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Panel 2: Understanding Network Effects in the Platform Context

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Panelists:

Rosa Abrantes-Metz

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MR. CRAGG: Welcome to our second panel at the Fordham Conference. This panel is about understanding network effects in a platform context, and we have both Europeans and Americans who will be

speaking with us today. Our speakers are:

Evan Chesler, the Chairman of Cravath, Swaine & Moore, is probably well known to many of you as someone who argued the *American Express* case before the Supreme Court of the United States.

We also have Kai-Uwe Kühn, who is a professor of economics, an academic affiliate at The Brattle Group, and has been at the Commission and worked with a number of different universities with a focus on high-tech and network-oriented industries over the years.

We also have Romy Abrantes-Metz, who just joined The Brattle Group. She started her career working in government and since then she has taught and has been publishing in the area of network effects and financial markets and is a well-known testifier in the area.

Finally, from Europe we have the head of Latham's Brussels office, Lars Kjølbye. Lars has a distinguished career, having spent the better part of

a decade with the Commission in various jobs in Europe, then going into private practice after that, where he specializes in the topic that we have at hand today.

Thank you to everybody who is going to be speaking today.

We are going to talk about a couple of different topics. We are going to talk a little bit about the existing law, just to set the table here; then have the economists talk a little bit about network effects; and then we are going to switch over to talk about a couple of cases and a couple of topics which are live today.

I will ask Lars and Evan to tee this up for us. I think there is a sense that because of network effects there is going to be a general inclination to look to the law that defines single-brand markets. I am curious what you think, from both an American perspective as well as a European perspective, about whether that observation is right and what it might

mean.

MR. CHESLER: From the U.S. perspective, the network effects issue often, of course, is accompanied by issues of lock-in, and that immediately causes people like me to think about single-brand markets and whether they are applicable or not.

In the United States, the law in that area was defined and set almost thirty years ago by the *Kodak* decision in the Supreme Court, and frankly there has not been a lot of evolution on the subject since then. There have been some lower court cases, but they have attempted to add more granularity or color to the *Kodak* principles of information costs and switching costs.

The challenge in applying that law to technology-based markets in the current environment is substantial because the questions about switching – for example, information costs – are often affected by modalities like multihoming. The law really has not yet adapted to those new technological facts, so you

find lawyers like me trying to fit the new technology facts into the thirty-year-old buckets defined by the Supreme Court, and that is not always an easy fit.

I think what will happen in the coming years is that the new facts that are arising in the context of technology-driven platforms and the network effects that take place on those platforms is going to cause the law on single markets to evolve past *Kodak* to accommodate phenomena like multihoming and how that relates to more traditional concepts like information costs and switching costs.

MR. CRAGG: That makes sense.

Lars, I am curious what your perspective is on this, coming from an obviously different legal regime.

MR. KJØLBYE: It is actually remarkably similar in the sense that the single-brand market cases that we have had are also pretty dated. They have all involved, like *Kodak*, aftermarket situations where the question was: "Is there a distinct

aftermarket for services or consumables? Like *Kodak*, we had cases involving printers and photocopiers and whether the ink cartridges for those products were in a distinct aftermarket.

The analysis that the Commission applied at the time was basically to ask whether the activity in question was shielded from competition.

Then, in the case of the aftermarkets, they looked at primary competition and whether that constrained the supplier of the ink cartridges in those cases. They basically looked at two things: (1) whether purchasers of those products engaged in lifecycle pricing; or (2) whether, even if they did not, when they considered buying a printer they looked at the cost of the consumables and would switch if they were too expensive.

While the cases involved traditional industrial products, I think actually the key question — namely, whether there is an activity which is shielded from competition in some shape or form —

actually remains sound. Then one can apply that also to more novel situations.

MR. CRAGG: I am curious. Would you then say to a young economist who is trying to be helpful to you, "Just read these old cases, and you will have all that you need to know to be useful to me?"

MR. KJØLBYE: I think you need to think about how those principles apply to new situations, obviously.

I do think the big question today is whether we continue applying traditional antitrust analysis and look at competition in markets and consumer welfare or we start applying broader concepts of fairness. You look at app stores, and the key question you ask is: Is there a problem with app store terms, and to assess that you look at whether the app developers can go somewhere else; or do you basically look at those terms in isolation to assess whether they are fair and reasonable?

From my perspective, unfortunately – we will

come back to that later when we talk about regulation – there is a tendency to look at the platform in isolation and ask the question: “Are these terms fair and reasonable?”

MR. CRAGG: I know that Evan’s colleagues are up to their eyeballs in this topic, so he may share some insight from that in a little while.

Let me turn to the economics now around what you have started to speak about.

Romy, one of the things that I notice, and you may notice also, is that, in general, this term “network effects” gets thrown around and it is fairly loosely defined. Some economists have tried to be more specific about it. Do you think it is important to be specific, be more careful about defining the network effects, or is it something where a loose understanding is “good enough” as they say?

MS. ABRANTES-METZ: I think this is one of the most critical parts of analyzing one of these cases, not just for regulation but also for antitrust.

As an economist who thinks about modeling network effects in the context of what economists call a general equilibrium model and try to come up with implications for the but-for world and implications of potential regulation this is really critical. I think it is easier if I explain this with a couple of examples.

Let's think about if I may buy a small cookie or I may buy a cookie that is four times bigger than the smaller cookie but it is otherwise the exact same cookie, so I am just getting more of the exact same cookie. That may be good for me if I really like cookies, but getting more of the same is the typical way that the economic literature has modeled network effects. So the relationship between the size of the network and the value of the network tends to be a constant scale, whatever that scale is – double, triple, etc.

This does not necessarily apply to all of the cases. For the conversation that we are having

today, and even with respect to the recent proposed steps by the House that came out yesterday, let me give the example of how modeling this is wrong in other contexts and the implications it may have for breaking up companies, for example.

When you have a cellphone company that has lots of subscribers, think about the value of the network as the number of bilateral calls that can be made. If we have one person in, there are no calls; if we have two people in, we have one call; if we have three people in, we have three calls; if we have four people in, we have six calls; if we have five people in, we have ten calls; if we have six people in, we have fifteen calls.

What is my point here? In each one of these I am adding one person, yet the value of the platform measured by the number of bilateral conversations is explosively growing. Of course, this is a very extreme example. Not all network effects are this strong – this is how I have characterized strong

network effects – but it has important implications.

If we think about breaking this platform of six that produces fifteen conversations into two platforms of three each – not overlapping and not connecting with each other – then the two platforms of three, which are the same size as the original big platform, only produce six conversations rather than fifteen. Why? Because we are losing all the value of the externality of the strong network effect.

Thinking that this scale may well not be constant depending on the size of the network, the relationship between the size of the network and the value of the network may change with the size of the network. This is critical for regulation, but it is also critical when you think about competition, when you think about what the critical mass is, how many platforms may we expect to exist. Do we have just a few? Do we have a lot? Are they big? Are they small? What is the value of multihoming depending on the strength of the network effect? All of these are

really important.

The more recent economic literature, including some of my own and others, is trying to focus more on modeling network effects in this context, and the implications for regulation are very important.

MR. CRAGG: Thanks, Romy. That is quite helpful.

I am wondering, Kai-Uwe, in terms of this question about multihoming that Romy just raised, and, in terms of that network example, presumably, even if you had two networks and everybody was multihoming, you would still have the benefits of going from five people to six people because they can share bilateral calls across the two platforms because they can multihome.

Could you tell us a little bit about how important this concept of multihoming is and whether there is a single economic insight that you draw from it or whether it is a function of market structure?

PROF. KÜHN: I am not sure whether it is a function of market structure.

I think there are two things that are important about it. One of them is why are we at all concerned about multihoming, and I think that comes back to the discussion of single brands that we have heard on the legal side. The second one is why would we look at multihoming in the network context as something for analyzing markets or trying to identify problems.

The first question is: Why are we at all concerned about multihoming, given that normally with other products we are not? Multihoming is something about me as a person using different services concurrently, basically.

If I am thinking about buying a car, no one would ask the question when analyzing the car market whether we are sufficiently multihoming between different car brands at the same time. Basically, I buy a car that is a relatively durable good for a

longer period of time; and then I buy a new one, and I might actually switch, and it might not matter all that much which brand I was buying before. At least it is a situation in which those switching costs do not seem to be high enough that we might start thinking about every brand of car as its own monopoly market. So the brand market does not come up here.

But I think what is essential here for my own kind of substitutability, if we are thinking that these purchase relationships tend to last a very long time – so we have long-lived durable goods, in a sense, which a lot of the choices we are making, for example, about ecosystems seem to be – I actually feel I am locked in the next time a choice opportunity comes. I might buy a new computer, but I already know in which ecosystem I am going to be because I have always used this.

I think the reason why multihoming has become such an important criterion is that we are thinking we are in markets in which switching costs

are actually relatively high. I think that is a little bit the difference to the old *Kodak* literature. It is not just the aftermarket that you can think of – for example, the applications that I have in a certain environment of an operating system – but it is also that once I have that whole environment of the operating system, I might actually switch to something else, and then I have to switch devices, I have to switch operating systems, I have to switch applications, and so on. So the very large complementarity of a lot of different products actually leads me into a situation where the switching costs are higher.

Why are we looking at multihoming then?

Because it is to some extent an indication of whether there are these types of problems there. If I am using multiple things at the same time, I can actually switch between them without incurring those switching costs because my type of behavior is already organized around a number of different things.

I think we can see that then we can differentiate to what extent actually the networks effects are all that big. I think the network effect – for example, if you are looking at telecoms – was so big because there was a physical network there that was connecting us so that you were actually getting these economies of scale.

But when I am thinking about social networks and why I am multihoming, it has really – for example, with texting – very often been something of a coordination between two people where the other person told me: “Oh, we are communicating on this, but I like this other system. Why don’t you download it and we try it?” I download it and we try it.

In that sense, the number of networks that I am actually using in this has enormously increased, and there is a whole question of whether that is an environment in which switching costs really matter or whether network effects really matter, because I can be induced to at least partially switch in response to

something that someone else does. The coordination problem of changing a whole complementary environment is not there to the same extent.

That may be a bit different when we are thinking about apps in a given environment, where for me switching that whole environment may be more difficult or not. But even there, we are to some extent multihoming between, say, the Apple environment, the Windows environment, and the Android environment.

If you are looking at a lot of markets that work really well, especially two-sided markets, where someone on one side of the market already has a large number of people, they just leverage this into the other side and then sell to the other side of the market. So some of these networks actually are movable.

I think the question of "can we move, can others move; do we go all the way to an Uber model where the drivers are multihoming and the users are

multihoming?" – those are actually questions where we need to look at the markets very individually, and that is why these platforms are so different from case to case. It is always very scary that we are now trying to use one framework for all of these platforms with network effects, which I think does not correspond to the reality of these markets.

MR. CRAGG: Kai-Uwe, am I right that the extent to which you are protected from monopoly power in a basic network market relies on you being able to switch between networks but for a two-sided market that insight actually changes?

MR. KÜHN: Yes. But that is why I said even in a two-sided market – we have a lot of two-sided markets where you are getting entry – the question is, which market are you actually interested in? I think the real competition problems are usually in the monetized side of the market, not in the subsidized side of the market.

The point, though, is that in the subsidized

side of the market there is actually a lot of competition for people. If you are looking, for example, at the Tripadvisor model, they already did something that was very popular, and then they said, "Hey, we have got all the information to make hotel and other bookings," and managed to enter in that way.

I think it is the question of whether you can separate the network effects on one side and the other side and how easy that is, because incremental entry into another market when you already have a network of a given size on one side of the market can be pretty easy, and then you are reducing that problem of a two-sided network effect issue.

So, again, I think there is a difference there, but there are enormous economies of scope once you have a network effect established already on one side.

MR. CRAGG: Thank you.

Evan, going back to the question that we started with about what law matters here, and as Kai-

Uwe and Romy were talking about both multihoming and networking effects, three of the biggest cases, obviously, that have happened over the last twenty years are so involved Microsoft, Netscape, and American Express.

When you are working with your clients, especially those who find themselves in a platform setting, do you find yourself going back to those cases as kind of the hallmark of how you advise them? How do you go about developing what is going to ultimately matter in terms of a legal case, whether it be a merger or a litigation of some sort?

MR. CHESLER: The answer is a little bit of both, I suppose — that is, relying upon those basic bedrock principles in those cases, but also trying to anticipate where the law is going to go and where I want it to go on behalf of whichever client I happen to be representing.

When we began preparing the defense in the *American Express* case, for example, two-sided markets

was a subject entirely focused upon by economists;; there were no cases. People talk about the *Times-Picayune* case, but it was kind of a reach to fit that into the model of a two-sided market as we were thinking about it.

That was a case where we were looking at where we wanted to move the law to come out at the end of the day, as opposed to starting with existing legal principles and applying the facts of that particular case to those principles in advising the client.

In the case of the *Microsoft* issues, I brought the *Netscape* case against Microsoft almost twenty years ago. There, there was the U.S. case that had recently been decided, which really did move the goalposts with respect to considering Section 2 cases. That is to say that the traditional unity between the conduct at issue and the market in which that conduct played out was disrupted by the *Microsoft* decision.

This concept of taking actions in one market that are intended to maintain or develop or preserve a

monopoly in a separate market was a significant development that has evolved since the U.S. case, and certainly since the time I brought the *Netscape* case.

There again you have a new paradigm of conduct versus market definition, but the cases are slowly expanding that paradigm and developing situations in which conduct that does not necessarily relate to the market in which the defendant possesses power nevertheless can form the basis for an action.

In some cases, it is moving the law to a place that does not yet exist, based often upon the economic literature that is ahead of the lawyers and ahead of the legal system; and in some cases it is taking existing jurisprudence like *Microsoft* and trying to expand it to apply to facts that have not been developed yet.

MR. CRAGG: Lars, in Europe there is some similarity with the *Microsoft Media Player* case. Obviously, one of the biggest differences is the limitations on those with monopoly power, what they

are actually able to do with that. If you could comment on that, I would be curious how you think of that in a platform context where paying for externalities is a big piece of the economics here.

MR. KJØLBYE: From a European perspective, the *Microsoft Media Player* case was the first big case that involved network effects analysis. Of course, the first case was probably also the one where you found the most clear-cut examples of a two-sided market with strong indirect network effects, because the operating system that has the best app environment attracts the most users, and the operating system that has the most users attracts the most app developers, and then you basically get to something which can be a very virtuous circle if you control that operating system.

You see that repeated over time later on with Android, very much the same thing. In that case, interestingly, the Microsoft smartphone operating system, Windows Phone, failed. Why? Because they did

not have a rich app environment and they could not compete. I think also from a European perspective it is a very interesting case.

Coming back to what Kai-Uwe said, I completely agree with you that you need to look at this case by case. Again, Microsoft and the *Microsoft* cases are very, very interesting because since the leading case there in 2004 there have been a couple of merger cases involving Microsoft that illustrate some of the points that Kai-Uwe made, which I think are useful just to complement what you said.

The first one was *Microsoft/Skype*, where Microsoft was acquiring Skype, a consumer communications service. At the time, Skype had a huge user base compared to everyone else, about 300 million. It was back in the days when people were only just starting to hear that there was such a thing called WhatsApp, but no one really used it at the time, so the big player in town was Skype.

You might think that a service with that

large a user base would be characterized by very strong network effects. But the Commission concluded that that was not the case because when you looked under the hood, you saw exactly what Kai-Uwe said – namely, that you had users that used the service to communicate with a very small number of friends and family that they knew well, and it was therefore very easy for them to persuade their family and friends to move to a competing service or use several services alongside.

There were some estimates made at the time that the average user's personal network was about six people. So the 300 million was actually made up of a huge number of very small personal networks that you could easily persuade to move – or at least persuade to multihome – to another service. It makes Kai-Uwe's point very strongly that you do need to look at the specifics of each model to understand the network effects.

I also think your point about Tripadvisor is

a very interesting one. As you said, that is a service where you have a two-sided market, and you would think, *Normally wouldn't the Microsoft approach apply there?* Yet, you see that there were competing accommodation and hotel booking platforms that had been in the market for quite a while when Tripadvisor entered, so apparently the network effects are not so strong that they cause markets to tip in favor of one.

Again, the *Microsoft* case is a good illustration of what can happen, like in telecoms, if you have very, very strong network effects, but it does not mean that whenever you have a company that has a large user base that you have network effects. You need to look very carefully at each individual model and how it works before you decide whether there is a problem or not.

MR. CRAGG: Yes, that makes sense.

One of the things that both you and Evan mentioned is the economics literature, in particular the importance of the economics literature to the

development of the law. One of the things that is a little bit striking about the *American Express* case is it did rely quite heavily on a number of economics papers.

I wonder, Romy and Kai-Uwe, if you could perhaps comment on whether those are the right papers for us going forward, or is there a new literature that is even more relevant?

Just to set the table there, those papers tend to be what economists call "partial equilibrium" papers, so they do not look at the market effects; they simply look at the actual network owner. So in some ways you might think, *Well, those are actually the wrong papers to rely on because they are not equilibrium papers.*

Maybe both of you could give your perspective on that as economists, and then I would be curious to hear what Evan and Lars have to follow up with.

MS. ABRANTES-METZ: The papers they were

used in the *American Express* case addressed the issues that were relevant to the *American Express* case. Those may not necessarily be the relevant issues in either the same industry or other industries moving forward.

One of the things, aside from the partial equilibrium effect that you mentioned, the partial equilibrium model, is the fact that these are typically the papers used to assess monopoly pricing. So if you are looking into a platform case – several are already ongoing – where the allegation is that there is a monopoly, and they potentially also engaged in some type of illegal conduct – if we think about the but-for world, is there still going to be just one platform or two large platforms or two large platforms and many little platforms, etc.?

We need to calculate the competitive pricing to have an estimate of what is the critical mass. We need to understand how likely entry is to occur and whether multihoming would likely also happen.

All of these things need to have a different kind of modeling, what economists normally call general equilibrium models, that take into account the interactions of all of the agents within an entire system, and that also look into the evolution, the dynamics, of how would we have reached the new alternative world if we are in the context of litigation.

All of these things are critically dependent on the network effects, not only obviously but very much so, because very strong network effects make it less likely that many competitors, especially many smaller competitors, would be able to successfully compete.

I think that a new era of literature is coming through in the last several years that is going to be better equipped to deal with the issues that I think are going to be upcoming in the new cases.

MR. CRAGG: Kai-Uwe, do you have some thoughts on this question?

MR. KÜHN: I think it is really two things. The most important question is the use of economics and the economic literature in the application to cases. We have a lot of things where it is coming up again – which used to be the case but not so much anymore – where we get a lot of example economics. You want to get an effect, so you put a couple of assumptions together and say, “See, you can generate the effect.” Typically, now competition authorities take this and say, “See, we need to do something about this.” That is what I find very dangerous.

The person who first warned about this in terms of applied game theory was John Sutton with a nice paper called “Explaining Everything, Explaining Nothing?: Game theoretic models in industrial economics,” a critique of modern applied game theory, which was basically saying if you want to generate an outcome and you can find the assumptions to generate the outcome.

But what it taught us, and I think where

economics has so much gone into the individual case analysis, is that what you need in order to make your theory relevant is to make sure that the evidence shows that the assumptions actually hold in that particular industry.

I think what we are doing at the moment is very generally talk about things like network effects. I see this with some concern, for example, in enforcement in Germany, where people basically say: "Oh, it is a platform with network effects. Markets with network effects lead to tipping. Given that they tip, we cannot allow this merger because it would make them stronger, and therefore tipping would occur faster." That is essentially the argument.

I think that would be very dangerous because we do have some models in which we have multiple networks. There are models that come out with tipping, for example, but they are typically very homogeneous. If you have a homogeneous network and the main thing you care about is the size of the

network, you are going to collapse to zero; it is like Bertrand competition with homogeneous goods, and one will survive.

What we are seeing is that success in entry in these markets has a lot to do with product differentiation. To the extent that you have decreasing returns to network size and have possibilities of product differentiation, you may have actually much more fragmented markets, but not totally fragmented, so the scope that you have and so on – for example, in Amazon – may be a sign of the quality of the network.

What comes back is that we have a large literature on endogenous market structure that I think we have to think about applying to this kind of context in order to understand what are actually sustainable market structures, especially for interventions like trying to break up firms, because if these structures are endogenous, we are just going to create the same structure afterwards. Those are

the kinds of things we have to think about a little bit more.

It is not that the tools are not there, but some of these ideas have not been brought together in the context of networks.

MR. CRAGG: It does remind me, Kai-Uwe, that one of the places where you see enormous innovation right now is in the fin-tech space, where they are piggybacking on old networks like the Society for Worldwide Interbank Financial Telecommunication network or MasterCard's or Visa's network, to a lesser extent American Express's network, but all of the successful entrants are ones that are going after specific submarkets. They are differentiating themselves through their features and through their pricing for specific customer needs.

Evan, you are obviously someone who has made very successful use of the economics literature in recent years. Perhaps you could comment a little bit on how you think about the *American Express* case, what

the economist papers there stand for, and what doors are still open as we go forward in both the law and the economics.

MR. CHESLER: First, let me say that the *American Express* case was an example, as I said before, where the economics were ahead of the law and the challenge was to apply the literature in a legal context, where it is subjected to cross-examination. Although I greatly respect the academic tradition of peer review, it is not quite the same thing as a courtroom cross-examination. So it was very challenging to bridge that gap, to make that conversion.

To your question about where things go from here in the light of *American Express*, one place that is very much an open area to be developed is the question of price effects. In the *American Express* case, that was fairly straightforward, in the sense that there was a price charge on the merchant side of the market for the services provided to merchants and

there was a so-called "negative" price on the consumer side in the form of rewards, and a lot of the litigation centered on whether the two-sided price had ever been determined and if there was any evidence of anticompetitive effect.

But as the *American Express* two-sided precedent, if you will, is applied going forward, one of the places that I think is a very interesting place where literature is needed is: What do you do when one side of the market involves data and a not a quantitative commodity that is relatively easily subjected to a price analysis? How do you determine, for example, what the two-sided price is when the product on one side of a two-sided market is data that is not charged for? How do you then even approach as a matter of economics and then translate that economic principle into the legal context? How do you approach the question of placing value on both sides of the market in order to determine whether there has been an anticompetitive price effect?

I think that is a place where a lot of attention is going to be paid in the legal environment and I suspect is being paid and will be paid in the context of the literature.

MR. CRAGG: Obviously, there is a set of class action cases that have gone forward around data breaches of exactly the sort that you are speaking to, Evan. They are class action cases, and so the first question is how you certify a class. That goes specifically to the question you are asking, Evan: What is the value of the data?

One approach that has been used is to say, "Well, we can observe the value of the data in a black market." I am wondering what you guys think of that as a potential solution to Evan's question about what the value of data is. Is that going to lead to an understatement of the value or an overstatement of the value?

MR. KÜHN: I think it is really the question of "What data?" A lot of people would be thinking,

Oh, you have a zero price; therefore you are paying with your data. I think that is wrong because the two-sided market models tell you that you get a zero price for other reasons than you giving something up, which would be data.

But I also think the value of data to one side of the market is very different from potentially the value of data to another.

It may actually also not be the same product. If a platform company sells its data – to the extent that they do; very often they do not – but to the extent that they do, that is already a structured data set that they have collected and had to prepare, so there is a different type of product in that that is actually being sold.

For me, asking that question in terms of “What is this other product as a price on the zero side of a market?” is also problematic because the issue is not so much “What is the value to me of retaining the data?” but it is the value to me of

avoiding an externality, that I might actually not even know what the size is.

I think we might come back to that discussion. I think that is much more problematic because the damage might actually be in a use of the data that was not even intended by the platform that is the other side of my transaction but might come up somewhere later in that chain of the data being used and being passed on.

I think the problem is even worse than saying, "There is no price for that." Otherwise, you would say, "Oh, let's just introduce prices and it is all good." I think there is a far deeper problem that comes from the measurement of what external effects could be on me from data being transferred from someone else and being used.

That is not a solution to the problem, but I think the problem is deeper than just asking the question of "What is the value of data to you?"

MR. CRAGG: Lars, you mentioned the

Nokia/Microsoft case earlier. When you look at the cases that have actually played themselves through into a regulatory setting or into a legal setting, it is quite striking how long that plays itself out. As we know from yesterday's congressional report, for instance, there is a great focus on the handful of networks that have succeeded.

Do you think there is an overemphasis on the successful networks, that as you look back at history, there is either a little bit of evidence or a lot of evidence that says that some of the concerns about networks are actually overstated and that Jeff Bezos might be more right than we think when he says that before he dies his monopoly is going to go away — although he does not, I think, use the word “monopoly.”

MR. KJØLBYE: I think there is some of that. If you look back in time, you could say that the enforcers and the political establishment have been used to having one very large and powerful tech

company around. You started off with, say, IBM, then you had Microsoft, and then you had Google. I think the concern is that at the same time you have now several large companies and the economy is seen to be in transformation and digitization is spreading across the entire economy.

Therefore, I think you get a bit the same concerns that you had with Microsoft and Windows, that people are saying, "Well, if Microsoft can integrate features into Windows without any limitation, where does it end?"

Now we are seeing that with several large platforms in parallel, where you would say, "Well, if there are no limits to how much each of these or collectively they can spread, they end up being involved in a large share of the entire economy."

If you look at it from a European perspective, for instance, the car industry is one of the remaining strongholds of European business, and there is clearly a lot of concern about what happens

if Google or Apple get into the car and control the value of the car. I think what you see now is a reaction to fear of the unknown, rather than necessarily having sat down and rationally looked at what the magnitude of the problem is, if any. So I think there is some of that.

MR. CRAGG: Yes. I am conscious of time. We have just a couple of minutes left here, so I will just make a couple of observations about our panel.

First, I would like to thank them. It is very interesting to me. We had a preparatory meeting earlier this week or last week, which was equally engaging. We could have gone on for hours, I think.

What is quite interesting about that is that the conversation we had today is not a mirror image of that conversation; it is quite a different conversation. I think the takeaway is, as our experts are identifying for us here, that these issues require detailed and careful examination, that it is very much not a "one size fits all," and the jurisdictions are

going to matter a lot.

The other thing that I would take away from this is what Lars is I think pointing to, which is that when you look back it creates a fear of the unknown. But if you put yourself at the turn of the century, I think very few people would have predicted that you would be witnessing essentially a battle of titans, for instance, between Epic and Apple in the way that they are now.

I would just note that when you look at where software markets are evolving and where technology markets are evolving, there are a couple of things which I think are worth pointing to.

One is obviously cloud computing is a major game changer; it is going to change the way we interface with our data and the devices that we use to do that. The other game changer is the transition to 5G and ultimately what that is going to mean for the backbone and the last mile and how we think about the relationship between hardware and software.

The last thing I would have people think about is, for those of you who have been involved in venture capital, IPO-stage companies, one of the things you will notice is that the hottest part of the market right now is the software-as-a-service model, which is a transformation of where we were previously. The other transformation of where we were previously is the idea of premium software.

As I look forward and ask the question "Do those past cases give us insight?" – I would say the cases involve both the economics and the law – "does it foreshadow where we are headed?" I would say that it does not really provide us a strong grounding from a regulatory perspective.

Prior to the conversations I had with this crew, I am not sure I would have held those perspectives in the way I do now.

I just want to say thank you to our panelists and thank you to our audience. Bye, everybody.

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Closing Remarks

MR. KEYTE: Thanks, everyone, for a first very full day of the Fordham Competition Law Institute Workshops.

Thank you to Edgeworth and Brattle for some incredibly in-depth economic analysis, which is what we have always been trying to achieve with the Economic Workshops.

Thanks also to our Heads of Authority panel. It is very interesting to get such a broad perspective, and we will try to figure out how to do that again even when we are live.

Tomorrow, of course, is a very full day with a networking breakfast. Please attend those. We will work out the kinks on the Remo platform this afternoon. That is with Skadden and Clifford Chance and in the afternoon with Freshfields.

Then, of course, we have Executive Vice President Vestager and Assistant Attorney General

Delrahim, a tech panel, a mergers panel, and a Fireside Chat with Barry Hawk and Bill Kovacic.

We will see you all tomorrow. Be ready for a full day. There will be opportunities for questions from the audience in all of the panels as well.

Thank you very much.