[SQUEAKING]

[RUSTLING]

[CLICKING]

PROFESSOR: OK, good morning. Thanks for being here this morning. So I'm a gross substitute for Glenn. And I'm going to do two classes this week. One on the morality of markets and one, which is more standard IO on regulating the tech giants. So we are going to go through that. And I'm going to motivate a little bit. Oh, by the way, ask as many questions as you want. It makes it more fun for me.

So when I was here, actually in those rooms a few years ago when I was a student, a PhD student here, that was very simple because you took [14.]271. And [14.]271 was basically antitrust. And then you took [14.]272, and that was regulation of telecoms, electricity, railroads, and so on. And then industrial policy, you will not talk about. That was a shame, a source of shame.

Now, things have changed a little bit in the last few years, partly because one neglected some research topics, which are very important. You know, there are lots of neglected topics in IO, like any field actually. So that was challenging our research. But also, we have a comeback of industrial policy, which I'll be happy to discuss, but I'm not planning to [INAUDIBLE].

So there are a number of issues which have to do with the challenges faced by too much cooperation. So basically, you have competitors or potential competitors who actually might agree on certain things that might be legitimate, but that might also facilitate collusion between the firms. So one of the things that we worked on in the last 20 years is intellectual property, the sharing of property, and maybe we'll discuss that in [14.]272. I don't know. Patent pool, cross-licensing, open source, and the like.

But then, of course, there are R&D joint ventures. The standard setting, which is very important, especially with the digital economy. Now, we have the issue of data pools. So we want the data, and can you have pools of data?

Collective negotiations. So you know that collective negotiations are prohibited by the Sherman Act, by many other acts after that. Because, of course, it's a kind of monopsony situation. But nowadays, we get wallet providers, like Apple, for example, they control the near field control. And that creates problem. Should you allow collective negotiations? Some countries do it, but you don't want boycotts either. So it's complicated.

You have the issues of common ownership-- that's a bit different-- by multiple investors, like the big mutual funds. You have algorithmic collusion. So there are lots of new issues and there are others, lots of new issues that we have to study.

At the same time, and that's what I'm going to focus on today, there is the issue of too little cooperation. So this is a diagram that you have to remember in a sense. So what I'm going to do is to look at some platform. It has different names. In Europe, it's called the core. In antitrust parlance, you will call that an essential facility in the past, whatever.

And it will be a two-sided market. So on one side, you will have the consumers, you and me. And on the other side, there will be merchants, applications, whatnot. Some of them will be like Amazon Basics or whatever. They will be in-house. And some others will be basically third party. OK? And there might be some competition between the two in each submarket.

And there are lots of concerns. So the concerns are in red. So for consumers, you have the concern that there might actually be some behavioral manipulations or some wrong recommendations. For example, when the platform recommends like Amazon does, for example, recommends a merchant, there might be some kind of self-preferencing and recommending a merchant within the house. But also, you might-- even for third-party merchants, you might recommend the merchant which gives the highest commission to the platform. Behavioral manipulation, of course, all kinds of things that were they exploit our weaknesses, like our propensity to want to consume right away.

And then, there is the issue of contestability, which can the new Facebook or the new Google or the new Amazon come in and replace the incumbent? And then, there is the issue of access and fair compensation, which is, do the apps and the merchant, do they get their fair share of the deal of the value they create for the ecosystem?

Now, each of those things have to have some kind of translation in current law. Europe has been a bit in advance compared to the US. Also, the US is moving there as well.

So for example, selection of recommendation. There was a P2B regulation in Europe, behavioral, the Artificial Intelligence Act. On content curation, there is a whole law called the Digital Services Act, which talks about the obligations for the platform to curate the content for the consumers.

Since 1996, in the US, basically, there was no obligation. But now, people feel there should be obligation on the platforms actually to curate a little bit of content. And that's actually very interesting to study, but we are not going to be discussing that today. We are going to focus on contestability and especially for access for compensation, OK?

And this is an old issue. I mean, this is a two-sided market, of course. And before that, people were worried about the same issues in one-sided markets. But Chicago School was saying already in the '80s or '70s that you should not be worried about, for example, self-preferencing or foreclosure or exclusion, or whatever you want to call it. So the third-party apps or merchants will not get a fair access to the platform, because in the end, the platform can make money out of consumers, OK? Can make money out of consumers if you offer a rich ecosystem on the other side.

So if you offer the consumers lots of competitive apps or merchants, then your service has a lot of benefit for the consumers. And you can charge the consumers for that particular service. So basically, the Chicago School, like 50 years ago, came up with the idea that there is nothing to be looked at because in the end, it's in the interest of a platform. Those were not two-sided markets. We were not calling that platforms.

But that's the end of the gatekeeper, actually, that in the benefit of the gatekeeper actually to offer a rich ecosystem. So it doesn't want to discriminate here because you can always raise the price to the consumer. You offer a better service, higher surplus, you raise the price to the consumer, OK? So we are going to focus mainly on this, but I will say a few things about contestability as well. Do you have questions?

OK, so what's wrong with the Chicago School argument? Three things. OK, let's go back to this.

I told you, if you offer a rich ecosystem, then you can always raise a price to consumers. But for that to be the case, it must be the case that, first, you can raise it, and you want to raise it, which are two different things. Now, if you are-- and that was the case in regulation-- if your price to the consumers is regulated, then you cannot raise a price to consumers because the regulator is controlling that. So if you cannot make more money here, you may want to make more money there, right? So that was the old style theory, which was applied to public utilities.

Now, in two-sided markets, it's a bit different. You can always raise the price to consumers. You can always charge a yearly fee or whatever or monthly fee. But you may not want to.

And that's very specific to the digital economy or mostly specific to that because if your optimal price to the consumer is negative, which is often the case when your opportunity cost is negative, then you want to charge-- you want to subsidize the consumer to use the platform. Actually, most of the services you use, when you use Google or Amazon or whatever, Facebook, you're not paying anything. The price is zero. If the price is zero, that means that the optimal price for those platform is negative.

Now, why is that negative? Simply because the opportunity cost is highly negative. Because whenever you use the platform, the platform is going to make a lot of money on this side, like merchant fees, for example, or whatever. So what's happening is that if you enlist the consumer, then you are going to make a lot of money on that consumer from the merchants or the apps. So that means that your marginal cost of serving the consumer is actually negative, actually highly negative. And that's why we all pay zero on many services, and fantastic services, and you still pay zero. That means that the optimal price is negative.

But you cannot charge a negative price because otherwise, if you charge a negative price, there will be arbitrage. They will be using bots, fake consumers so as to collect the money. And those fake consumers are of no interest to the platform because they are not going to buy goods and services from the merchants.

And the other way of making money, for example, is to have advertising, like Google or Facebook. But of course, advertising to bots is not very exciting and so on. Or you could collect data. But again, the data you collect from bots is completely useless. So the point is that you cannot charge negative prices because of arbitrage.

And therefore, you're constrained to actually charge a price which is equal to zero. You like to charge a negative price so as to attract more consumers. They are very profitable because of the money you make on this side, but you cannot do that. So you are at, what I will be calling the zero lower bound. Just like in macro, there will be a zero lower bound. And you will be at the zero lower bound here.

And you immediately see that the Chicago School argument doesn't hold anymore because the price at zero is already too high. So you don't want to raise it further. That's the first reason why actually the Chicago School argument doesn't work.

Second argument-- I'm just giving you the list, right-- is the contestability of the core segment. And there are several theories on this. The first is imagine that you favor your in-house apps. Maybe the competitive apps, the third-party apps, will actually exit the market.

Now, that's going to hurt you because you offer an ecosystem which is not as nice. There's less diversity and less competition. But maybe those third-party apps will-- because they don't get consumers anymore, they are going to exit the market. And next time, the next Google or Facebook or whatever comes in, there won't be apps for this new competitor because you will be controlling most of the apps.

So one way of seeing that is that you could have an application bias to entry. So if you prey on third-party apps, and they exit the market, then you protect your core facility. It's like an investment because in the short run you are losing money. You're offering an ecosystem which is not as rich, but in the long run, you may prevent entry by rival platforms.

The other possibility is that you might want to avoid that those third-party apps actually become core essential facilities. And that was the case for Microsoft in the old Microsoft trial, where you remember the browser case in the '90s. The browser case, there was Netscape, which was a third-party app, which was a browser. And there was Internet Explorer for Microsoft.

And what happened is that Netscape-- that was a claim. Netscape said we are discriminated against by Microsoft Windows, which was close to a monopoly. And the concern of Microsoft seems to have been that this app could have become a core segment itself. By adding lines of code, the browser could have become an operating system. Whether it's right or wrong. I don't know. But the story is correct, at least. And that was a possibility. So in that case, the idea, when you discriminate among those apps, is really to protect your core segment, indirectly, if you want.

And finally, this third reason why the Chicago School argument is incorrect, I mean, it's like all those benchmarks in a sense. I mean, if you take Modigliani-Miller or Atkinson-Stiglitz or all what you learn here, you don't really believe in it. But somehow, it's very important for structuring the ideas because it gives you a benchmark. And if you don't believe in it, you have to ask yourself-- it's perfectly correct in terms of logic. And you have to ask yourself, why is that I don't believe in it? And then, that's the thing is that forces you to think more and structure your thought around this benchmark.

So the third-- and this is going to be more obscure, but we are going to go through that in detail-- is that you have to zero lower bounds in those markets. You have the zero lower bound on the consumers, but you could have a zero lower bound by apps and merchant when they deal with third-party, like advertisers or their own merchants. And there you have a second zero lower bound. And that's going to mean that those apps actually make supranormal profits, profits which are too high because of zero lower bound. I will come back to that in detail. OK?

OK, so do you have questions? No? OK, so limits to regulation. So I'm going to go very fast through that. Those platforms, they look very much like the old public utilities. They benefit from network sites. They have extremely low marginal costs, often zero. So they are public utilities with a vengeance.

Now, in the early 20th century, it was decided to regulate the telecom industry, the railroads, the electricity industry, and so on, basically, on those grounds, the idea that you will have too much market power or monopoly power because of high fixed costs, low marginal costs, network externalities, and the like, OK? Now, does it mean that we should be regulating the platforms like public utilities? The answer is no. Because there are two big differences, at least two big differences, between utilities and platforms.

Even so, the technology looks the same. The first is that Microsoft and Apple and Google and so on are just global firms. All the public utilities in the past in every country were national or even regional. But they were not multinationals. So your telecom companies in the past or your electricity company was a local company, and there was one regulator who had oversight of the entire firm.

But then, imagine you wanted to regulate Apple or Google, which are in somewhere between 100 and 200 countries, it will be very difficult, actually, to regulate because you will not have the information. Cross countries, transfer prices, you don't have a clue about whether they make sense. And then, the other question is, who is going to ensure a fair rate of return to the shareholders? Given that you have many countries, it's impossible.

The other big thing is that things change very fast. And you get huge profits, but the industrial landscape changes very fast. So if you think about railroads, the technology hasn't changed for 150 years or more. I mean, I'm exaggerating. Those are not the same trains. But by and large, it's the same story since the creation of railroads.

And telecoms, until the '90s, where basically the same as in the early 20th century. Electricity is the same. Kirchhoff's law is still Kirchhoff's law. It's not that new.

Whereas here, the segments change all the time. And actually, you don't even follow the firms along their life cycle. So, for example, if you wanted to regulate Google and do it right, even if Google were just in one country, you would have to ask yourself, what is a fair rate of return for Google?

So you will have to understand what the investment of Google was, except that you didn't follow Google along the life cycle. You'll be starting following Google now, not 20 years ago. I don't know. Google started even earlier, but so that would be an issue, right?

And then, you have to ask yourself, which it's like for drugs in a sense. You know that the price for developing a new drug or antibiotic is, people say it's $1 billion or $2 billion. Who knows. How do you get to such numbers? Well, the answer is simple, is that the probability of success is incredibly small. But is that 1%? Is that 3%? It makes a huge difference in terms of the reward you should be giving. And it depends on the exact drug and so on.

And the same thing here. What was the probability of success of Google when Google started? Does anyone know? The answer is, yeah, no, we don't. We just don't know. So that's very difficult.

And related to that, there is the issue of changing products, which is it's very difficult to know. There are lots of proposals about breakups, so we should cut Google into pieces, for example. But what are the pieces?

I mean, for railroads, it's very simple. The tracks and stations you know are natural monopolies. You're not going to have another track and stations in south station. You cannot replace the Amtrak railroad. So you can have competition on operating trains, but you cannot have competition on new lines, new tracks, and new stations in the city center. It's impossible.

Whereas here, things change very fast. So how do you do it? What do you break up? OK, so let me.

So we're going to talk a fair amount about the Digital Market Act, which this is one which is focused on regulating dominant platforms. And it has two big-- I already mentioned it has two big items. The first is on contestability. The second is on equity or fairness.

So the contestability is about a more efficient entrant entering the core segment. The other one is about the merchants or the apps. There is a similar thing in the US, which is I don't know if there's been any new-- maybe you know, actually-- there's been a new law, which has been passed in the US. It's very much emulating the DMA. It's very similar to the DMA, so I'm not going to talk very much about it.

So basically, the DMA is going to designate platforms. There will be a very strong competition among platforms not to be part of the designated platforms based on some core services, like search, for example, or social networks or a marketplace. There will be threshold for whatever they mean.

So now, you can imagine that the lawyers are having a great time about if you think about, OK, is the threshold for 45 million users that's in the EU. Are they active? How active? You can imagine spending years discussing that the number of business users. You can possibly appeal if you don't like it.

And we know, by the way, the focus on big platforms. So really, the targets are clear-- Google, Facebook, Apple, and so on. But we know that actually platforms-- I don't know-- you haven't done two sided markets yet, but they can have actually quite a lot of market power, even if they are small, as long as they control access to the consumer. So you can be a small platform and have a lot of monopoly power.

And then, there are obligations. So, for example, you have to be fair to the merchants who are third-party merchants. And lots of that is self-execution.

So the European Union doesn't have the resources. I mean, they already have to do the entire antitrust and merger analysis. And then on top of that, they will have to monitor the platforms. So they become a regulator in a sense.

And so they don't really have the resources to regulate. It's not like the FCC or whatever. I mean, they will hire a few staff, of course, but that won't be sufficient. So there is a lot of self-execution. So basically, the platform has to explain how it makes sure that there is no discrimination among merchants and the like. And same thing, by the way, for the content curation.

And then, the question is where it's going to be located. Probably I will know more because I do a speech in Brussels next week. So probably, I will know. Last time I discussed with them, they were still unsure about whether it will be DG Comp, so the competition authority, or DG Connect, which will be like the telecom regulator.

And there are pros and cons. I mean, I'm more in favor of DG Comp. But of course, you know, some of some of the expertise on those things are DG Connect. How to do interconnection, for example, or interoperability or the like.

Big fines. Relatively big fines. So that's going to be interesting to see what's going to happen. There's a lot of public policy, which is going to be extremely interesting to look at in the next few years. So if you're interested in working on that, that's really worth doing.

It's Monday morning, I see. You haven't warmed up yet. OK, so competition and fairness. You got the slides, right? I already sent them.

So competition and fairness. So you have the economics of open ecosystem. So-- you have two [? prior ?] cases. I mean, one is the clearest. If you want to book an apartment on Airbnb, Airbnb is not going to have-- it's only going to have third-party merchants or apps or whatever you want to call them because it doesn't own any apartment, I believe so. Same thing, Bookings, Bookings doesn't own all the hotels in principle.

Or you could have everything done in the same roof. So you could have vertical integration. Almost no platform nowadays is vertically integrated fully. It may have something in between. Actually, most of the action is here, where you have this mix. From the diagram, you have this mix of in-house apps and third-party apps. And it's pretty clear with Amazon marketplace because you have Whole Foods, you have Amazon Basics.

But most of them, if you take Google, you take-- they all have some kind of mixture between in-house and third-party. OK?

I think that model-- I mean, Apple, historically, has always been much more vertically integrated, including into hardware. But by and large, the platform economics is mostly in that thing. Of course, you have a few pure brokers as well. But you know, most of the action is here.

Now, what some of the literature actually is asking the question, should we actually prohibit those platforms from having their own merchants? So should we impose a pure broker model? OK? That has some costs, of course.

First because they may have their own innovation, after all. The platform, they can find new needs for the consumer. They can have new technology that might introduce. They might want to create some competition for the third-party apps if they are too monopolistic.

Also, that's dangerous because something that makes people very angry at Amazon, for example, is that supposedly Amazon uses third-party apps data to actually mimic the services they offer. They see what is profitable. They have all the data. And then they can also see how it works. And they can mimic and try to basically substitute for the incumbent.

So let's talk about contestability. So the DMA view in Europe, but basically the same in the US, is we want to basically encourage entry by more efficient entrants on the core market. One way to do it is to promote multihoming. So multihoming means that either the merchant or the consumer actually connects to multiple platforms.

And just to give you an example, imagine that you're on Facebook. And then, there is a new Facebook Prime, perhaps a bit better than Facebook, wants to enter. Now, are you going to switch to Facebook Prime? And the answer is probably no, because, first, you have all your content on Facebook. You have the picture, the contacts, and whatever.

And on top of that, you are not sure that the new social network is going to have your friends. So there is some kind of coordination issue in switching to the new network. But if you can multihome, you are much more eager to try the new platform, the new social network, because you still have access to Facebook. Of course, it's a pain if you have to post the same content twice.

So that's why the law actually is asking for portability so that you can actually post the same content, for example, and have the same contacts on the two social networks so that you don't have to do the work twice. So they try to, basically, create some possibility of multihoming. And there are lots of variants of that.

So for example, one in Europe, they were based on some cases, the idea is that the merchant can tell you are reaching me through Amazon, for example. But if you want to reach me directly, here is my website or something like that. And by the way, it will be a bit cheaper. So you can disintermediate the platform if you want. OK?

Interoperability I already mentioned. And the other ones are a little bit more complicated. If you have never seen most favored nation clauses, probably I should not talk about it, but it's a very interesting issue.

Contestability. So contestability, we are in an industry with very large fixed costs or very large network externalities. So we know we are not going to get perfect competition. There is no way. You know you'll have market power, if only because you really have to cover those fixed costs.

So the general view is that those industries are going to be monopolistic, and therefore, you have to regulate them. Now, there was this book, very famous at the time by Baumol, Panzar, and Willig in the early '80s basically saying, no, no, no, no, you don't have to regulate them because if a monopolist were charging prices which are too high, then some entrant will come in an itinerant entry. So basically, cool invest rapidly and undercut and take all the market before the incumbent can adjust its price.

So let me see if I have any chalk. So imagine that you have a cost function c of q equals f plus cq. So you have a big fixed cost, a marginal cost, which may be low, I don't know. OK? So your average cost is going to look like this, right? That's the average cost.

Actually, yeah, it should be. It's going to be seen. OK, so you have an average cost like this, right? Now, here you have your minimum average cost. So if you want to break even, then you must have p times q minus c of q equals 0. So p is equal to c of q over q. So the price has to be equal to average cost.

So you could have a quantity, the Ramsey quantity. By the way, this also works with multiple goods. I mean, that's why I'm thinking about it right now, because it's called the Ramsey pricing. And you can do that with multiple goods.

So this is the lowest price you can charge while still breaking even. And Baumol, Panzar, and Willig's book is about yeah, you're going to end up here. Even so, you have a monopolist. So you get a monopolist, but this monopolist makes zero profit.

And the reasoning is that if you charge a higher price, then some entrant could say, no, I'm investing right away. And I'm charging this Ramsey price or a bit above the Ramsey price. And I'm taking the entire market if there are perfect substitutes. OK? That's the reasoning. It was more sophisticated, much more sophisticated than that, but the bottom line was that.

And you might say but wait. It may take three years or 10 years to build this huge fixed cost. And the price you can change very quickly. So the timing is not the right timing somehow.

And if someone enters, then there will be a price war. Because at that point, the marginal-- once the two firms are in the market, the fixed costs have been incurred. And you get just a lower marginal cost and very tough competition. So you might say, OK, if the incumbent can react to entry, which is very likely given that the fact that the investment takes much more time than changing the price, then you are going to end up with the entrant doesn't want to enter because the competition will be very tough.

Now, you can improve a bit, the Baumol, Panzar, Willig story by having some kind of dynamic economy in which you have network sites. And those network sites are kind of sticky because consumers don't switch immediately. And consumers, like me, they tend to stay on the same network forever. And that means that once you have acquired a consumer, then you have an installed base of consumer like this. And therefore, it's a bit more complex.

So we look at the model with Drew-- a long time ago, we looked at the model in which you have no interoperability. So basically, if you're on a network, you don't benefit from the network sites with the other network. And then, an entrant who is more efficient, it's a dynamic model with quality ladders if you want. So you can improve. And something which is more efficient than the entrant, but you can be replaced later on.

Then, you look at the dynamic. Sometimes there will be entries. Sometimes the next Google will be replaced, will be coming in and replacing Google and so on.

Now, the lack of interoperability, of course, makes entry more difficult, but it also has some social benefit because if consumers are sticky so they don't switch easily, they stay with incumbent. Then, whenever you have an entrant, that means that those consumers who are very sticky are going to be left stranded. They're going to be left in a small networks. So that means there won't be many applications and the like. So there are actually costs and benefits of entry in that model.

So you can imagine-- I'll let you have a look, but you can imagine what kind of story. But that was a paper which was also pretty much in favor of contestability. Even so, we never quite believe in it because you need to be able to enter, and you must be able to-- and if you are able to enter, then there's an issue you might not enter. And that's a literature I'm not going to talk about, but which is interesting as well, which is sometimes you have entranta who enter for buyouts.

So think about Instagram and WhatsApp. I'm not saying that's what has happened exactly, but that's a possible story. Instagram and WhatsApp are social networks. They sold out to Facebook. So you might say Facebook was willing to pay a lot of money in order to actually avoid competition.

Now, what Instagram and WhatsApp were doing was not quite what Facebook was doing. It was differentiated. Nobody knows what the trajectory would have been, whether they would have tried to replace Facebook or not, nobody knows. But the story is that Facebook bought WhatsApp and Instagram in order to deter competition.

And by the way, the same thing is happening in the pharma industry, where you have a new molecule. And the incumbent, which is threatened by this new molecule, is buying the startup. There's some evidence of that. Now, how important it is, we don't know, but there's clearly evidence of that.

And then, entry is not very interesting because it's just a way of blackmailing the incumbent and sharing the profit of the incumbent. So because if you have a me too product, and you invent a me too product, and you spend the money to do that. And you go and see the incumbent, hey, buy me and surpress the competition. Then, the consumers haven't gained anything. And the only thing that is happening is a transfer of wealth between the incumbent and the entrant. Basically, you bribe the entrant to disappear, right? So that's a big issue nowadays. And there are lots of interesting antitrust questions linked to that.

So let me move on. Let me move on to fairness. But a good time to stop to see if you have any questions. Yes?

AUDIENCE: Sure. So since you bring up the Facebook Instagram example, if I recall correctly, when posting on either one, you could have it so that what you're posting gets posted on both now. So I guess going back to the multihoming example, I think you brought up how if you have a new platform that's similar to one that already exists in a way get it going is to make it so that if you post one and automatically posts on the second. But I mean, that's to me seems like an example where the bigger platform could already like bought in the smaller one. So I guess I can't really think of an example where the platform could still be separated, and you'd still be able to have that mechanism.

PROFESSOR: Well, actually, that's a good question because, I mean, they're asking themselves now, if someone wants to replace Facebook, how are we going to promote that? And you need to have interoperability. And as you say, how do you make it happen? So you need APIs. You need the application programming interface and a standard of communication between Facebook and its rival.

Now, if you ask Facebook to do it, it's not going to work. We know that. I mean, that has happened in the telecom industry a long time ago, 50 years ago. We know that it doesn't work because, of course, the incumbent doesn't want to help the other enter.

So you need to have some kind of resolution of this issue. So is it the competition authority who is going to decide on the APIs? But probably they won't be very competent. They might be making mistakes. Is that a standardization effort? So you have-- but then, who does it exactly, which standard setting organization? All those things have been swept under the rug.

So in the document, if I remember, well, you don't see how it's going to be done. Say, there should be some APIs so that you can actually have interoperability, but who's going to decide on them? I guess that's-- I don't have an answer to your question, but that's actually an interesting question.

Let me say a few words about the traditional things. So the traditional way of looking at this-- and it's not a two-sided market. You basically have an upstream supplier who is supplying in-house and third parties, OK? So it's a language of regulation if you want upstream suppliers, downstream firms. And those downstream firms are supplying the consumers.

It's not a two-sided platform because this will be the kind of a platform, but it doesn't have access to the consumer. Whereas in a two-sided platform, the platform is controlling the access to consumers, so it's a bit different. It's allowing the apps to actually sell to the consumers.

But the apps, once they get the input from the upstream firm, can do whatever they want. They have direct contact with the consumers. So that was a framework we studied a couple of years ago. It's embarrassing to say how many years, but a number of years ago, that's basically the framework we studied.

Something we learned at the time was, basically, you needed a regulation of access. You should not count on the incumbent to allow access. This is not going to work. The second thing was this ECPR stuff, which was something that almost every judge dealing with competition policy would know around the world. But a number of economists would not even know. Even so, it was invented by Baumol and Willig, the same people, by Baumol and Willig. Basically, which was putting a cap on what the excess charge was.

So here, you have an internal transfer price. Think of this as being zero, or marginal cost more generally. So basically, this downstream unit was getting the essential input at a low price. But the question, what was the excess price for this third-party app or third-party merchant? And that had to be kept.

So the ceiling on the access charge that Baumol and Willig found, and that just said-- that was used a lot in antitrust and also in regulation-- was basically that you will put a ceiling at how much money was lost by the incumbent when D2 takes a customer away from the incumbent. So it's basically saying, OK, if I take a consumer away from you, I'm going to compensate you for your loss on that consumer, assuming the access cost is the same. So it doesn't cost more to supply D2 than supplying D1.

But basically, the idea was to compensate D1, UD1, for the loss profit, which is the margin on the downstream segment. So it was a price minus a marginal cost on the downstream segment. So that was used to basically find an upper bound on the access charge. You cannot charge more than what you lose when you lose a customer to your rival. It's a simple rule, right?

And in the work I did with Jean-Jacques Laffont, we found that actually that was not such a bad rule, except it's a very incomplete rule because you notice that it just connects two prices-- the access charge to third-party merchants-- with the final price you charge in the consumer segment. But it doesn't tell you what A and P1 should be. It just connects the two. In particular, they could be quite high. But in terms of efficiency, actually, it's not bad because in a sense you have D2 internalize the externality on D1. And basically, the market allocation between D1 and D2 is not going to be bad.

And something I want to say, which is very important, is that this upstream firm, the bottleneck of the core segment, if you want, can make money in two ways. And that's very important to realize. Can make money either in the downstream market through P1, or it can make money by giving access. So you can do it retail, or you can do it wholesale. You can make money in one of two ways. And in a sense this, if you have equality, that means that you're indifferent between the two ways. OK?

OK, now, that also tells you that-- let me move on to number four, and I will come back to number three-- that the marginal cost pricing of access may not be the right benchmark because if you charge a equals to 0, you're not going to make any profit on access. And then, there will be tough competition in the downstream market. And you may make no money at all.

Even so, the reason why you are monopolies is that you have very high fixed costs of upstream. So that's something that was a concern. The way Laffont and I actually solved it was basically by inventing a global price cap in which you will be putting not only the retail price in the price cap, but you also put the wholesale prices.

Now, the other thing that we are going to find again in what I'm going to tell you about in a few minutes, is that an excess markup, if you have a greater than C0, that doesn't necessarily mean that competitors are disadvantaged. Because if you look at the cost of each firm, each downstream firms, now, the cost here is equal to a, the access charge plus possibly a downstream cost. But here, the cost of D1 when charging P1 also has to include that if you take a consumer away from D2, you lose the difference between a and c0.

So your opportunity cost, if you are the integrated firm, is c0 plus a markup you make an access. And that's the access charge, which is the same as the access price for the rival. So in a sense, they have the same marginal cost, if you think about marginal cost as being opportunity cost.

That's a bit surprising the first time you see it. What? They are charging a markup on access, but at the same time, they face the same marginal cost. And the point is that you have to take into account that if you lose a consumer on the access market, you lose a minus c0. So actually, that you have to include in your cost.

And then, we derive the optimal regulated access charges, which are by Ramsey principle. If you think about giving access in the end as being just providing a retail good. Even so, it's a wholesale good, but indirectly, it's a retail good. So let me skip that.

OK, now, we are going to wonder what's happening with two-sided markets. So that I've already said. As a motivation, I'm going to go very fast through this. There are lots of concerns. There are lots of concerns about the charges to merchants.

So if you think about the app store or Google Play, you get 30% commissions and so on and so forth. It's not new, by the way. There are lots of antitrust cases which had to do with credit cards and debit cards. They are not charging 30%, but they were-- if you think about American Express or PayPal and all those platforms, they charge 3% or Google Pay or Apple Pay. Visa, it's a bit less, but Visa, MasterCard is a bit less, but they charge some money as well. So it's a general issue. There are lots of concern about-- and that has to do with equity or fairness.

And by the way, there is-- you probably have heard about this event where, basically, Apple removed the *Fortnite* game from the iPhone and the iPad because basically what Epic was doing was to offer another route to buying the subscription, so you could buy directly. And Apple was very upset and basically said, OK, you are out of my platform. You don't want to pay the 30%, you are dead. That was the idea. OK?

I don't know actually about the last thing. So if any of you has information about that. I read once that the commission in China-- I mean, you know, the top 20 tech firms in the world 11, which are American and non-Chinese. So there are big tech firms in China as well. And you know their names. But I read that some of them are asking up to 50%. I don't know if it's true. If you know, I will be interested in knowing.

OK. OK. So let me-- so there is a paper which was sent to you with a student of mine, Michele Bisceglia, which basically looks at the optimal access price. So 30 years later, we do access pricing for two-sided platforms, which is very important because all those regulations wants to keep those access prices low. But what does it mean low?

I mean, when you sell on Amazon marketplace, should it be 13%, 15%, 3%? What's your view? When you sell an app on Google Play, should it be 30% or 10%? OK?

That's very important because that's the business model of this platform which is at stake. So we know very little about that. So I'm going to give you some insights. But there is much more, both theoretically and empirically to be done because the regulations are in part going to be exactly on this access charge.

And so this is the same diagram I told you earlier. I just put names on the prices. So imagine that you have a consumer. The consumer will pay P0 for access to the platform. Actually, the 0 lower bound will bind when p0 is equal to 0. I'm going to assume that p0 cannot be negative.

Then, there is a core service. So think of that as being a search engine or a marketplace, which is going to lead you to an in-house app or a rival app. Let's assume that the service of this app or maybe the overall service will be theta. Theta may be a Trojan horse across consumers.

The in-house app will charge P1. The rival app will charge P2. The interesting case, the only interesting case is actually when the rival app is more efficient. So basically, it adds a utility delta on top of theta compared to the in-house app.

OK, so let's assume that the rival app, the third-party app is actually more efficient, delivers a better service. OK?

Now, something which is going to be very important is that the app providers are going to have negative marginal cost. So there can be advertising revenues. So when a consumer reaches a rival app, for example, then you'll have advertising on the platform. Itself will be a platform, if you want. But it will have advertising. It will have merch. If it has its own merchant, it will have merchant fees.

There might be data collection. So you are going to collect data about-- and those data are values. There can be repeat customers, too. So when you acquire a consumer, you're going to benefit because those consumers will come back to you.

So think about, OK, I'm using a car-sharing, carpooling service. First time I use BlaBlaCar-- I know in the US BlaBlaCar doesn't exist, but it exists in most countries in the world. I'm using BlaBlaCar the first time. But now, I found you. And next time, I'm going to use you without having any intermediary. So all kinds of things like that.

And I'm going to just assume that if an app has a consumer, then there will be an ancillary or side benefit be from that, which is positive. So given there is no marginal costs, it's a digital good, that means that your opportunity cost is minus b, so it's negative. That's going to be very important. It's often the case in those industries that you have negative costs. OK?

Now, I will say, as I said, I will say that there is a 0 lower bound on the core product, a core 0 lower bound if P0 is equal to 0. And there will be an app 0 lower bound if P1 is equal to 0. And P1 will be less than P2 as you might imagine because it's an inferior product. But you will have a 0 lower bound if P1 is equal to 0. OK?

OK, so an example of hybrid platforms, I already went through that. The third-party sellers are going to pay a unit access fee. It could be ad valorem, but I'm not going-- it doesn't change the results. It's just a fixed fee independent of price. OK?

And the access fee for the moment could be set by the platform or the regulator. And of course, one of the things you would like to understand is whether a platform has an incentive to charge access prices which are too high. OK. OK? So as I said, the app 0 lower bound corresponds to P1 equals 0, and the core lower bound is binding if P0 equals 0. Do you have questions?

OK, the zero lower bound are realistic because there are lots of services and apps which are free. But in this model, as I'm going to show you, if you don't have zero lower bounds, actually things are pretty good for the Chicago argument. So actually, the Chicago School argument, if none of the zero lower bound is binding, it's going to hold. OK? There is no substantive issue in that case. But if you have the zero lower bound that primes. So that's why we introduce those two zero lower bounds, OK?

OK, So let's flip it. So let's assume that there is a distribution F of theta on willingness is to pay for the consumer for the service offered by the platform. And you make the usual monotonous moderate condition, if you like. Actually, most of the time, I'm just going to assume theta is homogeneous. So theta will be the same for all consumers.

The reason why we introduce a distribution in the paper is twofold. The first is that we want to see robustness when you have heterogeneity and a downward sloping demand for the platform. But also, if you have two complementary goods and you have homogeneity, in general, you have multiple equilibria. You have a continuum of equilibria.

I mean, that's a standard Nash story, which is that, if you are willing to-- if you are-- OK, I'm offering a good. And you are offering a good, and the consumers are willing to pay 10. I can offer it at one. And there are two perfect complements. I can charge one. You can charge nine. Or I can charge seven, and you charge three. There are lots of lots of equilibria.

That was realized over 70 years ago by John Nash. He said, no, there are multiple equilibria. Let's have a downward sloping demand, and let's take the limit when you converge toward homogeneous demand. And then the equilibria is unique.

So if you want uniqueness, you use a Nash trick of introducing a little bit of randomness in the evaluation. And you get rid of this multiplicity. That's the other reason why we actually consider a downward sloping demand. Even so, most of the analysis is done with theta being the same for.

So if x is equal to 1 when the buyer, the consumers buys the third-party app and 0 if they buy the in-house app, then the platform's profit will be-- OK, if the cut off-- of course, I theta people are going to buy. So the fraction of people buying, let's assume there is a mass 1 of consumer is 1 minus f of theta star.

Now, what is the profit of a platform per customer? So it's going to be P0 for access, the consumer access to the platform. If, basically, the consumer buys from the rival, then the platform is going to get the access charge. But if it doesn't buy from the platform, then you'll get P1 minus a because you are losing the access charge if actually the in-house good is purchased. But then you get the benefit, the ancillary benefit from having access to the consumer on the app side. So you get the b.

The third party app, same thing. You have a number of consumer joining the platform, which is 1 minus f of theta star. And when it equals 1, if they buy from the third-party app, then third-party app gets P2 plus b minus a. OK?

Now, something you already notice here is that the marginal cost, when choosing the price P1, the marginal cost of the platform is a minus b, because if you acquire consumer for the app, a consumer buys your app, then you lose the access charge, but you get the ancillary benefit. Same thing. The marginal cost for the third-party app is the access charge minus b. So they're exactly the same marginal cost.

So there will be an access charge, a, which is determined either by the platform or by regulation. The firms will set their prices simultaneously. The platform chooses P0 and P1. The third-party app chooses P2. And the consumer choose whether to join the platform.

Now, there is a variant of that in which-- in the case there is no regulation. The platform can always foreclose access. And that's the whole issue about foreclosure foreclose access to the third-party app. For example, you can actually say, I'm not-- just like Apple did-- you are not on my platform anymore. That's a bit violent. You can do the same in a much softer way by saying, OK, you'll be on page 235. Web page 235, you are quite sure that nobody will buy from you. So that's the new.

So what you can do is to choose a competitive advantage delta, which is less than capital Delta, actually, without loss of generality, you can assume it's even negative. Whereas if you are monitored by a regulator, then there is no such possibility. That's the assumption. So in that case, a competitive advantage has to be capital Delta. So you can consider the case with the possibility of foreclosure and without the possibility of foreclosure.

OK, so that I've already told you. ECPR, remember, a less than P1 minus C1. Here, C1 is minus b, the marginal cost downstream. The marginal cost is negative. That's the expression of-- did I tell you what ECPR is, what it means? No. I'm sorry. You don't want to know anyway.

It's called the efficient component pricing rule. OK? Everybody calls that ECPR. Nobody knows anymore what it means. But, yeah, it's ECPR.

OK, so as I told you, I'm taking the case the limit when basically you converge to a homogeneous willingness to pay. As I told you, it's to do like John Nash did to select the [INAUDIBLE] [? equilibria ?] but also to see the robustness when you have a general demand function.

OK, so let's assume you cannot foreclose. Then, the cut off theta star, which is going to be equal to theta, the common theta, is basically P0 plus either you by from in-house and then at P1, or you buy at price P2 from the rival. But of course, in terms of net price, given that there is a superior quality for the entrant for the third-party app minus delta. OK?

So what's going to happen is that P1-- remember, a minus b is the opportunity marginal cost? So P1, which is-- think about Bertrand competition. Under Bertrand competition, basically, the superior product is going to get the entire market in the up market. And the inferior product is going to charge a marginal cost. Marginal cost is going to be a minus b, OK? Because, again, if you acquire a consumer, you lose the access charge, but you gain the ancillary benefit.

So the marginal, that will be the normal Bertrand outcome, except that if a is less than b, then you are bound by the zero lower bound. So your price will be 0. You like to go below that, but you cannot go below that. You cannot subsidize because that will be arbitraged away.

So this is very simple. If b is greater than a, so if the ancillary benefit is greater than the access charge, you are going to charge a zero price. You would like to charge a negative price, but you can't. And that's going to have as an implication that the rival app is going to make an extra profit above its contribution to the platform. So let me just mention that.

Imagine there was no access charge. So basically, if there were no access charge, basically, the third-party app will be charging delta. The platform will be charging 0 for the app. But then, the profit of the third-party app will be delta plus b.

So the third-party app will make profits which are greater than what it contributes to the ecosystem. The contribution to the ecosystem is delta, but you get this benefit, which is not competitive, where precisely because of the zero lower bound. To be competitive where you will have to basically charge minus b, but minus b is not feasible. So basically, you get supranormal profits for the third-party app. OK?

OK. The second question is, basically, what is your willingness to engage in non-price foreclosure? And you have two kinds of foreclosure in those models. One is a price foreclosure when you charge an access charge, which is very high. But when you have an access charge, which is very low, less than b, you actually want to use non-price foreclosure. So you basically get rid of the rival. You don't give access in some way.

And it's pretty easy to see actually that as long as a is greater than b, you don't want to foreclose your rival. It's a superior rival. So there's no reason to get rid of the rival. But because you are making money on access, more than you will be making just from the ancillary benefit of having the consumer. And basically, you're going to want to foreclose exactly when the app zero lower bond binds, so when a is less than b. When a is less than b, you want to foreclose.

So what this means is that having an access charge, which is too low-- by the way, that was already known in the one-sided market exam theory. Having an access charge which is too low is going to imply that you want to foreclose, OK?

By the way, there is a deep connection with the ECPR. Even if you don't remember what ECPR means, there is a deep connection with the ECPR, which is that in that region, a is less than P1 minus b. Remember, that's the action of C1. So actually, ECPR is satisfied with inequality in the sense that the access charge is very low.

So you have this region where the access charge is less than b, where ECPR taken with an equality is violated, and where the platform wants to foreclose. So if you want to insist on access charges which are too low, you are going to end up getting foreclosure, which means that you need big regulator just to oversee that there is no foreclosure, which is not easy.

I mean, that requires going into the algorithm of Google, of Amazon. How do you choose which product to recommend and all those things? And being on the second screen. Is that foreclosure and so on? That was, by the way, already the case for the computer reservation system in the '80s. There were a bunch of antitrust cases in the '80s on computer reservation systems.

You were not born, but basically, if you wanted to travel, you had to go to Harvard Square and go to an agent. The agent will have a computer. At the time, I think a computer was a big thing, You had a computer with software. And you will say, I want to fly to Chicago. And the agent will just look, flights Boston to Chicago. That will take a few minutes because that was very slow.

And then, you will have a first screen which will appear and say, here are the flights. And you say, oh, this is flight of United Airlines. And then you wonder, but doesn't the software belong to United Airlines? Because the software-- and you know, isn't that an incentive for United Airlines to actually put its flight first, given that nobody will ever go to the second page? It was too slow. You would not do that or for the third or fourth page. So those things already happened at the time. OK?

Let me tell you-- I'm just going to just tell you about this and conclude with some policy questions. So what happens if the-- here is the access charge. If the access charge is SNB, I told you that you want to foreclose. So basically, the access charge for the incumbent is not going to affect its profit. It's going to be theta, which is P0 in that case, plus the ancillary benefit, b, OK?

If there is monitoring of foreclosure, then the profit is going to grow with a and conversely, for the entrant, the third-party app. Then, you have a region of-- and then, ECPR will be with an inequality. Then, you have a region which is a Chicago School region, in which, basically, a is equal to P1 minus b. Everything is going to be independent of a.

So the access charge is not going to matter in this region. You can raise it, lower it. It doesn't matter. The profits are going to be the same. The allocation is going to be the same.

And then, at some point, when a is large, that means the prices of apps is going to go up. That means at some point the zero lower bound is going to bind for the core service. So P0 is going to be equal to 0 because the consumer are paying a lot for the apps. So they are not willing to pay much for access to the platform.

In that case, if you raise a, it cannot be absorbed by the platform. It has to be absorbed by the apps. The platform is already at P0 equals 0. So here, you have a region where the core zero lower bound binds, and there's a squeeze. So actually, the profit of the apps is going to go down to 0. And if a is really too large, then, basically, there's price foreclosure this time.

But the action is going to be there mainly when you have an access charge, which is too low because then there will be foreclosure and when there is an access charge, which is too high, when there is a squeeze. Now, what the best-- you see from this diagram-- what the best for the platform is, actually to choose this very high surcharge, to squeeze completely the superior third-party app. OK? That will be the one. So if you let the platform choose, it's going to choose this price.

Now, what will be the optimal price for regulator? Well, like this, it will be in this range. And actually, you'll get exactly delta in this range for the profit of the entrant. Now, if you add other consideration, like innovation, and endogeneity of consumer with respect to their preference for the app and so on, you can show that the optimal access charge is always b. That's another thing is that the optimal access charge has to be b, optimal.

So that will be-- but you have to introduce other considerations for that. And I'll let you look at this, the paper. But basically, the platform will choose a star here and the optimal access charge will be lower, but it will never be 0. It has to be b actually. OK?

Now, the next question, of course, you are going to ask me-- and I have exactly one minute to answer it, but it's a huge question-- is, now, how do you know b? OK? Probably, the participant, the firms have some estimate of b. Otherwise, they will have a hard time deciding what to do.

But the regulator doesn't have a clue. And it's heterogenous across applications, of course. So how do you know b? Now, don't ask a platform. That's hopeless. The platform is not going to tell you the truth.

What you could ask, what you could do-- I mean, basically, you like to elicit some commonly held information. So it's a masking game, You have to design a masking game. But here is a very simple masking game in which you could ask the entrant, the third-party app, and you say, how much are you willing to pay in terms of access charge?

Now, if you let the platform foreclose the entrant, the third-party app, then the answer will be a equals b. I want to pay b. Because, of course, the third-party app wants to pay the access charge, which is as small as possible. But he doesn't want to feel foreclosed. So it's going to ask-- it's going to say, I want b, right?

Now, this is a bit dangerous for a reason we discussed in the paper. We haven't fully solved it. We show it's a Pigouvian. It's in the spirit of Pigou. It's a Pigouvian regulation.

And in principle, it could be used by regulators for the moment that they don't really have a rule for that. They have in a special case, which is for credit cards, the European Union has a rule, which we designed with Jean-Charles Rochet actually, which we call the tourist test for credit cards. But for platforms, general platforms, we don't have a rule.

Here is a rule, equals b. That's not complicated. Here is a way of eliciting b. As we discussed, it's pretty risky still, and there is much more work to be done so that we make this operational. Because you have to realize when you design regulation, you also have to think about whether it's going to be used by regulators. And the regulators have a very small staff. And they don't have much time to think about it.

And, you know, if you design rules, which are incredibly complicated and requires 200 elasticities, forget about it. It's not going to happen. You need to have simple rules which work relatively well. And that's going to be part of the challenge in IO. We need to design those rules.

Now, I realize I'm one minute late, but I'll see you on Wednesday. So on Wednesday, you can ask me more questions about that. And then, I will tell you everything you ever wanted to know about the morality of markets, which is important because now, even the antitrust authorities are thinking about changing their rules in order to account for their responsibility with respect to the environment and other things. So I'll tell you a little bit more about the morality of markets on Wednesday.