things like information wants to be free. Marginal cost of information is going down, down, down. And they also say things like information is the public good, which is either absolutely wrong or is so -- it's just a meaningless statement because it's so -

You have to define public good fairly broadly. But, I think the important thing to say is if information did want to be free and if information were free, we could price discriminate perfectly. And we could also catch all downloaders, right? Because the minute I download a Capital record, Capital would know, right? So in fact, actually it's not at all clear, as information costs sort of spiral down, which direction, whether it's going to favor the people who want to protect privacy, which is to protect a certain category of information. And then sort of wall themselves off from price discrimination and from enforcement actions. Or whether it's going to actually protect the manufacturers better.

And the only other thing I'll tell you is that we still are left with the point I ended on, which is if you can perfectly price discriminate, at least our patent system tells us and we shouldn't ignore this teaching, that it's not at all clear that we want to give out full property rights. Where even though there's no static inefficiency, if you have a

perfectly price discriminating monopolous, it's not at all clear that we want to give out complete property rights. We don't in the patent system, even in the class of patents where we assume there is no deadweight loss, no static deadweight loss and there is a class of patents that people think don't create static deadweight.

Male Voice: Well, one thing to remember and that is it's a mistake to assume that physical property rights aren't leaky. I remember 10 or 15 years ago two economists named Larry Summers and Bradelon [phonetic] wrote a paper in which they found that the amount of social return from investment was approximately, I think it was double what the investors actually accomplished after it was appropriated. And so in fact, you have a mint leakage in all these systems and it's probably a good thing, as a matter of fact. And so the fact that intellectual property rights are leaky is a good thing, I think.

Mr. Odlyzko: The argument for giving people full property rights is that it's so much easier to do contracting today. It would be very hard to give [indiscernible] complete rights, because then somebody living in Paris would not have an easy way to negotiate with [indiscernible], et cetera. Today you can say well, [indiscernible] it's very easy to do. But, in printers that's not so, because of the complexity or the

difficulty that the sellers have in determining what possible users or what their user could be. A simple example, I tried to contact a New Yorker for permission, which I did contact a New Yorker for permission to use their famous cartoon, the one on internet, nobody knows you're a dog about 10 years ago and so on...

Male Voice: The first person ever to ask them for permission.

Mr. Odlyzko: Because [indiscernible] for doing it. Basically you send email or a fax to a particular number or email address describing which cartoon you wanted to use, how you want to use it and then they'll tell you what you're supposed to fill out. In my case, it was going to be for a presentation at an academic meeting, a nonprofit situation. And then they came back to me, again price discrimination; it's clearly individualized pricing. Somebody looked at it, there was a name signed to the email message, et cetera, saying I think \$50 per year is what they wanted from me. And I said no thank you. I'm a cheapskate academic. But...

Male Voice: It wasn't good price discrimination, was it?

Mr. Odlyzko: No, it was not. That's right.

Male Voice: Did they bargain?

Mr. Odlyzko: Sorry?

Male Voice: Did they bargain and come back with a lower offer?

Mr. Odlyzko: Well, I didn't respond. I should have tried it, but I did not. The argument is that it's very difficult for them to determine what's happening. And another example where I have discussed it, MIT has now decided to have their open cost system. They'll try to have cost materials for most of their lectures available for free on the internet.

Now, this is not totally out of pure generosity for the world. I think they are feeling they are going to [indiscernible] in their competitive advantage and become, developing a better brand, et cetera, et cetera. But now these cost materials often contain the copyrighted material, which by copyright law it's legal to use inside of AT&T for cost purposes, but you cannot simply put it up on the internet for the world to use. So therefore to put it up, therefore the world to download, they had to get permission from copyright owners. And that would be a major stumbling block.

About a quarter of their effort in developing this material has been negotiated with copyright owners and perhaps even a bigger section of the effort goes into something that is not fully accounted for, creating substitutes for the copyright material they cannot negotiate for.

Again, most of the time, you look at it and say it's not going to make any money for those guys, because [indiscernible] extremely sensitive to it and I have examples of the numbers the copyright owners demanded for very trivial things, like a stand up for a poem to be cited and this was really ludicrous. So they're not getting it, the owners are simply not being very rational. They're not [indiscernible] and it involves very difficult transactions on both sides.

Male Voice: Well, there are lots of problems in establishing markets here. And one story you can get from the music industry is that the rights are so fragmented and so uncertain that the transaction costs are aments and also, nobody knows how to value anything. If you read a book on music copyright or music rights, you'll find that there are very well established things.

People know how much to charge. Lawyers know how much to charge. But for the internet, they don't know. And so every time you try to get something up on the net, as one of the guys said, the artist regards the opportunity to renegotiate everything. And there are a million songs. And it took Steve Jobs' clout really to get the thing going. Sort of the immense value of Jobs' prestige in getting I-toons going and really getting people to be willing to put stuff up. It turned out to be very important.

And what Andrew says is correct. You have these problems of academic rights in negotiating. Also, one thing that's distorting the field is a lot of law professors seem to have a guiding principal in the whole thing, the idea that academics should get everything for free and that sort of animates their legal views. I have not figured this out yet why this should be a moral imparity.

Mr. Cox: I don't know if we have any questions, but feel free to ask.

Ms. Berry: My question is about the possibility of price discrimination in a competitive market? Can you hear me now?

Mr. Cox: Yes, thank you, Anne.

Ms. Berry: My question is about the feasibility of price discrimination in a competitive market. The SEC did a study explaining the rising cost numbers for the mutual fund industry and they broke up the industry into the types of securities that were being purchased and the types of customers and they showed that securities that were more expensive to trade in, like international securities were coming more into portfolios and consumers who were more expensive who had smaller accounts or required more marketing were coming into the industry too. So it seems not so hard to come up with a story for how that competitive industry is not successfully price discriminating, but is just pacing different sorts of costs.

In the internet world, it seems like the information that's available and the cheapness of the information that's available to consumers might make price discrimination harder and we heard about that this morning with the airline ticket-pricing story. And so I'm wondering why you think it's easier for firms to use the information that's on the internet to more effectively price discriminate against consumers when consumers have the same advantages, cheaper information available on the internet and it makes it harder for the firm to price discriminate.

Mr. Odlyzko: Okay. Well, it'll be a long story. I wrote something about it in one of my papers on privacy and price discrimination, but to give a very quick answer, I see lots of examples where it's happening. Airlines are a good example, as some that were cited here. If you show up at the last moment, ask for a walk up fare, this is the very highest fare, even though the marginal cost of putting you on the plane is very trivial, maybe \$15 or so and so by conventional economic doctrine, airlines should sell it to you for that price. No they don't, because they know from general expectations that walk up passengers are the ones with the highest willingness to pay and so they might charge you \$1,500 instead of the \$15.

But we have lots of examples from history of competitive markets where there is extensive price discrimination. One of

the [indiscernible] ones is American physicians. Up until a couple decades ago, they had graduated scales of fees, depending on the wealth or income of the patient. So this is not charity [indiscernible].

I'm not talking about a free clinic offered to the truly poor, but a separate fee schedule for the lower middle class and upper middle class. And the economists have studied this, there is quite a literature on it, concluded that this was [indiscernible] practice on their part. There are other examples as well. I've been collecting such stories, interviews with a TV repairman who was explaining how the rate he quotes for fixing TVs depends on how wealthy the household is. He's one of many people in the competitive industry that manages to price discriminate. So I think that's quite common.

Essentially what we see also is with car salesman. Certainly every time you have a salesman involved in negotiating a price, there's price discrimination.

Male Voice: What's a little bit different I think in the intellectual property is the intersection of price differentiation and fair use rights and digital rights management. Digital rights management is essentially, in my perspective, is the equivalent to what Voice Over IP is in the telecommunications world in a sense that it's bypassed current regulatory structure, although fair use rights is a judicial

doctrine. You may only be able to, if you buy a CD or a DVD, actually is what the future might be, you play it once and it'll self destruct, but that will only be a dollar if you'd like to watch it twice, it might be two dollars. If you'd like to keep it and store it on the shelf, it might cost you \$10. You might not be able to make a backup copy of it though and that's something that generally most consumers feel they should be able to do in what they would consider to be fair use. This is a consumer problem, but it's a contractual issue and that's what digital rights management essentially is. I know Andrew mentioned that on his presentation.

I actually went to a conference on this. Coase and Telser would be proud. I went to a conference of technologists and practitioners within the industry. I think I was the only Washington, D.C. policy person there. And this is their holy grail. This is their savior. Digital rights management is something that's being invested upon, not only in the consumers' faith, but also in the business world to track documents and comply with the TIPA and Sarbanes-Oxley and lots of other regulations. Go ahead, Fred.

Mr. Smith: This is for Jim particularly, but all of them. We've been talking all day to day about industries, sectors of the economy that are facing declining costs and how do we come up with a viable pricing model or financing model. And

intellectual property categories are different in that there the government has explicated created a mechanism intellectual property rights, to ease the problem of gaining revenue for creative acts. In all the other areas when you try to create a monopoly to do that, you can [indiscernible] antitrust violation. It seems like there's a difference in the way we treat -- well, there is a difference in the way we treat IP products and other problems with similar types.

The first three panels today you created a curtail to try to limit the sale or if you held the price up, you'd be guilty of an antitrust violation. In the IP you have the right to do so.

Mr. Odlyzko: Okay. If I could respond to it, to some extent that's two areas of hard physical goods and intellectual goods can be intermixed. In particular, the intellectual goods components, like a software component of hard goods is increasing. Producers are taking advantage of it. It's a very simple example from a telecom crash, you still can buy [indiscernible] very cheap on the internet, through EBay, for example, sometimes for two or three percent of the initial list price. What took a while for the industry to realize is that buying the box didn't give them extras to the operating system for the box that was licensed? The [indiscernible] operating system, which was absolutely crucial was licensed to the

original owner. So now the new owner of the box had it very cheaply, but they had to go and buy the operating system at list price and so the savings pretty much evaporated. And you can do the same thing with other goods.

Male Voice: But Fred, you don't -- you get legal monopoly on these things, but a number of times you get a real economic monopoly is very limited. Copyright is almost zero and even patent, nobody understands patent law, that's why everybody talked about copyright. But even patents, apparently people who know indeed manage to [indiscernible] and all sorts of things.

Mr. Cox: Well, since I actually have a casebook on patents, I think I'll -- it is true that actually lots of patents actually are complete. The example that I like to use is in fact is actually the sleeves on coffee cups. Actually there are three or four of them. The ones at Starbucks, you go get a little paper sleeve, actually there are three or four different patented things. They're slightly different. And they compete against each other. Now, if they don't hold price above marginal cost, then you should abolish the patent system and that's something where you don't want the patent system. It has to be holding price above marginal cost. But there's still some competitive restriction on how much they can price it.

So I think actually if you ran it through let's say the antitrust guidelines, you would find that they don't actually exercise a monopoly. In fact, historically monopoly has had at least two definitions. One, just sort of meaning exclusive rights granted by the government and that, of course, every patent fits. And then there's the more sophisticated economic definition, and that most patents don't fit, because there's usually a significant amount of price competition on it.

But I would say also, the analogy, the right analogy with physical property is not actually creating a cartel and that's the right analogy. I think the right analogy is property rights. That's what you're getting with the patent. In other words, the no patent solution is equivalent to saying if you build a nuclear power plant, you don't have it. It's not yours. It's the communities. And it's very easy to say then why we don't have the no property rights solution in heavy industries is because no one thinks that nuclear power plants rain down from heaven like Manna.

But there is a set of cases that perhaps, perhaps in some case, with certain ideas, we do think that they will arise exogenously and in that case, actually, I actually support and I'm writing on this that patents shouldn't occur. Generally it's consistent with the standard patent law ideas that we generally call obvious ideas. And there may be a few other

situations. But that I think is the right analogy to draw between the physical property world and patent world.

Male Voice: Yes. Well, there's an issue coming up now that I'll stand [indiscernible] correction on this, because I certainly have not written a patent case, but I was reading a book on 19<sup>th</sup> Century railroad regulation and it was saying that they sort of evolve the patent concept that something that wasn't quite obvious, it was sort of in the air. That things were going to be invented pretty quickly. And they tended to deny patents on a lot of [indiscernible]. You almost have the similar thing going on with the internet. [Indiscernible] and it's not clear that you really want the 20-year time.

Mr. Cox: Exactly. I actually gave a talk just a couple weeks ago on a patent reform conference, they're sort of popular these days, so it's full employment act for patent lawyers. So, in fact, actually, if you do an economic model of this and you try to calculate out the optimal patent term, as long as you have a steady state or sort of constant growth of small percentages or a small decline in the cost of creating some invention, you can come up with patent terms that are basically just what we've had. But, if you actually have a cost of inventing going from high to low really quickly like within a year or six months or something like that, then clearly a 20 year patent term is clearly inefficient. Or you

can say the limit of that is if something is infinitely expensive to invent today but will be free tomorrow, [indiscernible], in that case, it's obvious that a 20 year patent term will just get you 20 years of output restriction and no benefit whatsoever to society.

And from that you get this idea that in fact actually the areas where you want to enforce the so-called obvious [indiscernible] particularly where the cost of innovating might be falling very quickly. And internet patents and things like that, software patents, actually where there's been a lot of controversy in the patent system, those are areas where in fact, actually it's not so much that the patent system should not be there, but you have to enforce the doctrine of the patent system relatively vigorously, which we're having some trouble with.

Male Voice: Yes.

Mr. Cox: And maybe even have different time frames for different technologies.

Male Voice: There are people who have written on that.

Male Voice: I think that's a bad idea.

Mr. Cox: But it's an idea. I think that judges should try to come up with the grand unified theory and say that the reason why it's a long term is because it's a bad year or why we have to be careful here is because we would expect a lot of

obvious ideas to crop up in this area. And that's a general phenomenon. So whenever we see sort of exogenous growth in the technology very quickly, we should actually be very careful about granting patents, rather than just trying to say software will try to limit it, because as soon as you legislate that, then the industry changes.

Male Voice: And they call it something else.

Mr. Cox: That's true. We have time for one more question, if there is one. James?

Mr. Gattuso: Actually I had a very general question based on Jim's comment at the beginning, which I know he's been talking about for a couple of years now. Why is it that economics takes [indiscernible] prices will almost inevitably fall to marginal cost when there are, as we found out today, so many examples in so many industries where that does not happen.

Male Voice: Or at least it better not.

Mr. Gattuso: Yes. And we don't want it to happen. But where actually it does not happen, Andrew mentioned a law we've been talking about a lot during the day and it occurs to me that it's not even just technology based or any artifact of the modern world. And in fact, if you go farther back into time, it's the common situation. If you go to the third world today, everything's negotiated and I know that when I travel I'm getting a different price than the locals are. So,

[indiscernible] general question going beyond intellectual property, but are the economic textbooks just wrong? Are they misinterpreted or am I missing something?

Male Voice: I've been wondering about that for three years.

Male Voice: It's the end of the conference, what have you concluded?

Male Voice: I don't understand it. Fred?

Mr. Cox: Maybe this is a good pass over for Fred to give his concluding remarks, but first let's give a hand for the panel.

[Applause]

Mr. Smith: It's been a long day and we've covered a lot of topics. I think the beginning of the theme today throughout is what can we do to ensure the opportunity for viable financing options for these critically important sectors of the economy. We've heard a lot about it. I don't think we've resolved it, but at least we've started the one. Vernon gave us the idea that real markets in experimental situations act rather differently than the theory suggest. Coase and Telser in their own way, one pointing out even these industries essentially stand on their own bottom, that nobody should be cross subsidizing industries just because there are declining cost industries and that they're very -- again, Telser's rule -

- that there are very important sectors of the U.S. economy that aren't characterized by a one price model that would work. The various panels touched on that in different areas, I think.

One of the things we've learned is that the same problems occur and reoccur in each sector of the economy and I think the more [indiscernible] look at that as we digest these various papers and focus on proceedings that will be well worth it, that we can include a table in there and discuss the various mechanisms to be used by different sectors of the economy to resolve their declining market cost of this.

And then we got into intellectual property at the end and totally inadequately we discovered it. We discussed it and we began to make at least some understanding that it's not a unique industry. In many ways, a lot of industries face the same kind of problems that intellectual property owners do. And then we did less discussion on, although it came throughout the day today, was how do we legitimize the pricing rules that was clearly demonstrated [indiscernible] critical if we're going to have viable industries and transportation, telecommunications and so forth and yet, and yet, we don't find the public understands it very well. And even today the language of discriminatory prices came up and up and up again. We're certainly not going to remember that kind of language.

So at least I hope differential pricing or even, as I've said before, diversity pricing.

But those are the issues we're working on. The reason we did that is because these are all critical elements in the economic policy. Across the board, the political fights we're facing out there in many ways stem from exactly this confusion. And if anyone is going to shed light on that, it will have to be the policy community. Business doesn't have the credibility to and the regulators, no. They don't want to. It would curb their ability to regulate.

So, thank you all for coming. We'll be sitting proceedings out. You should pick up everything you've left behind and I guess, thank you all for coming. [Applause.]

[End of Tape 4, Side A]

[Tape 4, Side B is blank]

[End of transcript.]