IN THE COMPETITION APPEAL TRIBUNAL

Case No. : 1282/7/7/18; 1289/7/7/18

Salisbury Square House
8 Salisbury Square
London EC4Y 8AP
(Remote Hearing)

26 April 2021

Before:
The Honourable Mr Justice Roth
(President)
Dr William Bishop
Professor Stephen Wilks
(Sitting as a Tribunal in England and Wales)

BETWEEN:

UK Trucks Claim Limited
v
Fiat Chrysler Automobiles N.V. and Others
and
Road Haulage Association Limited
v
Man SE and Others

Monday, 26 April 2021

(10.30 am)

HOUSEKEEPING

THE PRESIDENT: Good morning. I should start, as usual, with the warning that these proceedings are being heard remotely, but they are as much formal Tribunal proceedings as if they were held in person in the courtroom at Salisbury Square House. An official transcript is being made, and they are being recorded by the Tribunal, but no one else is allowed to make any recording, audio or visual, of these proceedings, and to do so is a contempt of court and punishable as such. We will take, as usual, a short break mid-morning for the benefit of everyone, not least the witness, and if people lose their connection those who are on the Teams platform, if they send a message through to the registry we will try and pause if appropriate, and with that I will ask the registry to swear in Dr Lilico who I can see on screen.

ANDREW LILICO (Affirmed)

THE PRESIDENT: Good morning, Dr Lilico. There seems to be a slight echo which is no fault of yours, obviously, on the transmission. We will see how we get on, it may be that someone is not muted who might mute, and often that's the solution. Thank you, first of all, for coming to assist us this morning. This is not the sort of rigorous cross-examination that experts get at a trial. We really are wanting to, having read your report, to understand a bit better the method you are using, for you to clarify certain aspects for us. We may put some of the points that have been made by way of criticism, which I'm sure you have heard, not only in the written reports but I suspect you have either watched or read some transcripts from the proceedings of last week, for that purpose, and that will assist us in the exercise we have to carry out of really assessing how effective and plausible that methodology is going to be to deal with what is, on any view, quite a difficult problem of assessment of quantification.

So, I shall hand over to Dr Bishop to ask you some initial questions and Professor Wilks and I may then chip in from time to time.

DR BISHOP: Yes. We are all three going to do this actually, Dr Lilico, but very good to meet you. I don't think we've met before, other than in a previous hearing of this court, and as the president said, the task here this morning is not to cross-examine you or anything, but to understand your model, and how it would fit in, how it fits into a coherent litigation plan. It is a screening exercise, effectively.

Now, the trucks industry, truck manufacturing industry, seems to be an oligopoly, and could even possibly be described as a tight oligopoly, depending on what one means by that, but I take it you would agree that it is an oligopolystic industry, do you?

DR LILICO: I'm not sure that I have a strong view on that. It depends what you mean by an oligopoly. Obviously there are six or so major players, so in that sense it is really an oligopoly rather than there being, you know, hundreds of players or something, and there are probably some barriers to entry, so that there are some limits to how many more entrants you could get immediately, (Inaudible) I'm not altogether sure but they are probably sufficient for the -- presumably sufficient for the cartel to operate.

On the other hand, I don't think that that necessarily means that you would treat it in the sense of an oligopoly in the sense of the individual firms having market power outwith a cartel. There are a number of reasons why you might think that that wasn't very likely. One is that you might think that -- so one might imagine, supposing there is a particular sort of truck, and one firm sold that truck, and others didn't, because, obviously, there is a variety of different kinds of product, you might think, well, they might have some market power in respect of that truck, but there is probably fairly high supply side substitutability across this sector, so if somebody were making a kind of truck that others didn't make and they were attempting to sell it at above the competitive price, somebody else would transfer their connection capacity and compete with that truck, so my inclination is to think that it is possible (Inaudible).

DR BISHOP: Sorry, your words were lost there for a moment.

THE PRESIDENT: Yes. We've got some interference. Can you just repeat -- and it is happening again. Can I just ask, just on the technical side, are you at the solicitor's firm at the moment?

DR LILICO: Me?

THE PRESIDENT: Yes.

DR LILICO: Yes, I am in the same place that -- you can see it from the background, the same background that there was the other day, sir.

THE PRESIDENT: Yes. I don't know if there is someone there who can help on the technical side. We will go on at the moment, but it is not fair to you if your voice gets echoed in that way, but just carry on at the moment.

DR LILICO: I understand. There is a -- but of course in some of the models which I present there is market power outwith the cartel, or some degree of market power created by product differentiation, for example, so I think that it is possible that it is best seen as a form of oligopoly. It is also possible that it is best seen as a pretty competitive environment. Both of those I think possible -- that's the way things stand.

DR BISHOP: Yes. I see the arguments, and I agree with you that you can't characterise an industry and go to an outcome, merely because of the number of players you observe. I entirely agree with you. Supply side substitutability you mentioned, and that's obviously a major possibility.

Some of the economic critics, though, and -- say that the look -- well, a possibility here is that these firms, though they don't have much market -- a large amount of market power, each one has a certain amount, and that it's not particularly difficult for them to refrain from competing as vigorously as they might if they were in a -- if they faced many more competitors, and as you know there is a large amount of -- a large literature in economics -- talking of the -- investigating this phenomenon that with relatively few producers the outcome seems to be, frequently, that each firm earns a healthy margin over and above what the competitive level would suggest.

Now, you say that's not necessarily the case, and I agree with that.

I think the criticism that's been offered of you is that you don't allow for that -- for the alternative possibility, that the oligopoly might have a pricing outcome which is well above the competitive level, but albeit short of the perfect monopoly level. That's the criticism that has been made.

Now -- so I guess my question is, how would you take into account, in your procedures, the empirical possibility that the post-cartel outcome is an oligopolistic outcome, and that for the pre-cartel outcome there would have been some degree of co-ordination that may have had quite a modest effect only on the price and on the profits of the companies? Can you take that into account in your procedures?

DR LILICO: So, well, I would have thought that the most natural way to think about the possibility that there is non-trivial market power in a competitive movement is to see each firm as having a little bit of its own captive market, and that seems to me to be the same thought as the idea that there is non-trivial amounts of product differentiation, so if you had a moderate amount of product differentiation then each firm has a little bit of control over its own market demand curve, so there may be some -- so you can have an intermediate

(Inaudible) which is not no substitutability and -- but it's -- or complete monopoly position, and it's -- but neither is it full competition. It is a position where you control some of your own demand curve, and that's exactly what happens in the cases which we model of intermediate, or moderate, we call it -- we consider maximal and minimal -- they are both levels of intermediate market power, so I completely agree that that is a possibility, and that's exactly why we have models presenting that possibility.

If you were to think about how one -- whether one might have the idea that in the period of the cartel, the co-ordination didn't change the amount of market power relative to the post-cartel period, well, it seems to me that there is nothing really that stops one from considering -- so you set up a model, you calibrate it on the basis of the non-cartel period, and you ask, was anything actually different. You apply that to the cartel period, and you see to what extent that explains the data, and if your model, based on the non-cartel period and assumption -- and period of whatever the level of competition is that you are assuming there, applies better to the data of the cartel period, then a model based on the cartel period explains the non-cartel data, then that would tend to support the idea that the cartel was adding little to the -- whatever level of market power was present outside the cartel period.

DR BISHOP: Okay. I understand that, and that saves me a question because I was going to ask you whether that was contemplated, using the post-cartel period as the training set, as it were, to calibrate the model, and then applying it to the cartel period.

DR LILICO: Absolutely.

DR BISHOP: Yes. Okay. Now, so you are really adopting a before and after approach in that segment, what you are doing. You are -- so in that sense, it is the same -- the spirit is the same as the more standard econometric approach, which doesn't bother with the structure, just estimates the outcomes, and you are basically -- you are not doing the same thing, but it is driven by the same principle of letting -- of comparing the before, the cartel period, with the after period. Is that correct?

DR LILICO: Yes. That's a point of general principle, yes. Obviously the methodology by which one does that is quite different, but the spirit of the thing, of course, you consider what happens in the non-cartel period, you consider what happens in the cartel period, you can also do things like, you can think about the run-off period in the same way, so you could see to what extent your model based on the cartel period tended to match the data in 2011 or 2012 and you can do the same, you can see whether that's a better explainer of the data than the assumption of whatever you are generating as your competitive scenario, so -- and that can let one think about, you know, imagine that we've done some provisional thinking along those lines already. I mean, other things that one can do to test the robustness of things would be to do iterative interpolation, so you could think about if I had a model that was just based on 1997 and 1999 to 2010, but I missed out 1998, how well it fit in 1998 and sorts of things as well, so there are all kinds of ways here that one can probe with a simulation methodology how robust things are, and of course, I also envisage, as I'm sure you are aware, using the simulation model in collaboration with other methods as well. So, for example, if one were wanting to -- it might be that -- it depends how things go, obviously one hasn't seen what the data is -- but it could be that you ended up with some econometric model that produced a rather wide range that wasn't, in itself, useful but that wide range might help you to discriminate amongst simulation outcomes insofar as you had a black box result, so if you had some unobservable feature of a simulation model and the outcomes were more different as a result of that, than you were happy with, it might be that the econometric methodology, even though the range was wide, it allowed you to cross-check if that range overlapped one of the simulation models but not the other, but then that would help us to say, well, it seems that we are likely to sit -- the econometrics tells us we are likely to sit at this range and we know that the simulation -- that means that we tend to favour this kind of simulation model over theirs.

DR BISHOP: Yes. I see.

THE PRESIDENT: Can I just ask, Dr Bishop before and after. In this particular case is it more after rather than before in terms of calibration?

DR LILICO: So when you come to think of before and after we perhaps mean before and after an event, so the event might be the end of the cartel, so I don't think we are meaning here -- I don't think I understood Dr Bishop not necessarily as meaning before the cartel and after the cartel, but before and after the relevant event, namely the end of the cartel, so that's when one talks --

THE PRESIDENT: Yes.

DR LILICO: -- so before and after methodologies tend to mean before and after something that one is considering the significance of.

DR BISHOP: It is a fascinating idea, having a really good model of how an oligopoly operates and so on, but -- and being able to get some handle on whether the cartel had much impact or not which might have been huge, might have been small. However, the data demands are, you know, very considerable. In a more traditional econometric approach, you don't care about the marginal cost of the different firms and all the rest of it, you just look at what the result is in terms of the prices, and you quantify it by comparing before and after price effects. I guess the question arises of, you know, it is intellectually fascinating for someone with my background to have such a model presented in damages, but fascination for me is not one of the objects of the law, it is really a question of how we can quantify.

What do you think the simulation approach would add to the more conventional econometric approach?

DR LILICO: I think I would put two answers to that question. First of all I would -- there are two points where I might caveat slightly, which are I wouldn't say that a simulation approach of necessity involves use of the requirement to have more data than an econometric approach. The thing about the simulation approach is that you can produce an answer with very parsimonious amounts of data, and the more complicated one can make it, the more rapidly the data escalates. So I would say that if you are content with a relatively simple model, then a simulation model is going to require less data, but as it were relative to the amount of data that any added levels of complexity from a time series, or, sorry, some kind of before and after econometrics model might require, whereas that might, as it were, rise linearly, then it might be an exponential rise in requirement, so we probably start with less need of data, and as things get more complicated the amount of data that you want to -- that you need for a simulation model increases.

Secondly, the notion -- I'm surprised by the various considerations here, that there was something strange about a simulation model approach, that it was somehow unconventional. As far as I'm aware, and I have used simulation approaches in previous cases, it's a perfectly ordinary way of doing things, that people have used in other cases, and it is, indeed, one of the main recommended methodologies in the European Commission's guidance on how to do these things, so, now, as to the question of why I particularly think it is of particular relevance here, to me I would -- if you have got multiple -- if you have got a lot of money at stake, right, in a fairly -- in a large, you know, fairly elaborate market like the trucks market, what you have, I would have thought it was worth thinking about the question in a number of different ways, so you might think about it in terms of simulation setting, some before and after econometrics, and I would suggest thinking about it in terms of a synthetic counterfactual method, there is a lot of money at stake so you might as well get it right, I would have thought.

Now, an issue that -- so one kind of issue is, if you can do econometrics and there are a number of other things that might happen, I think it would be incumbent on you to check that the amount of money you are asking for isn't more than an efficient cartel would set, and that's been a hurdle where, in another case, the claimants failed, so there was another case where somebody was doing some -- they sought a method based on time series type extrapolation, when we did a simulation it turned out that the amount they were requesting was more, so I -- to me, one of the -- a key step in these settings is to make sure that when you ask for some certain amount of money based on the econometric methodology, you have checked that that amount of money isn't more than an efficient cartel would set, and to me a simulation model is a key way of thinking about that question.

If I'm -- in this setting as well, because it is going to be a long and complex case with all these hundreds of thousands of trucks covered, I would want to sit here and present to you a methodology I was confident was capable of producing an answer that was -- that sat within a reasonably narrow range, based on data that I could be very confident existed. I wouldn't want to come with a methodology that I think might, at the end of the day, produce an answer that was a half a billion or 50 billion and I couldn't really say what it was, or a methodology -- and some statistical methodologies might run that risk, and I might come in just a moment to why I think that before and after methodologies run some risk of that and see a devastating risk, but there is some risk that you would end up with a rather wide range of possibilities. Similarly, although I think that the synthetic counterfactual method is quite valuable, in principle, one thing that can happen with the synthetical counterfactual method is you go and you get your donor pool and the answer is there isn't any match, so I would be embarrassed to come to you and say we can proceed with a case that's going to cost millions of pounds based on a methodology where I knew that there was the possibility, even if it might be -- I'm optimistic that that won't happen, I wouldn't be proposing it if I thought it was likely -- but if I didn't feel that I could guarantee that the methodology had a pretty good chance of producing a reasonably precise answer, and in this setting I would have -- to me the most straightforward way of demonstrating that a simulation -- that a methodology can produce a reasonably -- is capable of producing a reasonably precise answer, is to do just that in respect -- with the data that we've got. Obviously it is provisional, and there will be all kinds of the questions which I have highlighted myself as to things to investigate further in the process -- in the course of the case, partly as a matter of evolving thinking, what happens in other cases, and, of course, on the basis of the data, and of the decisions once we know more of the detail of what they did from the European Commission.

In terms of just coming back to this point about one of my concerns about relying totally on a time-series method, there are issues about the data and, I think, other experts have readily conceded that it could be problematic getting robust data from before 1997, certainly on a basis where you could be confident that the methodology of gathering the data was consistent with that in the post-cartel period. We know how methodological issues can arise even if you are using a similar -- apparently similar methodology from just considering things like ONS -- the debacle over the RPI series with the ONS, and how you got some changes. In fact in this relevant period, that's to say 2010 to 2013 emerged over the gathering of that data, so there is that, but actually it is more ambiguous than that, is the question of attribution, so there is a number of ways that the attribution issue arises, and I have counted attribution issues myself when thinking about very long-lasting activities, trying to do those in econometrics, I think there are a number of things which I have raised, but perhaps the most straightforward to illustrate what the problem is, is the following; in the period -- so from 1994 to 2007 to early 2008, we had a period of very strong macro-economic growth. From the period 2010 or 2009 onwards to today, we had a period of low macro-economic growth. Now, obviously there will be some attempts to introduce controls of various sorts for the indications of more rapid and less rapid macro-economic growth in the period, but when all is said and done, what you have is the considerable majority of the cartel period is a period when the macro-economic is high, a considerable majority of the non-cartel, post-cartel period is when the macro-economic is low, and I worried that the question of how you disentangle those two, I mean, you are, to some extent, going to depend on what happens in 2008 to 2010, and that, of course, is a rather peculiar period. You may even have specific controls for those periods as well, so you are then going to have a problem of how you attribute effects. That's not just a matter, you might think, well, I mean, obviously there are techniques for looking at this, but when you think about a truck which is going to last over a number of years, so I'm buying a truck and it lasts for five years, it's not even as though I can get a lot from the individual deviation of particular years. Obviously in some years from 1994 to 2007 the GDP growth is going to be 3.5 and others it's going to be 3 and you might think you can get something out of that, but, of course, the truck is over multiple years. If I'm thinking about a second-hand truck, well maybe what happens within that one year might be enough, and so that might allow me to control it.

Now I'm not saying that these problems are necessarily prohibitive, right? So I'm saying I could -- that I can use a time series analysis as well, but it seems to me that when you have a question that you might face some difficulties of attribution and the one that I have painted is only one of a number of difficulties of attribution for a cartel that lasts as long as this, and you don't have other controls, so I see that there is some talk in other cases, that, you know, like trucks or something might be used as a comparator, as I understand it, this is a rather unconvincing comparator, it may be it emerges that it is a more convincing comparator, I don't know, but as I understand it, we are unlikely to have a (inaudible). We are not going to get any of the normal comparators we would use if we were trying to do a parallel model say, from other European countries because we can't use French, German or Swedish trucks or something because they are all subject to the same cartel, so our ability to use comparators is quite limited, our data before the period is unlikely, so we are dependent on during and after, the during relative to the after is subject to quite significant attribution problems, and I would have thought that in that context it was useful to have another string to one's bow, so that one wasn't completely dependent on the econometric methodology but would have something like a simulation methodology as something that worked together with the econometric methodology, so as to gain confidence that you were going to be able to narrow down the answer.

DR BISHOP: Yes, I see the logic, and I think as a principle it's always a good thing to have other fairly independent approaches to the same question to inform decision-making about how much value you attribute to each one.

Your approach was to have simulation in the foreground and econometrics in the background, but there is nothing that would stop you from saying, well, actually, the econometrics is the more convincing here after we've done all the work, so -- but let's take a look at -- I mean the problem that you put, the macro-economic background being different in the -- certainly to 2008 and after 2010 with the little question mark about '08, '09 and '10, is what should be a -- is a problem that's common to both approaches, isn't it. It's also true that the simulation approach would have to grapple with that problem, that the --

DR LILICO: It is certainly something that one would have to grapple with, but what we have in that setting is because we are going directly to the causal mechanism, so the causal mechanism for the creation of the cartel is built into the construction of the different models and the different kinds of approaches across the bearing, it is the case that that might give you some challenge in thinking about how you draw things out from one period to another, so, for example, if we were doing the exercise that we described earlier of calibrating the model based on the post-cartel period and applying that to the cartel period, it's definitely the case that you would have some of that challenge. I don't reject that point at all, but it seems to me that the question of attribution is likely to be less significant for the simulation model because of the construction of the model, the attribution is built into the model, and also, secondly, because you are working -- if you are working together with other approaches, if you are making your various model approaches work together, then you might have a question of -- if you are having your various models work together, then you would have a better chance that you are not -- that the problem which you have identified of attribution has not arisen, because if you approach the question in different ways and it produces the same answer, then you can be confident that it's less a construction of the way that you did it.

Sorry, let me put it that way. I slightly waffled there, but that was what I was trying to get at. If you have got multiple approaches then it is less likely that it will be built into the way that you did it that you get the answer that you did.

DR BISHOP: Yes, I agree with the general principle that multiple approaches does give you some hope that you might be able to identify things that are driven by the model approach, but let's -- but the -- you say that it is built into the simulation approach that the attribution problem is addressed. I'm not sure I understand that. We are now taking this model that we've been discussing in which you build a model of the oligopoly in the post-cartel period, then you use that to compare the outcomes in the cartel period, how -- in what sense -- I mean, we have six large firms imperfectly co-ordinating is the way this thing is going to work. How is it -- how does that address the attribution problem? It is the same oligopoly in both periods.

DR LILICO: Well, because what you are doing is, if you are calibrating on the post-cartel period, for example, all of your -- if we focus just on this question of the macro-economic effect, you have a common macro-economic environment for that, and you have your cartel period and you have a common macro-economic environment, a reasonably common macro-economic environment during the cartel period, and so in each case the model is -- it is not that the difference between the two periods is being defined by a variable which is that difference, right? So if I do some -- and these things are a matter of degree, as I said, but if I have a statistical model and I have something going on in the cartel period, and something going on in the non-cartel period, that difference between those two things I have to work out where it is coming from, right? Whereas in the simulation model, if I'm looking at the non-cartel period and I work out a model for that -- for what's going on there, and I look at the cartel period and I work out what's going on there, then the connection is -- so I'm not proposing, bear in mind, that you work out the amount of the overcharge by comparison of the two. So I'm saying you work out the overcharge by comparison -- by looking at your -- by constructing your model, but it's not that there is -- it is a difference -- sorry.

So if what you did was to take the cartel period and compare that with the model based on the non-cartel period, and then extrapolated that backwards, then you would face almost exactly the same problem. You have got your -- you have got a difference between the two, and it might be difficult to tell what was the cause of the difference, but that's not -- so if you were to do things that way, and I think that may be -- it wasn't clear to me what you were saying initially, but I think that may be what you are saying, and I agree, we've got very much the same problem, but if you calculate things based on the cartel period and the various analyses of what's going on, you will end up with a model which says what an optimising cartel, or whatever degree of optimisation of the cartel once you decide on your final model, produces in terms of the overcharge based on that period. You are not dependent on the difference between the two periods in order to produce the answer.

You will still have a problem of the -- how your calibration produced an answer, so you still might say, well, you know, I have got -- something goes on in 2008 and 2009 and 2010 and I have got my data from 1997 to 2007, it may be that the answer you produce is distorted in some way by that.

DR BISHOP: I'm just a bit puzzled. We began this part of the discussion by -- I was noting the large literature on oligopolistic outcomes that are not cartel outcomes, and that seems to be the background in this industry, so I had supposed that you envisioned a model of the post-cartel period, and that was the benchmark used for comparison of the cartel period, but if the cartel period had identical outcomes, then there are zero damages, if the cartel period had elevated outcomes, then the damages are the difference between the cartel period outcomes and the post-cartel period outcomes.

DR LILICO: That would definitely be one way of doing things, I agree. One issue -- so that might face, and insofar as one did that, one would face an issue analogous to the problem, ie you are quite right, insofar as one did that one would face an attribution problem of exactly the sort which I described earlier, so I don't pretend that the simulation model is immune from the attribution question, it's merely to me a model which is purely statistical here, which is more likely to be subject to the challenge of being dependent upon the fact that the periods under consideration -- all you have really got to play with in that setting is the difference between your two periods, and if you -- if there are too many things going on in a consistent way in one of those periods relative to the others, it will be hard to say which of them in a statistical sense is the one that you should rely upon, so that's really -- I don't pretend that, as I think I said from the start -- I don't pretend that the simulation model is immune from that problem, it's just a thing which is statistical doesn't have anything else -- doesn't have any other tools, whereas a simulation model has other ways of thinking about that.

DR BISHOP: Okay. All right. Look, our purpose here is not to, you know, make some decision on what we should do, but just to see what you are thinking about and whether it's plausible, and so on.

You did say that there are cases in which simulation methods have been used. Now, I'm well aware of merger cases in which they have been used, and even had some involvement with it myself, but I'm unaware of damages cases in which simulation methods had been used. Can you point me to any cases in the public domain?

DR LILICO: I have certainly used simulation methods in cases which have settled, so that has been a thing which I've done.

DR BISHOP: No, we were well aware of that. Nearly everything settles in this jurisdiction. I was just wondering if there was any case somewhere, I don't know, have we found one in some follow-on case in the United States or in Australia or something where a simulation method was used?

DR LILICO: I think that there have been some -- I believe that there were some references to cases, certainly, as you say, merger cases where it was used. The method -- it sounds a bit more like a lawyer's question than a question for me, perhaps, but I think that I mentioned in one of my -- some obscure footnote somewhere, if I can remember where it was, some of the -- some other

cases. Let me see which one I was thinking of.
THE PRESIDENT: Well, Dr Lilico, you can send us through the solicitor a note afterwards. You don't have to turn it up straight away.
DR BISHOP: Yes. Now, the simulation method is heavily dependent on reaction functions, and on marginal cost, and it necessarily makes some edit -- all models I have seen assume linear reaction functions, and they assume marginal cost is within any one unit of observation, say a quarter or a year is uniform in that year and doesn't vary. Those, of course, are simplifications, so a lot depends on the observations on marginal cost, and on the shape of those reaction functions, and --
DR LILICO: (Inaudible).
DR BISHOP: Sorry?
DR LILICO: And potentially the shape of your marginal cost curve as well.
DR BISHOP: Absolutely, the shape of the marginal cost curve. Marginal costs are notoriously difficult things to pin down. I guess what I'm feeling for is how confident you can be when damages are going to come out of this, people are going to be told they have to pay a lot of money, how confident we can be that the outcome doesn't depend on decisions made about what marginal cost is, and what the reaction functions are. The

reaction functions in the method we were discussing get estimated, but the marginal cost is something that, you know, is so much harder to know about, and the shape of the marginal cost curve, as you rightly say.

How confident -- I'm just wondering if you can give us some comfort about this?

DR LILICO: I can sir. Well, the first thing which I would say, which you probably expect me to say, is that marginal costs are probably best thought of as an economist's abstraction, a kind of calculation step, rather than things which you can necessarily observe in data, so a marginal cost that's in the nature of a marginal cost, that doesn't mean that it is completely de-anchored from data, so one would -- so one kind of question would be to consider where one looked at the data, even if a marginal cost, as an economist uses it, didn't match very precisely with analysis of variable costs in accounting data and financial data and so on, you would hope that it might have a reasonably similar shape.

So, one of the -- so one way in which you might think about these things would be to -- if you produce -- marginal cost is really a proxy -- it depends on the model but could be a proxy for a competitive price or it could be a calculation device in the -- in a model where there is some degree of market power outwith the cartel, so you would -- you might consider how convincing the match is between the implied shape of your marginal cost and the implied shape of marginal costs in the -- in whatever data you have on costs.

Another question is, which, to me gives me some comfort, is the match across cartelists. So if you found that your calibrated costs have very different shapes in different years for different cartelists, you would then worry that you hadn't properly captured the evolution of the sector of the -- because the costs for the sector, okay, they may not be exactly the same for different cartelists, but the evolution through time should reflect some kinds of things going on in the rest of the world, and one of the things that could give some comfort in respect of the -- say, for example, the product differentiation models, is that you get a similar characteristic shape for the different cartelists.

So you can -- if you have got -- one of the ways that you would think about these things would be you would challenge -- if I saw a model and it turned out that the calibrated costs were very different for different cartelists, some went up and down, some went down and up and some stayed the same or something like

that, or if there were big spikes from year to year,
high volatility, then I would say, well, there is
something going wrong, probably with your model, in that
setting, whereas if the different players tend to
exhibit a common shape, I would be likely to interpret
that as inclined that there was some common industry
background trend here that your model was capturing on
a reasonably consistent basis.

So -- and that's just one illustration of the way --
or perhaps two illustrations, matched with the variable
cost evolution shape and the common shape across
different players, but it's absolutely the case that
when all is said and done, one shouldn't have the
impression that a marginal cost is something which one
can go and look in somebody's accounts to find. That's
not the --

PROFESSOR WILKS: Would you mind if I came in as a rather
naive, non-economist on this?

DR BISHOP: No, go ahead.

PROFESSOR WILKS: On this whole question of marginal cost,
could I ask a question about how it actually works out
in operation, and could I take you to your first report
and to the -- the bundle number is {F/1/37}, so it's
when you are talking about calibrating your model.

DR LILICO: Yes.

PROFESSOR WILKS: Are we on the same page?
THE PRESIDENT: That's page -- we've got various page numbers. It's page 34 within the document --
PROFESSOR WILKS: Yes.
THE PRESIDENT: And F/1/37 in the bundle.
DR LILICO: I see it. Yes.
PROFESSOR WILKS: Okay? Your third paragraph down you talk about prices observed in the post-cartel period, 2011 onwards, as being a determining price for your marginal cost calculation, and you say the price would be equal to the marginal cost.
DR LILICO: Correct.
PROFESSOR WILKS: I really had two questions about that. One was, at the end of that paragraph you said:
"We can then use the trend in marginal cost to establish ... what the marginal cost would be ... in each year of the cartel period"?
DR LILICO: Correct.
PROFESSOR WILKS: My question was, what is the trend? How does one define or determine the trend, and my second question is; would this still be your approach? Because I appreciate this is 2018, and the debate has moved on somewhat. So if you could explain the trend first, that would be very helpful.
DR LILICO: Yes. Absolutely. So in this particular model,

one of the simplifying assumptions in this model, to generate a result, is that there is an underlying cost trend which is linear, that's the assumption, over the period of the cartel, subject to the changes associated with the different Euro standards. So it's not completely linear, it's linear but as the different Euro standards come in, they cause kinks in that linear trend.

The linear -- so we need to solve for a linear trend. The way -- when we -- so we don't want to have too high, we want to minimise the amount of deviation that our model, given our cost assumptions, that our model predicts for the prices, from the actual prices over the period, so the model -- the architecture, the maths of the model says if the costs are like this, then -- and the other assumptions that we've made, and so on, then the prices will be like this. We compare those prices with the prices in the cartel period and we say we want the minimum average deviation, or the sum of the squared deviations over the period. Then we have a further constraint because I'm illustrating the way in which you can use the post-cartel period data so as to test, because one of the things you want to be able to do with your model is show that it doesn't only predict -- it is calibrated to give a good prediction within the period and you want to say how well does it predict what goes on out of period.

PROFESSOR WILKS: You track back your marginal cost figure of 2011 back over the earlier period of the cartel.

DR LILICO: I use the period that -- that period -- to create a trend, and I then say you are not allowed, the model is not allowed to produce an answer that deviates by more than a certain amount from the 2013 number because I'm illustrating how you can use the post-cartel period to constrain the answer, so when you consider what that 2013 cost number ought to have been, given the rest of the analysis, then your trend shouldn't produce an answer where the deviation in 2013 is too high, so I say it has to sit within the same kind of level of deviation that you get from year to year, so you would have a number of shocks in the model, so in no year do the prices perfectly match what the costs are, but -- so -- and I interpret those as shocks of various sorts, so the cartelists are allowed to charge higher, as it were, in the model, without being cartelists, insofar as there is a cost shock in those years, but if you then were positing that you had some extraordinary cost shock in 2013 that was completely unlike those in the other periods, you would worry that the model wasn't doing very well at predicting the post-cartel period.

So as it happens, the way that it works out here is that that constraint means that we would have ended up with a higher answer, right?

PROFESSOR WILKS: Okay. I think I'm following that, and this is still very much your actual content for how you propose to implement the model. This is still your approach.

DR LILICO: Well, my approach is -- the approach is to use simulation models of various sorts. So the exact one that I would use -- so I'm not saying that I would necessarily use exactly the model which is set out here, though for various of the reasons I have described, my feeling is that the -- that the level of individual market power here is -- one should expect not to have been terribly high with the cartel period, so it may be that the undifferentiated model isn't an absolutely perfect representation of what's going on but it might be that things are more in the direction of low product differentiation or the undifferentiated model, than in the direction of the high models, but there are other factors which I say that you want to think about adding to the model insofar as it proves feasible to do as well, so the approach I'm describing is one of using simulation in the way that I have set out.

The particular simulation models, of course, will reflect what data we have and what proves feasible to do.

PROFESSOR WILKS: Okay. We will leave it there. I will pass it back to Bill. Thanks.

DR BISHOP: Right. Okay.

The criticism was made by the teams who do not want a certification to be made here, that you assume that price equals marginal costs, and that everything is then attributed to the cartel.

Now, that criticism was, I think, directed at the undifferentiated product model. We have been discussing, you and I were discussing earlier, the model that's constructed on the training set of the post period and I see how that criticism simply is not true of such a model.

What do you have to say, then, about the criticism that the undifferentiated product model would necessarily be assuming a perfect competition, perfectly competitive outcome, and then quantifying, basically, all the price over marginal cost as damages. Do you have any comment on that?

DR LILICO: I mean, it depends what you -- by assumption, of course, it is a model. Models proceed via assumptions and you have to work out how good -- first of all you have to work out how good your assumptions are and then you have to work out how well models based on different kinds of assumptions match with the data. So in a kind of -- I mean, in a sense, of course, it's right, right? So a model that's a model of perfect competition outwith the cartel is a model built into the model that you are assuming that the cartel -- that's what you are doing. That's the question that the model is answering, it is: if there were a monopoly in the context in which otherwise there would have been perfect competition, then how much did the prices go up. Of course that's the question, but that doesn't mean that the economic analysis is assuming that, because, first of all, you have some reason why you think that that is a relevant assumption in the first place, based on, you know, considerations, so I sketch out a few of the considerations that lead you to think that that might be one of the candidate things to think about. I mean, all kinds of things that one thinks about. I mean, one fairly obvious one is that the cartelists here had a very high collective market share, so it's one thing if you had a cartel and they only had 10 per cent of the market between them, and it is another thing if you have a cartel and they have 90 per cent of the market between them, so you might think that an assumption that you were able to influence prices was more credible in the latter kind of case than in the former.

So you have some economic reasoning, your reasoning then produces whatever you think are the relevant assumptions to try to model, your model then is an answer to that, so you defend your assumption in the first place on the basis of your reasoning. That doesn't mean that you assumed the thing you had to prove, I mean, how, because you had to come up with the assumption from somewhere in the first place, (a); (b), after you have done it, you have to show that the model that you got as a result is a better match to the data than models based on some other assumption, but that seems to me to be an objective decision, you can't use a simulation for anything.

DR BISHOP: Right, such as the model that we were discussing earlier of the differentiated product model and estimated on the cartel period and projected back. So what you are saying is that you would not contemplate coming to a court in later proceedings presenting only the model of undifferentiated products, and a very large number, and asserting that that is it and presenting nothing else. In other words, you would be testing your own model. If it is a limiting case, you would be testing that by, for example, econometric techniques and the differentiated model that we were discussing.

DR LILICO: Absolutely.

DR BISHOP: Have I understood you correctly? Okay then.

DR LILICO: That's what I would be describing. Of course, I don't know, I suppose it's possible that the economic -- I mean, I don't want to rule out necessarily the possibility that the economic analysis is absolutely compelling that by itself shows that this is a market in which the cartelists had the capacity to set things very effectively as a pure monopoly. Perhaps that's somehow built into the decision once we got filed on that, and maybe it would be that the economic analysis was absolutely compelling that outwith the cartel period they compete very fiercely on price. I don't -- so it could be that you would be wasting anybody's time to present lots and lots of models, but as I sit here, my expectation would be -- I presented multiple models even in my first report, so my expectation would be that you will present multiple models and you consider which of them best matches the data.

DR BISHOP: Mostly I was concerned with, in our screening role here, we have to think about the fairness to the class on whose behalf you -- wouldn't want you to come to court and for the whole thing to -- say you have proved nothing because the model is nothing and damages have to be zero when you have the intuition that they would be positive at some degree, but anyway, the most important thing you have answered, that you are not just planning to come with one model of fairly stark assumptions.

My last question in respect of modelling is one of the -- one of your critics was Dr Israel who gave a kind of list of what he would regard as essential in a -- he called it a minimum model, and he listed six quantities. Just to remind you, you probably remember them anyway; a production cost function, because otherwise the OEM's cost would be wrongly interpreted as a cartel price increase.

Secondly, variation in the effects of collusion, in the effectiveness of collusion, I think, is what he meant. Bargaining -- third is bargaining down the value chain from OEMs to users. Fourth was product differentiation beyond the single parameter, this was in your reference to your model on page 48 of your report, your original report, and finally two things about elasticities. The market's own price elasticity of demand, and the various interbrand cross-price elasticities which, in general, will be asymmetric and will differ considerably, and he asserts that data demands for this would be enormous.

Now -- and they sound large to me. My question for you is, do you think that Dr Israel is realistic, or is he suggesting far too much, and -- I just wonder what you think about those -- that laundry list of how you might approach it, or how he would approach it. His demand of how you should approach it, which is a different matter.

DR LILICO: I understand. As I think I said at the start, one of my central considerations here was how to come up with a methodology which I could be confident would produce some kind of an answer that was going to be useful for you. So it is the case that, as I said before, that if you try to get very involved with -- you try to over-specify everything, eventually you will end up with not merely very high data demands, but also the conceptual arguments as to exactly what the right way of thinking about this and that economic question would be, which would become prohibitive, so you -- if you are too ambitious, I mean, in the end, the only perfect model of -- my old Ph.D supervisor used to say, "The only perfect model of the world is the world", right? So the quite simple answer was to solve them. That was the way that he liked to think of things. You are always making some kind of simplifications, and what you want to be confident of isn't that there would be data to do the absolutely perfect model. What I would have thought you want to be confident of is that there is data to produce an answer which is reasonable, which gives you some sense of what's going on, that has -- that is a reasonable reflection of what the available data actually is. It's close enough.

Now, of the things which are described there, various of them, of course, are things which the models which are set out already have some consideration of, so the elasticity is calibrated in the differentiation model, the measure of product differentiation which may not be like the exact one that we did but that's what it is, in the (Inaudible) environment of the product differentiation model you get cross-price elasticities which are implied by the model, and, I mean, the question of -- so the question of bargaining, I mean, bargaining, of course, in some sense, is central -- it's why the cartel takes the form that it does at all, right? I mean, if I have a cartel in respect of oil prices, then we can get together and we can agree that we are not -- nobody is going to sell at more than US$30 a barrel or whatever it might be -- sorry, less than US$30 a barrel or whatever it might be.

In an environment in which you have varying bargaining -- perhaps varying bargaining power or varying bargains entered into, other kinds of things like economies of scale and so on across a whole ecosystem, then you don't want to have a cartel that tries to specify what you do under every single circumstance. What you do is that you coordinate over a list price as -- I mean, an anchor is a sort of word I'm not -- I know that there is -- one should rely solely on the claimant as an anchor and you need more specificity as to exactly what's going on than just calling it in general an anchor, but for this purpose, if we say that you have an environment which is -- the point of the cartel is that you have co-ordination over your anchoring point, and then the various heterogeneity across the market are normed relative to that, so if the other agents need to have their cut of what's going on, they will get their cut relative to that list price or -- now that question, of course, is central to the way that it works, but it doesn't follow from that, necessarily, that the cartel itself, its effectiveness, is created by that, so I could have that everybody entered into their own bargain but the cartel raises the price by 25 per cent for everybody. Those two things are perfectly consistent. The way I identify that there is a -- the main implication of differential bargaining power having an impact on the cartel, I think, is likely to be that the set of firms most likely to belong to an opt-out class are likely to be those with less bargaining power, so that something based on an average would then tend to understate how much their overcharge would end up being, so I freely admit that the methodology which I described might be conservative, and so if other experts at some point want to argue that they should -- that the number is higher, then -- because of bargaining power, then I guess they are free to do that. I would be surprised if the cartelists' experts wanted to argue that, but that's up to them.

DR BISHOP: Yes.

DR LILICO: And it would seem odd to me that an argument that said, well, it would be hard to come up with a methodology that produces an answer higher than the one that you did, therefore you shouldn't be allowed to proceed, would seem like rather a strange kind of way to argue the case. To me, I would have thought that the things you would want to focus upon might be questions which would make the answer lower rather than higher, but -- so -- but I agree that, you know, there could be some challenges in unpacking that exact point which one would have to face if one wanted to increase the claim on that basis.

Then it is in the effect of collusion. Now, if it were the case that -- I discussed the possibility of this in one of my reports -- that you could imagine that the cartel improved its effectiveness over time. So it might be that it was not perfectly effective exactly at the start and it increased up to 2005, something like that. The most obvious way to deal with that if you needed to consider that would be to have a straight line assumption of increasing, so you go from nothing in 1996 to the full effect of collusion by 2005, so you could impose a model with some sort of increasing collusion at the time. That's a possibility. I don't necessarily -- I'm not assuming that just at the moment, but it is possible, and you see, for example, in the pattern of individual years, though I don't say that you should ever rely on the individual years' numbers in the product differentiation model, it is the case that in the early years and the last years of the cartel, the percentages look -- are lower than in some of the intermediate years, and, perhaps, one might think that it took them a little while to get going and part of the reasons the cartel ceases to be attractive to all players by the end is that it's not making -- it's not allowing them to increase prices as much as they did at the start (Inaudible) when they get caught.

So that's possible as well. There are simple ways of thinking about that, if you wanted to get into very elaborate ways eventually you would make things so elaborate that it might be very difficult to do (Inaudible) certainly the far more effectiveness of collusion is this, I think, connected with another question which I think was raised that you were interested in thinking about, which was the question of the emissions technology matter.

Now, one of the ways, I guess you may come on, although I will let you ask your questions in your order, but I think it arises here. To me, the main way in which the cartel makes use of co-ordination over the emissions technology is as a means of disciplining the cartel. If you didn't coordinate over something like the timing of emissions technology production, you would face the problem that you would have products that were on the market that were with the newer ones and ones that were obsolete, and the people selling the obsolete products might then be able to say, "Oh well, we have to be able to unload ours cheap into the market because we are running out of time because the newer ones are already there and people are feeling that they are switching to those, so you might have the problem then -- the cartel might have faced the issue that it would be difficult to discriminate between, in favour of the cartelists, between people who were chiseling, undermining the cartel, and doing this unloading of obsolete products.

So to me the main thing that's going on with the co-ordination of the emissions technology is an enforcing of the efficient effectiveness of the cartel itself, and you see much the same with other things, perhaps like the co-ordination over the Euro -- the introduction of the Euro as opposed to the Euro standards back in 1999 or in 2001 or whatever, so you see the changes associated with that as well. I think that's about the same thing. That's a separate question, I guess we will come on to the other part of the emissions technology question, but that's how I think of it at this stage.

DR BISHOP: Thank you. Chairman, I wonder if we -- we probably have enough material -- we probably want to take a break, do we?

THE PRESIDENT: Yes. I think we should take a break in a minute. Can I just ask one thing to understand the pricing you are using in the model? Is this list prices or transaction prices that you apply?

DR LILICO: The prices that the model uses at the moment are list prices because those are the only prices we have. Ultimately I would hope to get transaction prices of one sort or another. So ideally, you would have -- I would have both the transaction prices so the price at which a firm sells either themselves directly to consumers, where they -- I understand that some of them have 80 per cent of their volume via that route and the transaction prices which they sell to dealers. So my presumption is that the firms ought to know at what price they sell their own products.

Ideally I would, of course, also have some data on what prices the consumers bought things, the consumer transactions as well because that would help you to think through some of the -- well, the questions about what happens in the intermediate chain and things like that.

If I didn't get numbers -- if the cartelists didn't know, presumably the cartelists would know quite a lot if they are competing with dealers, what prices other dealers were selling things at, if they are selling things directly themselves or leasing things directly themselves, but if they didn't know that then one would have to work off the data -- and you didn't find it via some other route, you would have to work off the -- some assumptions either about the data based on the samples which they have, so you would say cartelists sell -- so one of them sells 8-10 per cent of their products, this gives us an indication of what the market price is. The dealers can't be that different because otherwise everybody would either buy from the dealers or from the cartelists selling at 8-10 per cent of their products and then we can compare that with the prices which they sell to the dealers, and that gives you a sense of what the dealer margin is and how it changes over time, but, you know, as I say, you -- I'm an economist. I'm going to agree with the data, whatever data you can give me, I'm always going to ask for everything in the first instance, it's my wish list, I would like to know the transaction prices which they have and the prices that the cartelists sell to the firms. If I don't have all the data that I would like, then I can work with less. You are always going to work with whatever data you have.

THE PRESIDENT: That, of course, I understand. What I'm trying to really get a sense of is to what extent, given that we are dealing with the consumer price overcharge, if there is one, to what extent you need transaction prices, and to what extent you say one could look at their prices to dealers, and then what -- make an assumption about the dealer margin, or where would you get that assumption from about a dealer margin? Because I think certainly a number of the manufacturers sold direct only to very large customers, otherwise they sold through affiliated or unaffiliated dealers, and so where do you get the assumption about the dealer margin, and how would you go about working that out?

DR LILICO: So the models which I presented, and the general concept of those models is that they are models that relate to the price at which the cartelists sell things.

THE PRESIDENT: Yes.

DR LILICO: Fundamentally it is the price that they sell stuff. You then, of course, have a question of how, if they elevate the price that they sell stuff, does that turn into an impact on your consumers. So you need some kind of view, some of it you could do perhaps out of the data that you have from the -- insofar as you are dealing with relevant types, as you say it might be that they were only very large ones, you would either have to have some transactional price data for you to work out some kind of averages or typical margins, or maybe you would be able to get some witness evidence that said, you know, it might well be that somebody knew that the dealer mark-up was typically X or Y, it might even be that the cartelists in dealing with the dealers tended to encourage them, or, you know, incentivise them in some way to keep their margins within a certain range. It depends on what kinds of things emerge like that. They may know quite a lot, I would have thought, about what dealer margins are, but if you didn't get things, probably, my working assumption is that most of this is going to come out of disclosure from them, but if you didn't get it from them, of course, ultimately, you would have to have some mechanism for that.

Now, if there is third party disclosure or -- I mean, I mentioned that for a few categories of truck, it is possible that, for example, what could happen is that you could have a witness statement for these categories of truck that this was the typical level and that one could rely on that for perhaps the vast majority of trucks, and maybe there were a few niche types where the witness didn't know, or wasn't able to say something that was sufficiently limited, and maybe for those niche types you would then have to go to something like -- have some sort of database where you sampled, you tried to get that particular type, narrow type, a few hundred trucks of that sort, and then you were comparing for that niche set of people doing a more detailed investigation with additional kinds of disclosure from them.

Now, the exact -- I don't know, as I sit here, what the cartelists are going to be able to say and what I might get from other routes, so, for example, in some of my reports I paint a picture of a whole range of different ways in which you might get data. I'm not anticipating that all of those get deployed for every truck. I'm merely trying to indicate some of the different routes which you might go for different sorts of vehicle -- I mean --

THE PRESIDENT: When you say, "A witness statement", I think you mentioned, that would be what sort of witness?

DR LILICO: I guess I'm imagining that maybe there is some relevant industry expert perhaps from dealers, dealerships who may be able to say what typical mark-ups are -- there are a number of different reasons. Obviously it is better to have specific transactions data to work from, but if you can't get specific transactions data then you have to do what you can with the data that you have.

THE PRESIDENT: Yes. Thank you. I think we will take a break of 10 minutes. We will then return. Thank you.

(11.48 am)

(A short break)

(12.01 pm)

THE PRESIDENT: Dr Lilico, can you help me? I'm not an economist and it may be that the economists understand this very well, but I'm struggling a bit. If we go to your first report in -- which is in bundle {F/1/37}, the same page that Professor Wilks asked you to look at but at a different point which is internal page 34 in your report, but F/1/37 in the bundle -- do you have that.

DR LILICO: I do.

THE PRESIDENT: It says -- there is the section at the bottom, 5.3, "Results", and you talk about the linear model, and now, before we go into that in detail, you had explained in answer to Dr Bishop how you calibrate your model by reference to the post-cartel period but you say it's not -- what you are doing is not a comparison of those two periods, that's not how you are getting to the answer we are all looking at, which is was there an overcharge and if so how much, that's the question we are trying to address, so it's not a comparison that you were doing between those two periods. That's my understanding. That's right. You are nodding your head. I just -- the transcript doesn't pick up a nod.

DR LILICO: Yes. Yes.

THE PRESIDENT: So that's not, but of course there has to be some comparison somewhere to work out what is an overcharge, and here in 5.3 you say how you work out calibrated marginal cost, and then in the bottom paragraph on the page you say:

"By comparing the observed price data with the underlying calibrated marginal costs, we can estimate the overcharge imposed in each year of the cartel ... this is because the underlying calibrated marginal costs are the competitive prices that would have prevailed in the absence of the cartel".

So there is the comparison. That, as I understand it, is the undifferentiated model that you are addressing there, and you discuss. Then you go on to, in the next section, 6, two pages on {F/1/39} to talk about the differentiated product model which you have explained a few moments ago, but what is the equivalent comparison that you are making and need to make to estimate an overcharge?

DR LILICO: Sorry, do you mean in the differentiated product model?

THE PRESIDENT: In the differentiated product model.

DR LILICO: Certainly. In each case what happens is that the model has some -- what economists call, "Assumptions", which in reason 3.2 you will find outwith the model process and the architects, the maths of the model tells you that. If you observe -- if -- so taking the differentiated model case, if you have got cartelised behaviour, if we've characterised correctly what's going on with the cartel, then if that's the behaviour and we've characterised the nature of the market correctly as in there are no capacity constraints and there is no product differentiation and so on, then from the prices we observe there is an implied overcharge, so you are inferring it. What we do in -- so that just comes from the maths and the economic assumptions that are built into the model.

That works the same in each case, so that's happened in the same way in the differentiated model as in the undifferentiated model. The maths is different because the assumptions about how the market works and so on are different in the two settings, and of course one would, in due course, have to reason through to which of those best matched the data, and other criteria such as how much work you had to do in the calibration, so if you found, for example, that there was -- that in order to calibrate them you had to assume very high volatility in underlying parameters from year to year, that's obviously undesirable relative to reasonably stable evolution of the underlying parameters in the calibration, and that's the same in both models.

What's happening with the paragraph which I think you are pointing to there about the use of the post-cartel period is, as I explained, one of the ways in which you test the robustness of your results is how well does your model explain what's happening outside the cartel, so you want to be able to extrapolate through the non-cartel period, other kinds of robustness tests were some of the ones that I described earlier, so, for example, you might say is it giving a consistent treatment within the cartel or are my own results highly dependent on one year, so I might run through the model and calibrate the model off, 1997 and 1999 through to 201 missing out 1998 so if you get -- and do I then predict what happened in 1998? Well, so is it that my model appointed that, as I say, is my model too dependent on some things that happened in one year, so as well as saying does it predict well what happens after the cartel ends, does it also predict well what happens in a particular year. You can, in the same way, think about questions of run-off, so does your model then match very well your assumptions, is it that you -- an assumption that you have no cartel at all operating in, say, 2012, is that better or worse matched with the data than if you had that the cartel was operating in that year, so what I'm doing there is giving a version of the model where I restrict the way that the model works so that you don't get too bad a match with what happens in the non-cartel period.

So there are two kinds of things that you can -- two strategies that you could use for making use of the non-cartel period with the model based in the cartel period. One would be to say if I don't assume anything, how well does it match what happens afterwards, and then I might say it is a good or a bad model, another thing would be to tweak the model to improve it to restrict it in the light of what you see in the other period, then you hope that you get a better match because you are saying it's not just that I'm saying it fails or it succeeds because I'm saying that I can improve it by forcing it so that it matches a bit both periods, and that's something --

THE PRESIDENT: Yes. So if I can just interrupt you to make sure I test that, that I have understood it, if we go back to that paragraph that I took you to at the beginning of my question on page 37 {F/1/37}, so there you are setting out what is an assumption that the underlying calibrated marginal costs are the competitive prices, so have I understood this right, what you would be doing, you would be looking at the post-cartel period to see what -- are those calibrated marginal costs in fact the prices that prevail? If not, you would be looking to see, well, what is the calculation that one should make to see what the prices are that prevail, and then you would be applying, therefore refining your assumption, and then applying that assumption to the cartel period to look at what the prices would have been, but for the cartel.

DR LILICO: Exactly. So there are two strategies, two ways that you could make use of the non-cartel data here. One would be as a general test of your model, so if you have got a whole series of them you could say does it generally -- does it produce -- it might be that you did it and you found that for the non-cartel period you have a very poor match to the data at all, right? So you might then say well, I'm then going to say it's quite a poor model so I should then use one of the differentiated models or something like that, but another possibility is that you say, well, it is comparable but it's that I can use some of the data from that period to improve what I'm thinking about in this period, so the way that I considered doing that in the first paper was by having that I'm not allowed to deviate, so the sort of shock which would be required to explain 2013, bearing in mind I only have one data point, right, so the sort of shock I would need to explain 2013 had better not be a shock that was much larger than the shocks which I had seen in the 1997 to 2010 period on which the model was based.

So if you found that the shock was larger than that, then you are somehow saying that something strange has happened in the one year that you have here in order for your model to be consistent. Instead, I restrict the part of the marginal costs so that in that post-cartel period I don't get an unusual shock. It is a shock which sits within the set of shocks which I'm otherwise having to assume.

THE PRESIDENT: Yes. Thank you. Do you want to follow on from that?

DR BISHOP: Yes. I want to follow on there. I perhaps wasn't understanding you, what you said in the first hour. Let me tell you what I thought was going to be the procedure that you had used, and you can then say, "No, that's not it", or whatever. I thought that you would estimate the structural model based on the post-cartel period, and then that you would take all the parameter values that were -- that came out of that, and for each year or quarter, whatever it is, in the cartel period you would plug in those -- you would take those parameter values, you would plug in the actual data pertinent to that year, and produce a prediction of what the prices would be.

Then you would compare the predicted prices to the actual ones of that -- that applied during the cartel period, and then you would subtract one from the other.

Now -- and that would be your quantification. Now, have I --

DR LILICO: That's exactly one of the strategies which one would adopt, and insofar as you had enough post-cartel data to do that, I think that that would be an excellent application of this kind of method. The thing is, in the report, of course, I don't have the luxury of calibrating over multiple years, so at the time of this, when I was producing this report, I only had 2013 data, and you do have the option of using only the cartel period and the structural assumptions of the model to generate an assumption about --

DR BISHOP: I see. We are only here --

DR LILICO: I would imagine it to be a superior procedure once we had additional years of data, and what I was able to do with the data which I had, and then presented in the report --

DR BISHOP: No, no. We are actually not concerned -- we totally realise that, you know, you are dealing in -- you are wondering what you can do, and you are writing, you are speculating, and we know that you will do something different once you get all the data and all the rest of it. We totally understand that. We just wanted to -- I just wanted to be sure that that wasn't ruled out. We don't care, really, about the explanation of why you wrote this or that paragraph. It's what you are going to do that really matters, if we --

DR LILICO: And the procedure which you describe is -- would be exactly, so doing things for the non-cartel period and applying it to the cartel period, also you would, of course, at the same time, you might think, because your model -- you would hope that a model which you used for the cartel period would also produce a good match to the non-cartel period if you did things on that basis as well, so as well as doing the thing which you described, I would expect to do the other and see what the match was, and if the match was poor, then that would be an indication that maybe you should use a different one of the other assumptions, structural assumptions in your model, so that's a way in which you are validating the results.

Of course, I can't, you know -- for the -- the advantage -- a key thing about the advantage for the second procedure is that it produces a test of the efficacy of the model. The thing which you are describing there as the first procedure, so that is that you calibrate purely off of that period and apply it into the cartel period, is that we are only, from that procedure, getting the but for price. We have no prediction from that about, right, per se from that, about what would be the cartel price. We can, of course, then impose an assumption that we have collected bargaining -- sorry -- collected private maximisation in that period and see how well we get as a result. That's, of course, true as well, but in the first instance -- so I'm just describing there that I would expect to use a range of different procedures, partly to come up with the answer, but also partly to test how robust the answer was.

DR BISHOP: Right, but --

DR LILICO: Some of the time we are talking about the latter.

DR BISHOP: -- but we do know, we will know what the actual cartel price was. We know -- we can observe that outcome in the disclosure of the data that you get, so, really, what we want to know, the counterfactual price, the but for price, and those two things are all we need to know, the actual and the counterfactual, the difference between them is the damages, it would appear, or at least the overcharge.

DR LILICO: The overcharge, that's right. Now, perhaps -- that's absolutely correct, and that's the kind of thing I would envisage doing, ultimately saying that I would accept our procedures by which I have tested the robustness of the model as well as procedures by which I came up with my answer.

DR BISHOP: Sure. Okay. Fine.

THE PRESIDENT: We are, of course -- in this case you are seeking to produce figures for aggregate damages. If we go on in your first report to a couple of pages on to page 43 in the bundle, page 40 in internal page in the document {F/1/43}, total damages and attribution model, and this is, of course, just an illustration, it's not in any way a calculation of what the figures might be, but you then explain in 7.3 the damages incurred by a given claimant in each year for a given category of truck can be calculated as the product of the number of trucks acquired, whether by purchase, and so on, in that category {F/1/44}, the average overcharge for that category, as you have just discussed with Dr Bishop, and then interest mark-up, and then this calculation should be performed for each year of the cartel period.

Now, there you are talking about for a given claimant, but of course this is -- here you are dealing with it on aggregate for the class, so what I want to understand is how are you going to get the total number of trucks if you are doing it on -- maybe it is within sub-classes, but in each case you are going to need a total number, an aggregate number of trucks, and how are you going to get that figure, or figures?

DR LILICO: I guess it is all of the trucks in the market, minus whoever the trucks -- the trucks of whoever opts out or whoever is excluded for other kinds of reasons.

THE PRESIDENT: I suppose it, then, the exclusions. I mean, how are you going to get the exclusions of those who have started individual claims of which there are quite a lot now? You are going to need those figures, aren't you, of the number of trucks involved?

DR LILICO: Absolutely. I mean, I guess that's intrinsic to the notion of an opt-out -- of having an opt-out claim at all, that there must be a procedure by which those who opt out -- well, either one has a procedure by which those who opt out indicate how many trucks that they had, and I would have just thought that in whatever their award was, that they must similarly have a mechanism by which you decide how many trucks are covered, and if the trucks are covered, then you exclude those trucks.

Now, so I'm -- that's my working assumption as to how things should be pursued. Either somebody opts out and they tell you or if there is another action there will be a determination of how many are covered and in either case you deduct those from the total. If we did end up having to do some approximation of some sort, then there are things that one could imagine doing if one needed to, but my working assumption would be that the legal process will tell you what the answers are to that in the first instance, and so I haven't sought to have anything beyond the assumptions that the process will tell us the answer.

THE PRESIDENT: No. Well, if we think of another category that might have to be excluded, if the Tribunal were to direct that the category should exclude trucks purchased by companies that have gone out of business, or by sole traders who have died, now they are not going to be, like individual actions where you can perhaps look at the actions, see a number of trucks, you won't know as such. How are we going to, in getting the aggregate, deal with that?

DR LILICO: So insofar as that was what you decided to do, the way I would recommend that one proceed there would be in the first instance, to -- well, insofar as you ideally of course you might be able to use Companies House data or something to give you a pretty precise steer on how many firms had disappeared over the period, but insofar as one didn't get that, I --

THE PRESIDENT: Well, if I could interrupt you a second, you might -- well, you won't know who is in the class unless you have all their names, but even if you have got the names which you won't have because it is an opt-out class, so you don't have the names of the companies that purchase trucks and you won't know, anyway, how many --

Companies House won't tell you how many trucks they brought.

DR LILICO: I agree, but I'm just saying that ideally one would get some data that told us these things quite precisely. I don't imagine that that would be feasible to do in very great depth. I understand that the RHA claim involves some sort of estimation of how many these are, so presumably it must be feasible to do it on that basis to some extent but I would imagine, setting aside that kind of legal process, will (Inaudible) that data, the ways that I would probably be inclined to do it would be twofold, so I would estimate a churn rate, I would probably start with a churn rate for businesses per year in the economy as a whole which I might get while there is VAT data that is the basis of this which I have used in other settings when I have had to estimate churn rates, and then maybe I would consider from the general economy churn rate for businesses to what extent I could improve that estimate based on any evidence that things were different for trucks, so it might be that people would say, well, it tended to be higher in trucks, the truck sector, for some reason, because maybe the age profile of people who were involved in the businesses, or maybe it would be the churn rate for businesses above a certain scale or below a certain scale, it would depend on -- so you would refine your initial all economy assumption based on that kind of consideration, and then you would come up with a number that would be your best guess as to the average number of firms that disappeared in each year, and of course once you knew the average number that disappeared in each year you would create a sort of survival rate over the period, so presumably you would have fewer than had been around in 1997.

Now, that is, again, giving us a number for the number of firms rather than a number of trucks. So what we would then probably need to do would be to consider, are these tending to be smaller ones that are disappearing or larger ones that are disappearing on average. I would have thought the natural assumption is that those that are disappearing would be smaller. It might be that one would observe that there were some particularly well known -- you know, it might be that it turned out -- I'm not aware of one -- but if it turned out that some company that I'm not aware of had gone bust that sold an awful lot, then, presumably, you might take account of that, but otherwise I think you would probably have to say, you would have to look at across the set of trucks manufacturers, approximately what proportions are bought by small versus big of -- sorry, not trucks manufacturers, trucks acquirers, approximately what proportions are bought by small versus big, and adjust your estimate for the number of trucks based on your data for the churn rate bearing that gradient in mind.

If you wanted to think about the question of people who had died, again you would probably take a fairly similar procedure which would be, I would start with national -- so I probably would get somebody to tell me what was a typical age for somebody who runs a trucking business. I would assume they would probably get some witness evidence or something of that sort, to give you a rough approximate age of trucking businesses, then I would have the expected death rate for people, I would have the national death rate for people of that age from 1997 and onwards, and then I would -- so I would then construct out of that then an estimated number of people who are likely to have died over the period and in the same way I might then say, well, the people who died probably are going to be at the smaller end, so I would use my same estimate of the gradient between the larger and the smaller players, to then produce a rough estimate of the number of -- of the aggregate number of trucks that would be covered by this.

I don't see that this procedure -- there is going to be a roughness to doing it this way, inevitably, but we are not -- I mean, I think it is worth bearing in mind that we have a rather large number of trucks here, so averages will help us, right? So it's not -- if you had a very small number then statistical things based on the whole population, say, of death rates, might -- if we are only talking about 30 people and you are doing national statistics, you are going to get a very uncertain estimate as to how those statistics are going to apply --

THE PRESIDENT: I understand. Sure. The other thing you have to exclude, I think, because the class is excluding, I think will -- what I might call, "Long lessors", that's to say people who purchased trucks to rent them out on operating leases, because it's -- the class includes the people who leased those trucks but not the purchasers of the trucks, so are they going to be excluded or will those trucks be kept in on the basis that -- because they are leased out on operating leases, you will treat them as trucks within the class, and then it's just a question of who can recover.

DR LILICO: Well, as I understand it, so -- this treatment that we've done at the moment, the question is where the truck is -- so all of the trucks are supposed to be encompassed here, so it is on the truck rather than --

so it's the -- and the person associated with that kind of truck, so absolutely, a person who acquired some kind of finance house or something who acquires a truck in order to engage in the business of leasing the truck to somebody else, they are excluded from the class, as I would understand it, but that doesn't make any difference to the number of trucks. It would be including them so that there were two sets of claims going on that would create the complexity for me, as far as I can see. As things stand, it's just one truck, and --

THE PRESIDENT: So is, then, the assumption that the overcharge which you are doing on the purchase price gets transmitted through to the person who's taking the truck on the long lease?

DR LILICO: Here I think we have -- so I think there is an interesting question, I mean, I'm sure you would be, at some point, coming on to ask me about pass-on questions, and I think one of the interesting things to understand is where pass-on matters do and don't arise in the analysis as presented. So there are three places where it might seem as if they arise, and I would say that in two of those it doesn't arise, and in one of them it does arise but only in a notional sense.

So the one you were alluding to there is the question of what happens to leased trucks. So the working assumption here, so pass-through is fundamentally a supply side question, so my costs go up, and then I'm driven to pass through some of the increase in my costs, but the assumption -- the consideration of these questions in the analysis that we've done so far focuses on a demand side question, so the assumption is that the cartelists, through their sale of trucks directly, and their own leasing, fix a market price. Then you would have a small player who might themselves be a lessor of a truck. The price which they lease the truck out at is defined by the market price set by the cartelists, so it doesn't matter to them what price they get their trucks for at all.

So if, who knows, they -- some company went bust and they had 500 trucks free to take away, new trucks to take away to a good owner and they got them for absolutely free, that wouldn't mean that they would lease them out for free, the price at which they leased them out is going to be independent of the price at which they acquired them because the price at which they leased them out is fixed by the general market price.

So that is -- in the analysis here is a demand side question and not a question of pass through. In a similar way the analysis here considers that the question of the demand side effect of second-hand trucks. So if you found that second-hand trucks were substitutes for new trucks, then the fact that your new trucks had gone up in price would mean that your outside option, if you didn't buy a second-hand truck here and the things that compete with it, would also tend to go up in price so that would be a demand side effect bidding up the price of second-hand trucks.

Our working assumption is that that doesn't happen, so --

THE PRESIDENT: Sorry, could you say again? I missed that. Your working assumption is that?

DR LILICO: That process doesn't happen, so our understanding is that new trucks and second-hand trucks are used for quite different things, and that they therefore don't compete directly. That's an independent question from the question of whether there is pass-through which would be a supply side effect of the cost of trucks. So there are a number of things that we might say about that if we come to -- did you say -- and I'm happy to go on and discuss the pass-through now in more detail, but the thing I want to emphasise is that in terms of the analysis that we have, it would have made a difference if there had been a direct effect. If there had been a direct effect that new trucks and second-hand trucks competed in the same market, then the fact that you had raised the price of new trucks would, itself, through direct substitution have increased the price of second-hand trucks, and so we then have a consideration of -- this is where I have the calculation of the reduction in the claim if it turned out that that had happened, or, similarly, if it turned out that the cartel itself was one which had elevated the price of second-hand trucks.

Neither of those is a pass-through effect because they both occur on the demand side rather than on the supply side.

The third type of effect here, pass-through, which does arise in terms of my analysis is that the transmission from the firm that sells to the dealer and the dealer then selling on to the truck's acquirer, and I think here what is important to bear in mind is, at least my understanding of the sector, is that dealers in this case are not wholesalers. It isn't that they buy 100 trucks, they sell them for what they can, so that the question of pass-through arises in that way.

Instead, as my understanding of the process is that the dealer has a function much more like a broker so that the dealer, in fact, does own the truck for a few moments or a few hours as a legal -- part of the legal process of closing the deal, but that is a very notional -- they are only owning the truck as part of the business of closing the deal. It isn't that they bear some production risk, it's not that they have a business of buying in trucks and then selling trucks, rather the nature of their business is that they broker a deal, close a deal between -- and so in that kind of setting, we do -- so we are assuming that there is pass-through in that setting, and why wouldn't there be anything other than pass-through because you are only holding it for a moment, so in those senses I'm very happy to talk to you about how I think about pass-through more generally, if you want to go on to that question now, but in terms of -- I think it is important to make this distinction in the analysis between things which are demand side effects which are not pass-through, and things which are supply side effects, and one of the implications of that course is, if you have a lessor, and the lessor acquired their truck, there is no pass-through connection between the fact that the lessor is -- getting their truck -- a small lessor is getting their truck at a higher price, and the fact that they then are charging a higher or a lower price downstream, there is obviously a practical connection between those two types of things, but the claim isn't one of pass-through. It is a different kind of process.

THE PRESIDENT: So to see if I have understood that. For the long-term operating lease, which is the only category actually in the class where the lessor is not in the class but the lessees are, there you are assuming a direct pass-through. Is that right? In that sense?

DR LILICO: I'm assuming a connection with the price of the acquired truck or the price that cartelists lease the truck at, so that lessor is -- it isn't that -- in the process which I'm envisaging, it isn't that the lessor gets the truck at a higher cost and therefore is driven to rent -- to lease the truck at a higher price, instead they get the price at whatever price they get it, and they find that when they come to leasing it out, the market price, which is nothing to do with them and they don't have any control over it, is now higher, and that's a different process from -- it isn't -- their own costs are not affecting the market price because they are small players in the market. The market price is being defined by the activities of the cartel. They are just fringe elements here, fringe players, so I'm not arguing pass-through, I'm arguing direct effect on the demand side.

THE PRESIDENT: So, well they might be large companies leasing out, but you are saying -- so they pay more for their trucks because of a cartel, they are not the claimants in the class, the claimants in the class are the people who take an operating lease, but they are affected by the same degree of price increase as people who buy.

DR LILICO: The lessees, yes.

THE PRESIDENT: The lessees.

DR LILICO: The lessees are affected because there is a market price which is defined by the cartelists.

THE PRESIDENT: And which -- therefore affects the operating lease price because it's a long lease?

DR LILICO: Yes. Absolutely.

THE PRESIDENT: Yes, and to the same degree. So it's a market price effect is what you are saying, rather than -- well, a market price effect which therefore determines the leasing price and, I mean, leads to what is, in fact, a pass-through, but not a pass-through in the sense of a conscious decision to elevate a price by the leasing company.

DR LILICO: It is a mitigating factor for the lessor, absolutely, because they are finding that the same market conditions which mean that the price is elevated to them, also mean that they sell on at a higher price, but that's the same kind of effect as I was saying for the second-hand trucks, so if second-hand trucks and new trucks competed directly, then the very same process that elevates the price would also elevate the price downstream and would be a mitigant, and I describe that mitigating process. That, for me, as I understand these things, is a separate question from that of pass-through, and one of the ways of thinking about this is seeing why -- is because as a -- suppose that the lessor happened to get their trucks on a very unfavourable -- suppose that it turned out that they were -- had a higher cartel damage overcharge than everybody else, suppose that that turned out. Suppose that theirs was twice as high. They still wouldn't be able to pass on, right, any of the effect of that, because they don't define what the market price is.

THE PRESIDENT: I understand.

DR LILICO: The market price downstream is nothing to do with the price at which they acquire the trucks themselves, so that's the -- because they are small players, so the market price is going to be -- either direct leasing from the manufacturers themselves and their operations in direct sales, so it's --

THE PRESIDENT: And what you are looking to measure is the overcharge in the market price --

DR LILICO: Correct.

THE PRESIDENT: -- for new trucks. Yes, I think I understand.

Now let's go on to -- whether one calls it, "Pass-through", or, "Mitigation", the simple point of people who buy a new truck and then after several years they sell it on, and those are people in the class and the people to whom they sell it on to as a used truck are not in the class, so that is a mitigation that could, therefore, properly reduce the damages they pay if the price at which they sell it on has been elevated as a result of the cartel, and the position taken by the manufacturers in all the individual actions and which they say they will take in these actions is if, which they deny, there was any overcharge, which they of course refute, then it also would have impinged on the disposal price at which a purchaser of a new truck would have resold it, and therefore has to be measured and if this is aggregate damages, then it's got to be measured on an aggregate basis. How do you go about -- or would you go about -- doing that?

DR LILICO: Sure. As you can appreciate, of course the things I have been asked to write the papers on and the questions I had there related to the overcharge.

THE PRESIDENT: Yes.

DR LILICO: You can imagine that when we think about the questions of pass-on there wasn't anything specific for me to respond to, so those are hypothetical considerations, but suppose that it were demonstrated that downstream there was some sort of process of passing on into the price of second-hand trucks. I have got one thing that I would say about that as a privilege --

THE PRESIDENT: Well, just to interrupt you a moment, of course the way the process works is it won't be demonstrated, it will be alleged, and everyone is going to have to prepare their evidence by making some estimate of what might have happened. It won't be determined --

DR LILICO: I mean, that isn't the process as it has been put to me so far, but if that's going to be the process, I shall take your instruction on that point. The thing I would say, as a preliminary here is that the -- I don't think that you should consider it quite so obvious as it appears to me to be in some of the documents that, there would be pass-through into second-hand prices, so I understand the argument as being that -- so as Dr Davis puts it, that you would have fewer new trucks because the price of new trucks would go up, and because there were fewer new trucks then, down the line, there is reduced supply of second-hand trucks, and because the second-hand truck supply is lower then the price goes up through that mechanism, and, you know, on the face of it, that's a reasonable enough mechanism.

I don't think that it's as obvious as you might think -- sorry -- not as you might think, but as the discussion has suggested --

THE PRESIDENT: I see.

DR LILICO: -- if I can put it that way, as one might think, that that actually leads to an elevation in the second-hand price for a couple of reasons. So one is we don't really know, I don't really know exactly what second-hand trucks compete with. It might be, my understanding is that it is unlikely to be in the same market as new trucks because one of the things that comes with new trucks is you send them over very long distances and you run them very frequently, and when you have a second-hand truck it doesn't -- because it has been doing that for a long time, it doesn't have the reliability to be used for those kinds of purposes, and, therefore, it tends to run at shorter -- or distances where it doesn't matter so much if it breaks down.

It might be, I don't know, it might be that in that context it ended up competing with other kinds of transport modes that were relevant, that were not

competitors to the new trucks.
THE PRESIDENT: Can I interrupt you? Because I see those arguments, and you are about to make some more and we are running a bit out of time, but we don't know whether it had an effect and, if so, how much. Have you got a means of trying to assess and determine whether it did have any effect on the used trucks and what is it? What is that method?
DR LILICO: So if one -- so if one were to come to the conclusion, despite these other kinds of reasonings, that one did have (Inaudible) and probably my instinct is that there would be some, despite the things (Inaudible) result then I would have thought the natural way of doing that was probably via econometrics, so if you wanted to estimate downstream effects, the natural thing I would have thought would be to do an econometric analysis of the -- so you are then looking at what happens over time as the cartel price -- what's the correlation over time, not only in the cartel period but in the non-cartel period, between movements in the price of new trucks and movements in the price of second-hand trucks, say three to five years later, so you are probably doing some analysis of econometrics with a lag that reflects the normal life of a truck.
THE PRESIDENT: To try and develop a correlation which you

can then apply to --

DR LILICO: Exactly.

THE PRESIDENT: -- the overcharge --

DR LILICO: -- the ratio which said that for a given percentage rise in the price of a new truck then you would tend to get some percentage rise in the second-hand trucks downstream. That would be insofar as the other kinds of reasoning, as -- so insofar as other kinds of reasoning suggested, that that was likely to be relevant. You might think that the correlation would be spurious, but if you felt that there was likely to be an effect and my instinct, as I say, is probably that there would be, but I leave open the possibility that there would be some compelling argument that it wouldn't be, then you -- then you would just use this kind of correlation analysis to get a rule of thumb and I would have thought that you would probably be able to have a rule of thumb that would be quite general. It seems to me that it shouldn't be prohibitive to create a rule of thumb that said for this kind of truck, you know, say one of my nine categories of truck, it is probably worth breaking down by different categories because different types of trucks may have different lives and different second-hand recovery rates, so the impact might not be the same for one where the second-hand recovery is 10 per cent, and one where the second-hand recovery was 20 per cent for example.

THE PRESIDENT: And you would get the data on used truck prices to perform this analysis, the econometric analysis?

DR LILICO: Exactly. That seems to me -- if I were attempting to estimate pass-through then that's the kind of thing that I would seek to do.

THE PRESIDENT: Yes. Then I wanted to ask a bit about Euro emissions because the claim that is put forward by UKTC who have instructed you includes, as you know, a claim for extra fuel cost that was incurred because the manufacturers agreed to delay the introduction of the new Euro emission standards. Well, let's assume, because that's not an economic question, it's shown that when they produce trucks to the higher emission standards it was more fuel-efficient, and that that's demonstrated.

The question is the quantifying the claim of what extra cost actually was incurred by the class as a result. Is that something you have considered, because how would one go about quantifying that on a class-wide basis? Because I didn't see it in the report, but I might have missed it.

DR LILICO: So let's break it down here, so as I said a few moments ago, one thing -- I will deliver it only in a sentence or two, is the point that my general position would be the most likely way in which the emissions technology is relevant here is by being a mechanism of disciplining of the efficiency of the cartel itself. That's a point that I made, so I will not --

THE PRESIDENT: Yes, but if I can interrupt you, that doesn't produce a separate additional quantifiable claim.

DR LILICO: Exactly. So I haven't sought to have a method for estimating that because it isn't a separate claim.

Secondly, my instinct would be that I think the natural assumption is that you wouldn't have -- once you took account -- it might be that fuel costs were lower, but there is presumably a capital cost of the -- well, there is, it is in the analysis that we have as well, an increased cost of buying the truck which was a little bit more efficient, so -- and once you took account of the increased capital cost of the truck, and the fuel reduction of the running of the truck, I think the natural assumption is that on the point of view of the truck's user that's more expensive not less. Why do I think that that is the natural assumption? Because that's why there needed to be legislation to make them do it, right? If it were that the -- if everybody had expected that this would be cheaper for the users of the trucks to do, once you took account of the elevated capital cost as well, then the measure would just have been introduced without any need for legislation. The truck's manufacturers would have found that to be beneficial to their clients to do that.

Now -- but, of course, it is possible that even if people had expected that there wouldn't be any gain from this advance, as it transpired it might be that, actually, the net of the capital costs and the fuel effects and so on would have been beneficial. I mean, things that you expect in advance aren't necessarily the same as how things turn out, so if it turned out that that was so, and for me that's like a matter for some sort of business analysis of time and motion-type study of trucks, et cetera, I don't think that's an economist's question, you would then, I would have thought, have each type of truck, you would have some relevant business analyst of the process, which would say, well, there was a difference of a certain amount for each truck per year as the average running costs. I think you would then say, well, we've got this many trucks in the class, there are this many years that they are delayed from the evidence which is suggested in the -- so it might be that the evidence from disclosure suggests that one of the cartelists was thinking of introducing it a year earlier than they did, but in the end they coordinated on a certain number which was a year later. You would have based that on, one year for this type of truck, this amount of extra cost, we will add that to the claim.

As things stand my assumption is there won't be anything of that sort, so I don't have any numbers in there because my working assumption is that there is going to be no number to have in there, but if it turns out that there is -- so it has been left open, as I put the point at the end of my first report, if it turns out that there is an elevated cost, then that's the way I would expect to deal with it.

THE PRESIDENT: Although when you say, "The average saving in running costs", that's taking account of the different degree of truck usage as between different members in the class. It would be averaged out to get -- that's what you mean by --

DR LILICO: Exactly. It's probably -- my guess is that this kind of analysis -- I mean, it's not for me to do the -- this time immersion study or whatever, but I would assume that they would probably end up doing it for some kind of mode case, or a typical case of a truck rather than to try to get a distribution of everything and work out a formal average across all of the distribution. You would probably -- somebody would do an analysis and they would say for a typical truck's usage, this is how much you would spend with the Euro standard X and this is how much you would have with Euro standard Y, and so the difference is this, once you took account of the capital cost, so that's how I would imagine you would do it, and then you would apply it -- it is a fairly straightforward calculation. I don't have anything in there for that as a number because I'm not expecting there to be anything above zero as the number, but if it does turn out that there is a number that's higher it is important to add.

THE PRESIDENT: Yes. Thank you. Then just looking at your fourth report, I just wanted to clarify one thing where you summarise your methodology. That's in this bundle at {F/4/8} which is internal page 6 in the report. You summarise in 2.18 the task plan, and at 2.19 you refer to various data sources that you would expect to draw on, and you do -- looking on the facing page, 7, No. 9 in the bundle {F/4/9} you talk about data obtained from claimants, that's to say class members, perhaps sample data. How important is it for the way -- the method you want to apply to get data from claimants.

DR LILICO: I tried to sketch out -- I almost kind of imagined, like, 2018 and 2019 almost like if one was putting in a proposal to a --

THE PRESIDENT: We understand it's not a sort of finalised actual operating method, but --

DR LILICO: But just to give one a sense of what the working procedure would be as well as the technical method, just if I were writing a proposal that I had been commissioned with the ITT or something, so I thought of it a bit like that, of setting up a task plan and some of the various data sources that one might draw upon for different things. That doesn't mean that I -- and of course I need to have a method that might mean -- in principle, the -- this might be an opt out or an opt in claim, so there are different possibilities here as to what's going on. I'm sketching there a whole range of different data sources that one might get in different cases. I don't expect to need every data source for every truck, but insofar as one didn't get what one hoped to through, say, disclosure, then there are -- in the various reports I have sketched out strategies in which I might fill in gaps, and as you go through the number of trucks you end up with more and more niche questions. So maybe it would turn out that trucks that are used for transporting certain kinds of horses or something have some very particular characteristics and you've narrowed things down and you've got satisfactory answers for everything else, but then you end up with some small set where you have to go into more detail. It might be that in some -- that you end up with niche types of truck which -- where things aren't answered satisfactorily by other parts of the analysis, and perhaps in those cases you would do something like ask claimants, even, that, you know, you might ask something of dealers, whatever it might be, there are all kinds of different sources that you would consider, but that doesn't mean that you expect to have to use -- this is simply a list of all of the data that I would need to do anything, this is a kind of a cascade where you --

THE PRESIDENT: No, I understand. So you are not saying that in order to operate the basic method, the simulation method, and the mitigation/pass-through calculation, the econometric -- that you explain econometrically, that you need data from claimants, as I understand it. You are saying that that may be a source that one could look to if there are particular issues that arose such as, as you put them now, niche issues of particular kinds. Is that a fair summary?

DR LILICO: That's a fair summary, but -- and I think that certain sorts of questions are more likely to end up needing data from claimants than others, so if, for example, there were to be -- it were to be demonstrated that there was pass-through of -- not into second-hand trucks but maybe into general prices for some -- and that pass-through was unlikely to be upset by volume effects for some particular subset or, I mean, well, I suppose an easy example might be if it were proved that there were a general proposition that you had cost pass-through contracts which not only covered things like fuel and hire purchase, I mean, my understanding is that where you have these open book contracts they don't typically cover the capital costs of a truck, so that some things like hire purchase costs (Inaudible) probably isn't so relevant to the UKTC one, but if it were to be demonstrated that there was a market practice of doing those things, presumably, as part of the process of getting the claim, you would need to get disclosure from claimants as to whether they had these particular sorts of contracts in this particular sector, and that might be one example of things where you need to go into more detail. Another might be if you were looking at -- if you have demonstrated that there was likely -- that there was going to be cost pass through in the way that I -- so you narrowed down the universe, or I imagined you pass through on a top-down basis rather than bottom-up, so you narrow down the universe of different types of trucks, you probably start by saying, well, in these sectors you may compete with rail or light vans or maybe you compete -- it's not possible for people to raise the pass-through prices because I'm transporting quarrying from a long distance and they wouldn't pay anything more because there is a nearby quarry, so the actual underlying product is competing with something which is not subject to transport costs so you don't have any capacity to do that, maybe you would have other cases where, because, if you have a sufficiently low elasticity of supply, and sufficiently high elasticity of demand that go together, then even though you can do some cost pass through, the volume effect will typically be similar to, or outweigh it, so you would be able to narrow down the universe and then you have got a smaller set of cases which you are coming to when you say, well, in these kinds of -- for these few sectors we hope by then, once we've narrowed down the universe, we think that there may be cost pass-through, it may be that for those sectors you would need to do some sort of econometrics that looked at a -- in a classic kind of pass-through analysis, which looked at the ratio between input costs and prices, probably at above some level, so you would probably do an analysis which said if the numbers were very small, does that make a difference, if it is a larger proportion of your costs then you tend to pass them through. In order to do that kind of econometric analysis, you probably would need to ask, once it was demonstrated, that that was actually something that was going on, you then probably would need to ask for samples of claimants in that narrow set of sectors which is going to be by no means everybody, as I have said, but in my opinion it would be easy to ask for some data from people. I mean, as I understand it, once pass-through has been demonstrated there is a burden on the -- those who are claiming to -- sorry -- to provide disclosure of various sorts in order to allow the defendants to assess, perfectly reasonably, what mitigating factors there might have been, once they can demonstrate that there is a reasonable possibility that they exist so, in those kinds of cases I would have thought it was natural to expect that the -- it's just part of the process, right? The claimants are going to have to -- some of them at least -- are going to have to provide an update in order to allow you to estimate it.

THE PRESIDENT: Can I ask, you referred to the fact that it could be -- it's not necessarily opt-out, it could be opt-in, the UKTC claim, would the methods you have described, not just this last one, but more generally, would they be easier for you as an expert to apply if it is opt-in and you could go to everyone in the class and get data or does it not make a huge difference?

DR LILICO: I think that the -- obviously the more -- some of the things are going to be easier if you have got some people to get data out of, clearly. Certain sorts of questions are going to be easier to answer if you have some specific people. It depends how many there are. It could be that the number of claimants was of certain categories in an opt-in claim, was not so large that they gave you a typical indication of what was going on for that market. It might be that they did, but you could imagine that there would be categories where what you would need to do would be to look over the market as a whole anyway, even though you had an opt-in claim, and in those kinds of cases you would probably gain relatively little in terms of the methodology, but, sure, I mean, it would tend to mean, if you had an opt-in claim, that you are more likely to go -- to have a higher weight in the methodology which I have described probably to econometric methodologies, because you have got more direct data for yourself to use to populate your models. When you are using more general econometric data, not that any econometrics would do at all, but you have got a different quality of more general data that you are trying to use, so I would have thought that that would shift the weight, I'm probably still expecting to use both techniques, but you would expect to have a slightly higher weight to my econometrics in the methodology versus the simulation in the synthetic counterfactual method than I would have in an opt-out case where I --

THE PRESIDENT: Yes.

DR LILICO: -- the same data.

THE PRESIDENT: Yes. Thank you very much. I think we should take a break for lunch. We will return at 2 o'clock. Then if my two colleagues have any more questions, and then we will allow for about 30 minutes for the counsel for the proposed respondents to ask you any follow-on questions if they want to, but it will be no more than 30 minutes and then we will conclude and hear from Dr Davis. So we will return at 2 o'clock. Thank you very much, Dr Lilico. I think you know that you are not supposed to -- you mustn't discuss your evidence with those instructing you over the lunch break.

DR LILICO: Absolutely. I will not do so.

(1.03 pm)

(Luncheon adjournment)

(2.00 pm)

THE PRESIDENT: Thank you. We have Mr Harris of counsel on screen. I said before we rose for lunch that we would allow any of the respondents' counsel to ask some brief supplemental questions of Dr Lilico for just 30 minutes, and I hope that you have had a chance to confer between you as to whether you do want to ask questions, and, if so, who's going to ask the questions, bearing in mind that it's not a cross-examination as in a trial, so can I ask -- Mr Harris appeared first. Do the respondents want to ask any questions, and who's going to do it?

MR HARRIS: Yes Mr President, thank you. My understanding had been, and I have got in front of me the second letter that the CAT registry wrote on 15 April, that the -- and I quote:

"The respondents and objectors are permitted to make brief oral submissions during the first hour of Day 5", that's tomorrow, "As regards the evidence that we are hearing today", and our position for Daimler is that we would like to make very brief submissions on the expert evidence we hear today, and I would be in a position to make the ones I wish to make at the end of today if there is time, or very briefly tomorrow morning, but provided that there is that opportunity which is set out in that letter then I don't have any questions for Dr Lilico now, though I do know that Mr Jowell for MAN does have one, I understand, or some short questions for now, possibly in addition to any brief oral submissions that MAN may wish to make later.

THE PRESIDENT: Well, in answer to your first point, the answer is yes, there will be an hour tomorrow. We've just been discussing amongst ourselves how to structure it. I think probably we would want to start at 10 o'clock, have that hour to 11 o'clock, and then sit until 5 o'clock, so that both Mr Thompson and Mr Flynn have a full two-and-a-half hours for reply. So there will be an hour tomorrow as promised.

Separately from that, as I said to you, we can allow up to 30 minutes if there is any supplemental question of the witness, of the expert. You said you have none but you will get your chance tomorrow, and if you could please liaise between you, as you have done very effectively for your submissions so far, as to who's going to -- or which of you are going to make submissions about the expert evidence we've heard.

So, Mr Jowell, you want to ask some questions now, as I understand it, of Dr Lilico? Is that right?

MR JOWELL: Just on one very discrete point if I may.

THE PRESIDENT: Sure. Yes.

MR JOWELL: Dr Lilico, you were asked by Professor Bishop whether you were aware of any previous cases in which a simulation model had been used, and you may recall that you were looking in your -- in the report, I think, to find where you might have referenced them. I wonder if I could take you to {F/1/20}, and to footnote 21 of your first report. I don't know whether that was what you were looking for. You say there:

"Simulation models have been used in past cases".

You gave the example there of the Berkshire Golf Club v Revenue & Customs?

DR LILICO: Of course that's not a cartel case, but yes.

MR JOWELL: And that's not a cartel case. It was a case, I think, about the charges of Value Added Tax that were sought to be recovered from golf courses -- or that golf courses had paid and that they sought to recover, and the question was where was the incidence of the tax, was it passed on, effectively, to their customers. That's correct, is it?

DR LILICO: According to my understanding, yes.

MR JOWELL: Yes, and you mention also there that the Bertrand model was approved by the court (Inaudible) looking at it appeared that the court or the Tribunal had approved an imperfect model of competition but didn't seem to have specified which particular model, whether Bertrand or Cournot it was favouring. Perhaps you don't have any recollection of the case. Is that --

DR LILICO: This -- it would have been three years ago that

I looked at that.

MR JOWELL: I'm afraid we can't hear you, Dr Lilico.

THE PRESIDENT: You can't hear Dr Lilico? Ah. We can. Start again, Dr Lilico. I think Dr Lilico was saying it was three years ago that -- which is -- that you looked at it.

DR LILICO: Yes. It was three years ago I last looked at that particular thing so I wouldn't attempt to take you through what was said there in any detail. The kinds of things -- as I said, I have used them, simulation models, in other cases that settled. I'm not -- I would have thought it was for lawyers rather than for me to go through a lot of examples of previous cases when these things went to court, and I'm not clear what the nature is of the controversy about the use of the method, given that it is one of the main methods recommended in the guidance for cartel damages cases, but, I mean, it sounds like a question that you are raising for lawyers rather than for me per se.

MR JOWELL: No, well, I have no further questions, sir.

THE PRESIDENT: Is there anyone else among the respondents' counsel who wants to ask a question? No? Thank you very much. Well, Dr Lilico, thank you very much for your assistance today, which we greatly appreciate. You are now released, which means you can now talk to whomever you want about whatever you want.

DR LILICO: Thank you very much.

THE PRESIDENT: That concludes your evidence, and we turn, then, to Dr Davis. So if we can switch, please -- I can see Dr Davis, I can see Mr Flynn.

So if the registry has arranged, I hope, Dr Davis, for you to be sworn in?

PETER JOHN DAVIS (Affirmed)

THE PRESIDENT: Thank you very much. I'm sure you were listening when Dr Lilico started his evidence, and you heard me say to him, so I will repeat more briefly to you, that this is not a formal cross-examination. As you see, the respondents' counsel ask very limited questions. It's really an exploration, if I can put it that way, and a bit of probing by the Tribunal so we clarify points about the method you have described in four reports and some very full reports, raise any queries or concerns that we have at this initial stage, and, of course, although you have done a lot of work, we accept that this was very much at the outset. You will have, if the RHA claim is certified and goes ahead, you will have a lot more data and detail in due course to work on and that's clearly understood both for you and for Dr Lilico.

With that, I will hand over to Dr Bishop. You are muted.

DR BISHOP: Thank you chairman, Dr Davis hello.

Just a few questions, really. I suppose my one question that occurred to me is; why are you bothering with the transactions-price equation? I mean, in the end -- I'm sorry, with the list price equations, the other way around. In the end it is transactions prices that really matter and that's where the quantification comes from. Would anything be lost if you -- and then you have done enormous amount of thinking about how to do all that. Would anything be lost if you dropped the list price equation?

DR DAVIS: So it is an interesting question. I think you do lose -- at this point I think you do lose something probably quite important, which is just that the mechanism which is described in the Commission's decision is a mechanism, as many of the experts for the defence have put forward, that describes information exchange, and that information, at least in part, and that information involved the list prices being exchanged, and the configurators being exchanged, and so at the heart of part of the mechanism, it seems to me, is the question of whether or not the infringement had an effect on the list prices, and if it did, then whether that, in turn, had an impact on the transaction prices, and so the idea of the two regressions was really getting at whether we could understand that mechanism that's described in the decision, did the conduct have an impact on list prices, and if yes then did that feed through either directly into transaction prices or, indeed, indirectly into transaction prices.

DR BISHOP: Yes. I see. So I can see it is sort of interesting. I mean, if you found that there was no effect of the European list price on the UK list price, and there was still a big transaction price difference, presumably you would argue the European cartel had had some impact. I mean, I'm just wondering, it sounds like a fifth wheel on the coach. You know, it's not necessary to get there.

DR DAVIS: No, with respect, I'm not sure that that's right for the reasons I have given, that the conduct -- at least part of the allegations and part of the findings in the Commission's decision is that the conduct impacted the list prices, and then the list prices are relevant to transaction prices. Indeed, you can think of the transaction price regression if you like as trying to characterise the nature of discounts, right? The difference is between the transaction prices and the list prices, and those discounts can happen at multiple levels, but understanding how the conduct impacted the list prices and then understanding whether or not the conduct either through the list prices, through its effect on the list prices, or through another mechanism directly impacted transaction prices, those seem to me to be the key questions at the heart of whether or not the conduct had an impact on transaction prices, and that, in turn, is the key piece of analysis for -- in evaluating whether or not the conduct caused damage, so I don't think it's right to describe it as a fifth wheel.

DR BISHOP: Yes. I see. You are being very scrupulous about all the aspects of the decision. I asked the questions only because I haven't seen something that tried to do this before, but, you know, there is certainly nothing wrong with it, and, in the end, it is the transactions prices that will determine the quantum, so --

DR DAVIS: Absolutely.

DR BISHOP: Okay. My next question, then, is about the run-off period. The eight years -- are you aware of any other case in which seriousness of this kind is alleged in eight years?

DR DAVIS: Eight years specifically? No. I can't give you a case that has an eight-year period. I think my starting point in thinking about the run-off is really that in practice what we are going to need to do is think about each of the potential causes of a run-off, and evaluate whether or not there is evidence of there having been a run-off period, either in the documents or in the econometrics, and, you know, if you break it down at the moment you have potential for run-off on prices, and I should say that as I have said in the report, explicitly, if there is no evidence of a run-off period then it's clear that we shouldn't be awarding damages during the run-off period. I don't think that should be at all controversial, and certainly isn't for me, but if we break it down, the potential sources of the run-off as we -- as I understand them now, there is potential on prices, and so there is some discussion in the factual witness evidence about the potential for contracts which were specified during the infringement period, and contained prices which would then have applied afterwards. There is discussion of pricing matrices, for example, and the description of some of those contracts being long or multi-year.

Now I don't know at this stage what that description means, "Multi-year". It may not be eight years long, and, you know, I -- intuitively for pricing effects -- eight years does seem to me to be a long period, intuitively, for pricing effects, but it is -- but it's not something I would rule out as a matter of, necessarily, that pricing effects need to be shorter than that, but it is going to depend on the factual situation in respect of things like long run contracts.

On the Euro emissions technology --

PROFESSOR WILKS: Could I just come in for a moment, Dr Davis, just on the run-off question? I think there is a parallel with the lifts cartel which had service agreements which went on for up to five years, so I think your contract point is a valid one, but it would depend how many contracts there were, of course, and of what nature, but my second point was, it's all very well saying that, you know, we can determine in due course what the run-off is, but we have, as you heard in the evidence no doubt last week, we have the class definition question, and that has to be settled rather earlier than the run-off, so it does become quite important as to whether or not there is a run-off period and what it should be. I just wondered if you had any thoughts on that.

THE PRESIDENT: And if I can -- just before you answer that, if I can just come in on the contract point, one can, of course, say that the class members include those who entered into a contract during the cartel period, albeit the contract had a life extending beyond the cartel period, so one can define it more narrowly as opposed to a general run-off which says somebody who just started buying trucks three years after the end of the period is in the class, so there are various ways one could define it, other than saying it's eight years and anyone who bought in the eight years, whether one-off or for the first time, is included, so just to explain that before you answer Professor Wilks' question.

DR DAVIS: Thank you. So yes, indeed, one could -- well, really that -- the class definition question is -- I understand the challenge that you face in evaluating that. I think to just carry on on the different headings, maybe that's a useful place to go first, so on the Euro emissions, you know, it is right that by the time the Euro 6 technologies are introduced, that does suggest that a multi-year run-off, but not a run-off that goes all the way to -- not goes for eight years on the face of it, and then on the third heading I think I would say is on the pre-owned trucks, and there, you know, I think we have a description that the pre-owned trucks are often new trucks three to six years on, and so there, again, I think you would expect to see that if that mechanism is at play, and there is, indeed, an overcharge on the pre-owned trucks, that there would be a multi-year run-off.

Now I don't want to say that eight years is the right answer, because I don't know that eight years is the right answer, right? And I can't -- I haven't done the analysis to tell you what the answer for the run-off period is at the moment, but it does seem to me credible that there is at least the possibility that there would be a multi-year run-off for each of those three reasons, and perhaps just to add on the pricing side, you know, the contracts are one argument for why you might see a run-off period. There is also a general argument which will need to be evaluated as to whether or not the re-establishment of competition happened quickly, or whether there was some run-off period more generally than just because of the contracts, and, you know, we do know from at least some past cases, and the one I have in mind in particular is a very famous cartel in the G Westinghouse cartel case which -- there is a wonderful article in Time Magazine in 1960, I think, describing the details of it, but also a Harvard Business School review case that I think my report referred to, and there were indications that the price book, so here we have computerised price lists, but the price books had led to a situation where it was understood what was meant by an agreement, and if you got an understanding of what it means in a complex industry with differentiated products to agree to coordinate, then there is at least part of the problem still solved, the problem of how you establish co-ordination and maintain co-ordination, still solved after the end of the cartel period.

Now that doesn't -- none of that says that there should, in fact, be a run-off. You know, it will be the case that we are going to need to evaluate each of those potential reasons that there was a run-off period, and come to a view, and so I think I'm somewhat limited in my ability to help you resolve your conundrum at the moment, because I haven't done the analysis and I haven't seen the evidence from disclosure, and the documents to be able to really give you a very informed view, so the best I can do for you in terms of the run-off is probably to say that if you think about used trucks in particular, those -- I think it is in Mr Flach's evidence -- there is a statement along the lines of, "That normally trucks are sold ..." you know, after three to six years, so if you took -- so that would suggest that pre-owned effects would be -- might start between three and six years, and if they then carried on through resale of pre-owned trucks which I know has been raised as an issue, then you can perhaps get to a longer run-off period, but, you know, I say that with some nervousness because I'm speculating, essentially, on the length of the run-off period, having not done any of the economic work to justify giving you a firm view, but I do not see how -- yes. So probably I should stop there.

THE PRESIDENT: Can I just, then, clarify, if I have understood it correctly, that the eight years that's put in the claim form, that's not based on your advice that that is the right period as an economist, because you haven't really looked at it, you can see various reasons why there might be a slightly longer run-off period here than in some other cases, but you don't -- you're not in a position to say how long it might be at this stage.

DR DAVIS: Precisely. That's true. You know, I have -- absolutely right that I have, I think, in the report, I even say in terms that I'm not in the position to give you a view. I wouldn't rule out eight years, but neither can I tell you that that is a reasonable view on what the run-off period is, certainly.

DR BISHOP: Do you want to go on to sub-classes? I think you were going to ask about that.

THE PRESIDENT: You have postulated a number of sub-classes and saying at least two, and maybe, I think, one for cash and another for rentals, spot hire might be a third when data is collected. Is that a fair understanding?

And there might be more.

DR DAVIS: So I have suggested six sub-classes. There were four for new trucks and two for pre-owned trucks, and the new trucks were divided into those trucks that were purchased on cash price and those trucks purchased on non-cash price contracts, so the way, in broad terms, to understand that is the difference between a hire purchase or a finance lease on the one hand, those are non-cash price contracts in the terminology adopted in the report, and the -- sorry, those are cash price contracts in the terminology adopted in the report -- and the operating leases which are the non-cash price contracts. So that's one distinction that's drawn, and the other one is between, essentially between vertically integrated supply chains, or distribution channels, and those which are not vertically integrated, so in the terms in the report that's the difference between affiliated dealers and non-affiliated dealers. So those are the four for new trucks, and then for pre-owned there is a distinction drawn between -- again -- between the cash price contracts and the non-cash price contracts, and let me try and -- shall I explain the rationale for those six? So --

THE PRESIDENT: Well, can I ask you, perhaps, before you do that, you heard, I think, the submissions on behalf of

Volvo / Renault which were suggesting that we shouldn't, if we did certify the RHA, go firm, as it were, on sub-classes at the outset, but that it might be more practicable to leave the possibility of -- or perhaps even likelihood -- that there will be sub-classes to be refined, and then determined once evidence starts -- and data -- coming out, and you have more to work on to see what, exactly, the best subdivision is, and one could then also hear from the respondent's experts on what is the way they suggest prices might be analysed. Do you think that's a workable method going forward, or might one want to have anyway two sub-classes, one being new and the other being used because of pre-owned, used, trucks, because of the sharp difference between the interest there, and then leave the rest to be elaborated in due course?

DR DAVIS: So having reflected on the various submissions, I'm still, as I laid out in my fourth report, I still think it is a sensible way forward to go with the six sub-classes. As you mentioned, the new versus pre-owned distinction is very clear, that we will be using -- I would be using very different data, and am expecting to be running a different regression for the pre-owned trucks and for the used trucks -- for the new trucks, so that distinction seems to me to make sense.

On the cash versus non-cash distinction, one of the key points, I think, to bear in mind is that the non-cash price contracts, the haulage company never actually takes ownership of the truck, the lessee never takes ownership of the truck, right? You are using those trucking services for a period of months or years, but you never take ownership of the truck, and what that means is that there is no issue of needing to adjust the damage calculation for an overcharge on pre-owned trucks, or rather mitigation, because you have got a higher price for your truck when you handed it back. You never owned it. You used it for a period of time, and then the finance company took the truck back and it's dealt with in the way it's dealt with, but it's no longer -- importantly it's no longer the -- there are no residual rights or options or right to any of the cash from the sale of that vehicle, as I understand it, for those trucks which are on operating lease-like contracts, so in the report, non-cash price contracts.

So -- and that's important for the methodology for two reasons. One is that -- is that there wouldn't be a source of mitigation for those types of trucks, and the second is, really, that as we start -- well, maybe it is the same reason. As we start thinking about how you would measure that mitigation, you know, we won't, on the non-cash price side, I will not have to worry about residual values. Those -- except, perhaps, as variables in the regression, it can affect the lease prices, and so you may have to put the residual values on the regression on the non-cash price side, but on the cash price side, for those types of contracts the factual evidence, and the experts on the defence side, have highlighted that there are buy-back arrangements, and that those buy-back arrangements are important to take account of, so if I have a guaranteed price at which you will -- that the manufacturers would take back the truck, then that is set at the point of -- at which you are buying your truck, and will impact either the list price -- the lease price that you are offered, and so it's going to be important in the methodology to the extent that that form of mitigation does seem very likely to be argued, or is already being argued, that it will need to be taken into account, and so that distinction between the cash price and the non-cash price contracts seems to me to be almost unarguably important to take into account.

Now, you can argue on the margin there may be some which are closer to -- you know, between particular types of contracts, whether they should be in the one bucket or the other, but the core distinction between taking ownership of the truck or having rights in the used truck or an option to either buy or hand back that used truck, that issue is not there in the non-cash price trucks, so that distinction seems to me to be an important one, and then on the vertical integration side, you know, I guess as economists we believe that vertical integration can be important for defining people's incentives, and I do -- in the report I do note Volvo's evidence around there not being a big distinction between the way pricing works from the manufacturers to wholly-owned dealers and franchise dealers, but I think -- so my view at the moment is, obviously it is a preliminary view, is that that doesn't provide me with the reassurance because -- that there should not be a distinction, because ultimately you are -- the big question is whether or not those vertically integrated structures will provide different transaction prices to claimants, compared to having an extra decision-maker at the dealer level, and so the fact that the manufacturer is providing the same incentives to dealers, no matter whether it is a vertically integrated structure or a vertically disintegrated structure doesn't tell me that the transaction prices -- the impact of an overcharge would play out in the same way, and I think also it's going to be important to look at the factual evidence on the degree to which vertical integration is, really, the same as vertical separation, because, you know, there are ultimately franchise agreements here, and so not only will there be transaction prices, but there may be rebates, there may be franchise fees, and I think as Mr Cussans who, for MAN who lays out in terms that this -- when they were deciding whether to operate a vertically integrated model or a vertically separated model, that this was both a big decision and that it was one which had material implications.

So, again, that third distinction between vertically integrated and not vertically integrated structures seems to me to be very likely to be important in framing the analysis, so my basic view is that the six sub-classes that I laid out make sense, but that, absolutely, it may make sense to have further sub-classes, and it may be in respect of direct sales, and in respect of spot hire, to take the two, I think, leading examples, that, down the line, it may make sense to introduce additional sub-classes, but those -- the six sub-classes I laid out, I think, still, to me, make good economic sense.

THE PRESIDENT: Because your basic approach, as I understand it, given that you are looking at things collectively, but seeking to arrive, then, at individual per claimant damages is that you will, through using sub-classes, get a collective view within a sub-class of what the percentage overcharge should be, and then that will be applied to -- as a percentage -- to the individual claimants, purchasers, within that sub-class. Is that a summary of the way one gets from, as it were, a collective approach to an individual damage?

DR DAVIS: So the damages within each sub-class are at the truck level. The regressions are all being run at the truck level.

THE PRESIDENT: I should have said, "Trucks", you are quite right, because a claimant could be, therefore -- an individual claimant could have trucks in different sub-classes, I suppose.

DR DAVIS: That's absolutely right, and so, then, the damages are calculated as -- by adding up for a given claimant across all of the -- across all of the trucks within each sub-class, and then across the sub-classes.

Now, I'm not sure if you were pushing me towards a discussion of average effects versus individual effects in your question, Mr President. I'm happy to deal with that topic if you would like me to.

THE PRESIDENT: Well, yes. That is where I wanted to go, because, of course, the point, as you heard, being made by several of the respondents is this is all so heterogeneous in various different ways, both the truck itself and what's sold with it, and, then, the nature of the purchaser, and their bargaining power, that one really can't do any kind of averaging, even in sub-classes, and perhaps you can explain, if you feel -- as you obviously do feel able to take account of that -- but how you approach that problem.

DR DAVIS: So, if I may, I think I would like to divide it into a number of separate points. So the first one is whether or not there are just -- there is just too much product heterogeneity which is potentially observed, but the point is made that these trucks are very heterogeneous, they have different weights, they have different gearboxes, and on that point, you know, I believe that the defence are overstating the concerns that that raises, so -- and let me give you a specific example. I'm just trying to remember whose -- if you could just give me a second I will just try and remember whose case -- whose witness statement to take you to.

So if we go to Mr Flach at paragraph 20 --

THE PRESIDENT: If someone could give us a reference?

DR DAVIS: I think that's D/3 and then it's paragraph 20.

THE PRESIDENT: Yes it is -- thank you. It's D/3, and it's paragraph 20 which is on page {D/3/5}.

DR DAVIS: Thank you very much. I'm afraid the bundling numbering system is -- I'm getting used it, but it has defeated me for a moment, but if I could take you to that table which shows for a Eurocargo truck, it highlights that there are 15 variants of that truck thought about in terms of the gross vehicle weight, six sizes by engines, 13 gearbox options, 12 wheel base options, three types of cab and four types of suspension, and I suppose my -- the point I would just like to highlight is that some of these points of distinction are really not going to require separate variables in the econometrics, but rather are describing that a given variable may take on many values, and so take, for example, the gross vehicle weight. So it's true that there are -- within Iveco's Eurocargo trucks, we've got 15 different gross vehicle weights, but when we are building a model which is explaining the variation in list or transactional prices, we may only have one variable in that model which is gross vehicle weight, which is doing the vast majority of the explaining of variation across the trucks in gross vehicle weight, and the same for engine size. You know, the horsepower of an engine, it's true, we could write down an econometric model which had a different dummy variable in for every possible engine size, but we probably wouldn't want to do that. We probably would want to have a variable which is engine size. So a single variable which takes on different values.

Similarly, for wheel base, you know, 12 different lengths between the front and back wheels, those are telling you that within Eurocargo you have got trucks which take on 12 different values for the variable wheel base, but it does not mean that we need to put into the econometric model 12 dummy variables for that particular model of truck. It's just telling you that we probably need to have the variable wheel base in the regression equation.

Now, I haven't gone through and put the work in to evaluate whether the same is true in respect of some of the others, the other variables here, but my -- I think, I hope, those observations make clear that at least on the observed characteristics the degree of heterogeneity which is being pointed to is -- overstates the extent to which that is going to create problems for the econometrics, because we are confusing the values which the variables which we put in the econometric models will take on with needing to put in many, many, many variables in the regression which I accept would be -- might lead to a problem, but while I'm accepting that might lead to a problem I don't think it is a problem we are going to have here for the reasons I give you.

So that's the first issue, is observed heterogeneity, the problems associated with that are being hugely overstated in my view.

The second, which is not, by the way, to say that there won't still be challenges, of course, and I think somebody else raises the issue of whether one can tell -- whether we will be able to tell apart white trucks from another colour trucks because white trucks sell for higher prices, and, you know, ultimately there will be characteristics of the trucks which will not be observed and will be in the error terms in the regression equations, and we will have to accept that, and evaluate whether or not the specification is nonetheless reliable, but that's true in every econometric exercise ever undertaken, that there will ultimately be some unobserved variables.

So that's on the observed characteristics side.

There is a second point on the unobserved drivers of prices, let's put it that way, and the leading issue here is in respect of bargaining power, and Dr Durkin in particular says; well, people have abilities, and we can't observe the bargaining ability of an individual dealer or an individual haulier or an individual manufacturer, so -- and in large part I agree with that.

We can't observe their ability, but the same is true for any industry, or any negotiation where people bargain, and still yet economists undertake empirical investigations involving -- in industries where bargaining is important, and, you know, the reason is that we do see both the outcomes of the negotiation, we see the price levels that are achieved, so it may turn out to be the case that smaller hauliers have lower prices than -- sorry -- higher prices than larger purchasers of trucks, and if it does then I will be able to control for that in the regression analysis, so we see the outcomes, and we see the -- and we have an understanding from the economics as to what drives negotiators' relative bargaining positions, and that is a focus on their relative -- the relative attractiveness of their outside options, and so again we can see, observe, data and measure variables which are related to the outside options of, potentially, both dealers and claimants, so, you know, just to make that concrete, if you know that you need a truck which is particularly relevant for distribution, then by looking across the marketplace we will be able to see whether there are lots of good trucks with similar characteristics or -- and similar price points -- or a sparsity of trucks. Maybe there is only, in one particular part of the product line, there are relatively few substitutes, potential substitutes available, ie in that case the haulier would have a worse outside option, or, even more concretely in terms of the dealers, it is not at all unusual to count the number of dealers in a local number of outlets in a local area in, say, a retail merger investigation. You might count, and so I can happily envision getting the data on the locations of the dealers, vis-à-vis the claimant's head office, and constructing measures of the extent to which they have multiple options nearby, and those outside options, therefore, are amenable to collecting data on them, the factors which drive somebody to have a better or a worse outside option, and, therefore, those variables can be used in an econometric exercise.

So I think those are the first two points that I wanted to hit, and then I was going to get on to the averaging versus individual distinction, but --

THE PRESIDENT: Just before you do that, the other one that's mentioned is the bundle, the purchasing bundle, you know the point I mean about other matters being purchased at the same time, whether it's repair and maintenance arrangements or warranties and so on.

DR DAVIS: Absolutely, and so, you know, that is -- the bundling I think raises two issues. One is measurement and the other is mitigation, so let me deal with the measurement point, although they are deeply interconnected, because, you know, clearly in order to evaluate whether an overcharge on trucks was nonetheless competed away through lower prices on repair and maintenance contracts, for example, it's going to be necessary to collect information on not just the truck price but also the service, and so my basic proposal is, in the reports, is to measure both the price of the -- what's sometimes called, "The naked truck", or in the report, "The chassis cab", and the price of the bundle, and so on -- and by looking at both of them I should be able to see whether or not there is a negative overcharge on the extra services that are included in the bundle. Now I have suggested that we take a two-stage approach to that, first of all to look at the factual evidence to decide whether or not it's necessary, through a stage of disclosure, to decide whether or not it's necessary to go through an empirical exercise, so, for example, in respect of finance, you know, if, having looked at it, you think that interest rates are essentially set, the finance is really within the context of a broader market for loans for durable goods, then it may be you come to the view that it is sufficiently unlikely that the conduct through the --

whether it is an exchange of information or something beyond that in respect of trucks, you know, perhaps didn't -- is unlikely to have had an impact on the rates of interest that hauliers are charged when they lease trucks.

Just because, you know, if, ultimately, in order to provide -- you have an option as a haulier to go with the manufacturer's financing arm or to go with an independent source of finance, and if -- and so you can't be too far out of line, and if it were the case that those rates were essentially set in a market for finance for durable goods then it may be that it's less likely that you get that kind of negative overcharge effect on that element of the bundle, so I have suggested two stages -- first of all, let's look at the disclosure -- let's get some disclosure on these topics and see whether or not these are material effects, and if they are then let's look at them and let's try and measure whether or not it is appropriate to take into account a negative overcharge or some mitigation, and I think in broad terms I do expect there to be data available to do that exercise. You know, one -- maybe not everywhere, and maybe not in respect of every truck, but in respect of -- or every service -- but in respect of a significant number of them, and, you know, we do know from the factual evidence that cash prices, that is the price of the naked truck, is available, and not just for cash price contracts, but also for some of those trucks which are offered through operating leases, the non-cash contracts, so we see some evidence of the pure -- just the chassis cab price, and, you know, fundamentally whenever we've got -- whenever what we are seeing is, for example, finance being provided by the defendants in particular, then I do not see how you can loan money against a -- to a haulier to finance their truck without having some sense of, for example, the transaction price and the component in that, so that would be one source of data. There will also be potentially the claimant group through asking them to provide information, and then also dealers to the extent that it's feasible to get that kind of third party disclosure, and in broad terms I would say the right approach is probably to get as much information as we can out of the defendants and dealers, and then use the information from the claimants to the extent necessary.

Did I -- I hope I have answered your question, Mr President.

THE PRESIDENT: Yes. You talked about how you would try and deal with the -- these different heterogeneous variations, and then you were, I think, going to -- that was a prelude, in a sense, or a separate question to the issue about going from collective to individual.

DR DAVIS: Absolutely. So let me be -- thank you very much.

So let me be absolutely clear. The aim of the methodology is to get to individual damages for each individual truck in each sub-class, and then add them up. Now, it is true that whenever we estimate a regression, the -- we have parameters, and those parameters are estimated using data not just on one individual's truck, but on a group of them, and so there will, undoubtedly, be a degree of averaging embedded in the parameter values of the regression, but let me be absolutely clear that the -- some of the contentions which are being put forward, that the -- that what will come out of the regression analysis is necessarily only an average overcharge across the entire sub-class, that is not right. It clearly is the case that it's perfectly feasible to allow for, in technical terms, an interaction between characteristics of the claimant and the overcharge dummy variable, so that the overcharge can be estimated separately for, at least in principle, if we have enough data, for different sub-groups of claimants within a sub-class, and that's what I would expect to be able to do, so that in the end the damages estimate for an individual truck in an individual sub-class will depend on that individual's data, their characteristics, their size, perhaps, and also the regression parameters, and the regression parameters may relate to the whole sub-class, but they would only do so if you believed -- if the data don't reject the hypothesis that there is -- there are differences which are relevant, differences in the overcharge which are relevant, so we are going to have -- in essence we are going to have a regression model which can allow for a significant degree of heterogeneity, even within a sub-class across different types of claimants, and, potentially, you know, not just the claimant characteristics, it may be that the nature of the dealer impacts the overcharge or the identity of the manufacturer. All of those will be possible, and it will be possible to evaluate one specification versus another, so, you know, fundamentally what we are shooting at here is individual damages. Yes, there may be some degree of averaging ultimately, but only to the degree in the overcharge estimates, but only to the degree that the data suggests that that is appropriate.

PROFESSOR WILKS: Dr Davis, could I come in and pick up one or two of the points you have made there? You actually do discuss this, I think it's pages 60-62 in your further report. I don't necessarily want to take you to that, but if I could just quote from paragraph 128 -- sorry, I will let you turn to it. {F/9/61} and it is paragraph 128.

DR DAVIS: Yes. I have got it. Thank you.

PROFESSOR WILKS: You do address exactly this question of averaging and you say:

"It will be a narrow group of hauliers ..."

Reading on:

" ... who purchase the same type of truck in the same type of transaction".

What I'm just trying to visualise is the fact that we are dealing with hundreds of thousands of trucks, and I'm trying to get some sense of how many sub-groups you would need. It does seem an extremely substantial number, but have I misunderstood that?

DR DAVIS: So I don't know how many sub-groups we are going to need ultimately. I should be clear that when this paragraph says that it can effectively be taken over a narrow group, you know, that is describing what's possible rather than necessarily where we land, so it will be possible to the extent that we have enough data, there are enough trucks within the sub-class, then it will be possible to have narrow groups. To the extent that there is less data, then, obviously, you are -- the degree to which we will be able to get in a granular look at the extent of the overcharge will be less, and that is inherent in the -- you know, the connection between -- if you have got more data you will be able to get a more granular view on the extent of the overcharge, and it seems to be -- you know, I suppose the example that's maybe typical, but arguing by analogy, typical, the example that may be in all of our minds at the moment, given the circumstances is related to sort of the effectiveness of vaccines. You can think of that as a sort of before and after evaluation, and it is interesting to look at the average effect, right, but then it's also interesting to understand what's happening for different groups, and the more data you have the more granular the view that you will be able to take on not just what the average overcharge was, but also the overcharge for different types of hauliers, and with enough data we will be able to get very granular. I'm not -- I can't promise you at this stage we will have enough data to get very granular, and I certainly don't want to overstate the position. You know, there will be inevitably approximation in here, so that, you know, the extent to which, in the end, with the data that is actually available, we will be able to get very granular on this point is, frankly, an empirical question that I will only really be able to answer once the data is in and the regressions have been run, but as an objective to get at these individual damages the regression approach certainly has the potential to get nicely granular so that we are looking at the overcharges and how they vary across trucks within the sub-class, so you are getting the heterogeneity both within the sub-class and also across the sub-classes.

PROFESSOR WILKS: That's very helpful. Thank you.

THE PRESIDENT: How much data do you then anticipate seeking to get, trying to get, from class members?

DR DAVIS: So, as I said, I think the starting point should be that we get as much data as possible from the defendants and, if it is feasible to, given the constraints from the dealers, and the reason to do that is simply that that will give us data which is more likely to be on a consistent basis, and will not require -- it will enable us to go to individual computer systems and get the answers for, you know, for large numbers of trucks rather than to go claimant by claimant, and I suspect for some of the claimants that the computer systems will not be at the standard that they might be for large multinational companies, so I think the basic answer to your question is that ultimately how much needs to come from the individual claimants I will have to see down the line, but I would certainly aim, I think, in the first instance, to get as much data as possible from the defendants and from the dealers where that is feasible to do so, and then use the claimant data as a third source of information, but I do think that a considerable amount can come from the claimants if that is required.

THE PRESIDENT: You will want, as a minimum, I suppose, what trucks they have bought, when, at what price. Is that right?

DR DAVIS: Sir, I think that's -- that's certainly information that I would want, but whether or not that has to come from the claimant group, or whether it is available from others, I think is yet to be seen, so, anyway, if you think about the finance houses of the truck manufacturers, for example, you know, they, I do think, will have information on transaction prices, at least in some instances, because you can't loan money against a truck without having some information on transaction prices, but the extent to which that information is available is -- you know, I just don't know at the moment but I would expect some of it to be available, some of it to be available from dealers to the extent that that third party disclosure is feasible to use, and if not then the trial run of the survey that was run as part of my first report, and reported on, that did bring out significant amounts of information from the claimant group. I don't think it showed us that we are going to get everything that, in an ideal world, we would get on all of the variables, but certainly significant amounts of information came out from the claimant group, and so that is a -- I think of it as a third source but, nonetheless, potentially substantial amount of information coming out of the claimant group.

THE PRESIDENT: Yes. Thank you.

We would like to ask you about pass-through or mitigation which was put to us should not be treated as a common issue for the purpose of, really, your calculations of individual loss, but at the same time, if it is not looked at and one ends up with figures ignoring pass-through, that leaves a lot to be done by way of progressing, then, individual claims, given that the defendants will argue, certainly on the new trucks, that there is significant pass-through.

There are places in your reports where you seem to be thinking about how it could be done on a common method, and can you elaborate? Do you think that is feasible? Maybe you need different sub-classes to look at that in a different way, such as those who use the truck for hire and reward as opposed to those who use the truck for their own account in their business. It might be one -- just thinking in the abstract -- one possible division, but can you see that there might be ways of doing that on a common method?

DR DAVIS: Yes. So thinking purely about this pass-on, I have seen that we've been using, "Pass-on", and, "Mitigation", in a -- meaning a variety of things, but -- so, you know, the complements argument, that's potentially mitigation, the new versus used, that's potentially mitigation, and those are certainly both already within the methodology. The pass-on in respect of, you know, did a haulier raise their own prices, so the own account pass-on argument, or did the downstream retailer, say, pass on their increased trucking retailer costs. I really laid out my still relatively preliminary views in the second report, and in broad terms what I have suggested is that what's required is a two-stage approach. One is a set of market definition exercises, so in order to evaluate pass-on, we've first of all got to understand what the downstream market is that we are looking at, and so, for example, for own account -- sorry -- for hire and reward, that -- it may be that that shipping pallets is a -- within the UK -- is a market. It may not be, but it may be, and if it is then it would make sense to collect price data for that market, downstream price data for that market, that's the price of shipping pallets and build the methodology to evaluate whether or not those increased -- assuming there was an increased price of trucks -- translated into higher haulage prices.

On the own account side it will be a matter of going, I think, market-by-market, again, but now instead of operating at the haulage -- in the haulage markets, we are really looking at the downstream markets, and there, you know, it is the case that I have not gone into any depth as to exactly how that would play out, but the broad approach of looking for prices or price indexes in downstream markets and seeing whether or not, when haulage prices went up, that's an industry-wide cost increase, that showed up as increased downstream prices, undoubtedly they -- an exercise which would be data-intensive and challenging, but I don't see at a fundamental level why that won't prove to be a feasible activity for economists in the case, but it will certainly be a challenging and resource-intensive exercise.

THE PRESIDENT: Yes. When you say haulage prices go up, you mean truck purchase prices go up?

DR DAVIS: When truck purchase prices go up, and then the question for the pass-on is whether the haulage prices go up for the hire and reward sector.

THE PRESIDENT: For the hire and reward. Yes. You say new and used -- you are sort of doing that, you are doing used truck prices for those who are purchasing used trucks. Does that equate with the sell-on or resale pass-through of someone who has bought a new truck and keeps it for four or five years, and then disposes of it?

DR DAVIS: Thank you for picking me up on that because that is an important point. So -- and you are absolutely right that there is no immediate read across. So where, perhaps, my language is reflecting my emerging thoughts rather than what's in the report, so -- although quite a lot of those thoughts, I think, are in the report already -- you know, in essence when you start thinking about mitigation on the non-cash price contract side, there, as I said earlier on, the claimant never takes ownership, so there the answer seems to be straightforward, which is that there is no mitigation through the sale of those trucks.

THE PRESIDENT: Yes.

DR DAVIS: On the -- although there could still be an issue, as I lay out in the report, that the lease payments for that group could have been lower if the residual values of the truck were -- which impact the lease price --

were -- well, they could have been inflated if you thought the conduct impacted the -- sorry -- could have been inflated if you think that the residual values were higher because the expected future used prices were higher, or if the conduct -- and this is not in the Commission's decision -- but if the conduct impacted those residual values, then potentially they could have been lower as well. So I'm not sure what the direction is, ultimately, on that, but certainly you would want to take that into account.

On the cash price side, we have a more complex picture, and -- but in very broad terms the defence witnesses lay out that there is an important role being played by, for example, buy-backs, and that those buy-backs, you know, guaranteed buy-backs or buy-back options, that those are purchased at the point at which the new truck is sold, and so the question would be whether or not those residual values which impact the value of that buy-back were impacted by the conduct, and in some respects it looks like those residual values are -- or at least my current view is that those residual values more or less play the role of used truck prices in the used truck price regression in respect of guaranteed buy-backs, you know, did you get a better guaranteed price for your truck for handing back your truck at the end of your lease period because there were going to be fewer trucks around at that point, three, four or five, six years down the line, that feels like it fits quite closely by analogy into the used -- into the pre-owned truck regressions. In other areas where you are not guaranteed a buy-back but there is an option, the price variable would be different. It wouldn't be the residual value of the -- the whole of the residual value of the truck, we would need to construct an option value for the truck, and I'm expecting that because -- sorry, I should be clear.

It is an option value because if you are granted the option of selling your truck back at the end of its life to the manufacturer, then you probably only want to do that if you are going to get a better price for it than you would do selling it on the used market, and so that, then, introduces a complexity that needs to be thought through in respect of the -- that element of pass-on.

So, you know, I do think we are broadly in a position where elements of the pass-on methodology for -- sorry -- the used methodology -- the mitigation methodology is coming together, but it is not yet fully specified in the report, and I should be clear about that.

THE PRESIDENT: Although it's not yet fully specified, do I take it from what you have been saying that you think that it should -- you envisage that it may well be possible to develop a method of then estimating this form of mitigation which, as you explained, is really more pronounced on the cash price side, that's to say something that you would actually deduct from the overcharge that's calculated on a common basis by appropriate groups?

DR DAVIS: Yes. My current view is that that is likely to be possible, but, obviously, I haven't gone into that in the same level of detail as I have in respect of overcharge on the pre-owned trucks.

THE PRESIDENT: Yes. Thank you. I think we've slightly overrun the time we would normally take a break so we will take a short break now.

DR BISHOP: Could I ask just one question?

THE PRESIDENT: Of course.

DR BISHOP: Just Mr Belk in his statement, you don't need to go to it, says that bulk discounts sometimes may be off-invoice, and, therefore, not detectable in data sets. It may be you have dealt with it, and of course there's got to be something in that residual term, maybe you can't deal with it. Is it a matter that you have considered?

DR DAVIS: So not in any detail. I just don't have the information to really consider what those kind of -- what rebates look like or what bulk discounts look like. I guess intuitively, you know, to the extent that the classes are made up of insignificant parts, smaller claimants, then the bulk discounts may be less of an issue for those groups, but clearly my understanding is there are some larger firms in the claimant group as well where that may be more of an issue and so would need to be looked at, but it depends on the nature of the discount, right? If the discount is -- if the bulk discount is really a per-truck discount, then it may make sense to just look at the price net of -- for the truck net of the discount, and that may be relatively straightforward. If it is something which looks more like a rebate type of structure, then there are decisions to be made about whether to try and incorporate that into the measurement of price or adjust for it in some other way, but -- and my thoughts haven't -- I just don't have enough information to really unpick that for you.

THE PRESIDENT: We will return at 3.35. Thank you.

(3.25 pm)

(A short break)

(3.40 pm)

THE PRESIDENT: Dr Davis, I wanted to ask you about one particular aspect of the claim which is the alleged effect of the delay in the Euro emission compliant trucks. It is said that when they were bought out compliant with the Euro 4, 5 and 6 they were more fuel-efficient. That's obviously not an economic question. Let's assume that that's right, that they were, but what is said is, therefore, the delay caused a loss in terms of extra fuel costs which would have been saved if these trucks had been put on the market and available for purchase earlier.

Can you explain if you are -- how you are able, if you are able, to calculate that sort of loss on any kind of common basis?

DR DAVIS: I can certainly have a try, and I have had a go at this, obviously in the reports. So, initially, in the first report and then most recently in the fourth report. My basic approach is to make some assumptions which are going to need to be tested, and then -- and specifically what I have done is suggested that at least for this -- at least for the moment, the working assumption is that the -- is that if you bought a truck that was subject to a -- during a period when there had been delay, so that you would have had an additional set of options or one option or an additional set of options had you -- had there not been the infringing conduct, then I am assuming that the -- that a given claimant would have replaced the truck that they actually bought with the closest more advanced Euro emissions technology version, had that been made available earlier, and I think that's the key assumption. There are simplifying assumptions such as that the same procurement method would have been chosen in both the factual and the counterfactual, and that the lifetime of the truck and the mileage of the truck --

THE PRESIDENT: Yes. You are assuming, cutting it short, a sort of equivalent purchase and use.

DR DAVIS: That's right, yes.

THE PRESIDENT: Yes. I understand that.

DR DAVIS: And then --

THE PRESIDENT: Go on.

DR DAVIS: And then I asked the question, well, would the total cost of ownership, having established those two trucks, would the total cost of ownership have been lower in the counterfactual, and if it had been lower in the counterfactual, then there would have been a loss as a result of the conduct and therefore damage, and, of course, your question is, well, how do you get at the total cost of ownership, and in the first report, maybe I can take you there --

THE PRESIDENT: Yes?

DR DAVIS: So if I can take you to the first report which I don't have the bundle number for, so --

THE PRESIDENT: Don't worry. {F/7/1}.

DR DAVIS: So I'm looking for the first report.

THE PRESIDENT: Yes. It's in bundle -- the first F bundle.

MR FLYNN: F/5.

THE PRESIDENT: Oh sorry, F/5. I'm so sorry. {F/5/1}.

DR DAVIS: I was going to take you to page 94, or paragraph 202 if that's easier. {F/5/97}. That's essentially laying out the definition of the total cost of ownership, and it is a simplified version of total cost of ownership. There may be other elements to add in here, but crudely it is saying that the total cost of ownership is the price of the new truck less the current value at the point of purchase of a new truck of the amount you would sell that truck for, and I should say this formula is for a cash price purchase, and then plus the Net Present Value of the operating cost. So nothing very surprising in the definition of the total cost of ownership, and remember we are going to calculate that for the truck that you actually purchased, the claimant actually purchased, and for this potential counterfactual truck, which is the closest equivalent with the Euro emissions technology, okay?

THE PRESIDENT: Yes.

DR DAVIS: Now, so, the price of the new truck in the counterfactual, that is an element of the total cost of ownership, and that, in broad terms, is the subject of the overcharge regression for new trucks, and what would the counterfactual price have been of a truck that can be predicted using the regression analysis. The pre-owned price, again, we have a regression analysis estimating what the pre-owned price would be, and we may observe it in the factual and we can predict it in the counterfactual, and then the operating costs, and the operating costs, the fuel and the repair and maintenance expenditure are what's identified in the equation, so if I -- maybe the thing to do is to focus on the fuel, since that one seems to be -- have created a particular controversy about whether or not fuel efficiency can be reliably measured using a common method, and that is probably best done by taking you to my fourth report, which is {F/9/61} and, in particular, paragraph 176 {F/9/78} which lays out that fuel costs are going to depend on variables such as mileage, and this is where an assumption comes in, that the mileage in the factual and the counterfactual at the moment are being assumed to be the same, and then at point 2 there is fuel prices {F/9/79} but page will differ across individuals, of course, and individual trucks potentially, we are collecting information on the mileage at the individual truck data from the claimants.

THE PRESIDENT: Well that's the point, really, if I can interject, sorry to interrupt you, I understand -- well I don't pretend I understand the formula completely, that's not my forte, but I can see the concept of total cost of ownership and the need to make these assumptions, and let's assume they are reasonable assumptions for present purposes, but the mileage seems so critical, and that will be -- vary from, certainly, claimant to claimant, possibly truck to truck, but certainly the claimants may have an average across their trucks, but it will change from claimant to claimant, so what I'm trying to understand is, are you saying if these sections where you discuss TCO that this is something that you think can be done but it's got to be done on an individual claimant basis, although some of the elements in the formula will be common, or derived from the regression, or is it something that you can do on an averaging basis for sub-classes or groups, and then apply. How granular, in other words, has it got to be, because it might be quite difficult, in practical terms, to get from 20,000 class members, details of what mileage they drove each truck each year going back, you know, to 2001, 1999, et cetera.

DR DAVIS: Absolutely. So it may turn out to be difficult, but so the question is --

THE PRESIDENT: Do you need that, is what I'm trying to understand, or are you saying it can be done in a common way, or do you really need the details from everyone of their mileage and so on?

DR DAVIS: So my basic approach is to aim for the individual damage where we are collecting individual data, so, for example, in my reply report at paragraph 404, which we don't need to turn up, but what it does is report the response rate from the survey of hauliers that were -- of the claimants that were undertaken, or the trial survey, as it were, and you will see that there is a response rate of above 20 per cent, I think, you know, there is nothing -- we shouldn't rely on the individual number of -- I think it is 27 per cent but we shouldn't rely on that, but a ballpark over 20 per cent response rate, so it does seem that there is an indication that at least some data on fuel efficiency will be -- on mileage -- will be available at the individual claimant -- or individual truck level, and where individual data is not available then we may need to -- I may need to approximate, and approximate on the basis that there is two ways of doing that. One is to use averages, and there are -- since we will have some data, it may be feasible to use the data from other claimants to say that a typical truck, type of truck being deployed in a specific type of use may be -- has a typical mileage, or a mileage that can be used as an approximation, but the first port of call is to try and get data on individual mileage, and then to use that and -- in order to inform the calculation. It might require that you do -- for the missing data, because there will inevitably be missing data, it may well require that there is a method to predict the mileage of other claimants on the back of information that was collected for those claimants where -- or those trucks -- where it was possible to collect mileage information, or if that's not acceptable, then it may turn out to be that the -- that this methodology would be only able to be applied for a smaller subset of the -- of the claimants, but I'm expecting to get some individual claimant level data on mileage in particular.

THE PRESIDENT: Yes. Thank you. I wanted, in the end, to go back to early on to the questions Dr Bishop asked you, about the run-off period, and you will recall the discussion about that. Is there not a potential problem with a long run-off period in that your calculation of overcharge is a during and after method. You are looking at the -- you are doing the position during the period and then after the period for the purpose of comparison. If you have a long run-off, the eight years that's currently proposed, that, of course, rather squeezes the after period to quite a short time in which to get a sufficient data, and is that something we should be concerned about?

DR DAVIS: I'm not sure you should be concerned about it now, except at a conceptual level, and certainly it is something that I worried about in the report, and, you know, I think I was very clear in saying that, really, the strategy that is used for identifying the overcharge -- sorry -- economist language, identifying the overcharge, whether it is before and after variation or some other source of data variation which is best placed -- some other comparator which is best placed to identify the overcharge, that is really, ultimately, a question which is -- a decision which is best made down the line once the data is available, in particular, once it's clearer whether the scope of the cartel really was evenly spread across products, across types of trucks within the marketplace, or perhaps less evenly spread as may be the case, I think Professor Neven makes that point, that it may turn out that some categories of trucks are -- were -- are the -- were subject to an overcharge, and others were not, for example, or at least the evidence is clear on those points, so it may be that the -- that a comparator becomes clear as we go into the evidence other than during and after. So that's a point, but probably more directly to your question, you know, I think it depends on the nature of the run-off, on the reason for the run-off, so if, for example, we thought that the -- or the evidence showed that the pricing effects were for a few years but not a very long run-off, then this obviously becomes less of a concern in respect of the pricing overcharges. If it is the case that they are -- it is a very long run-off, then -- in respect of prices -- then you are right, that the -- we would need to look for -- I would need to look for some other source of -- some other comparator to identify the overcharge effect, or, you know, ultimately, I think as Dr Lilico said this morning, ultimately there is, indeed, the simulation model back-up. Perhaps for me that would be the last port of call rather than the first one, but it is possible that you would land there if you really couldn't find a source of data variation that was going to identify the cartel effect, and I should be clear, by the way, that I started my academic career in building simulation models and so, like Dr Bishop, I'm a big fan and would love to spend a significant amount of the next months and years building a simulation model, but I do think it is going to be a complex undertaking, so I would think of it as a data-driven simulation model, anyway, it would be a complex undertaking, so I would think of that as the -- you know, the approach that you take if, really, there isn't a source of data variation that would allow you to identify the overcharge effect.

THE PRESIDENT: I mean, it is very difficult here because you have got a pan-European cartel, unless you start a detailed investigation of this other market. I think, and this you may not know, but certainly in one of the individual actions that we are dealing with, it's been accepted that light trucks, as opposed to the medium and heavy trucks which were the colluded products, the conditions of the market are quite different, and, therefore, they are not a good comparator, certainly that has been said there included by, I think, claimant experts, so the most straightforward is -- and also in terms, no doubt, of data gathering -- the same trucks in a clean period.

DR DAVIS: Yes. So I agree, and that's definitely why it's the -- it's highlighted there as, in my first report, as being sort of the default option, as it were, but if information does come to light that means that it is feasible and desirable to use other comparators because the cartel wasn't effective across all types of trucks, or equally effective across all types of trucks, then -- for example -- then one might want to go there, but if it does turn out that the run-off period was very long and that didn't give you any data in the after period, then it is right that you would have a challenge in identifying the overcharge, but I'm not sure that -- but I'm not sure that you necessarily get there immediately, so if, for example, you thought that the run-off period was long because of the pre-owned trucks, so you thought the pricing and the -- so the pricing -- long-run pricing contracts were a shorter run and you thought that the emissions ran out in -- the emissions technology, that ran out in 2014, if you thought that, then for those reasons you would have data after the event, and a longer run-off period then being driven by the pre-owned trucks, and there I think, probably, I would want to think carefully about whether -- before and after becomes an option in the situation -- sorry -- before and during becomes an option. I didn't talk about this directly in the reports, but if you think that the effects of the cartel are really being delayed by a material number of years -- six years -- then it may be that at the beginning of the period you get some information which is helpful for evaluating the overcharge, but, you know, I don't want to put that out there. It's an idea to put out there for a comparator. It is clearly not a panacea, because do you have -- you know, if it is only three years at the point at which your trucks become on the pre-owned market, then 1997-2000 will give you some data, but obviously not a long before period, but that, again, may depend on the type of truck, right? It may depend on the type of truck and the type of operator, and so which comparators that you can use ultimately really does require a bit more information than we've really got at the moment to dig into it, and, of course --

PROFESSOR WILKS: Could I pursue this for a second in I don't want to flog this horse to death, but I understand the used truck argument, and I understand the Euro 6 argument. What other arguments would you look to to persuade you that the run-off period might be very substantial? Because I think the orthodox view is that it would be -- you know, the cartel would have come to an end fairly promptly.

DR DAVIS: Well, I heard Dr Bishop make that point. It is an interesting one. I'm not sure I can tell you about a study that I have seen looking at the duration of these run-on effects. I think my starting point is always that cartels are very different from one another, so if you look in the -- at, for example, at the famous Connor study that was adopted by -- and developed further by Oxera and that's been relied on by lots of people lots of times. That one -- my take away from those group of studies was that there is an awful lot of variation across cartels in their effectiveness, and no doubt their duration as well, and so, really, what you have to do is look at this specific case and evaluate it on that basis, and we are going to be in a much better place to do that down the line, but you may well be right. It may well be that the evidence shows that the pricing run-off is either zero years or two, three, four years, and the TCO -- and the Euro emissions run-on period is -- runs out in 2014, and that then, obviously, is very helpful for the character analysis.

PROFESSOR WILKS: Some of Dr Lilico's graphs in his first report do seem to indicate that for heavy trucks. There is a very substantial reduction in gross prices, but that's simply an observation.

DR DAVIS: Yes. I'm not sure I would put too much reliance on those simulations at this point. I think we are -- you know, my basic view is that the -- a very stylised simulation model here may end up giving you -- may end up giving you the wrong answers, and so because of all this heterogeneity that's being talked about that can be handled in the regression analysis, but can't be handled in the simulation in a simple stylised simulation model, but I haven't been instructed to give a -- or I haven't, for a while, gone into the detail of Dr Lilico's submissions so I don't offer that as a critique, I would be nervous about -- personally I would be nervous about relying too much on the patterns that are coming out from what is clearly is very preliminary exercise.

DR BISHOP: Can I just make an observation? Clearly some things would have lasted a while, if a firm had a three-year contract for supply agreed just before the cartel was busted, then that effect would continue, but I think we can be fairly confident that in the main mechanism of the cartel as you yourself have emphasised by having that regression of list prices, was to agree European list prices. They would meet each quarter and agree European list prices. I think we can be quite sure that stopped. I would be astonished by any evidence that they continued to meet after that. The effect of the busting of a cartel is traumatic within companies. People worry that they are going to lose their jobs, they are going to go to jail, that the company will be fined a billion Euros which is actually what happened in the case of Daimler, and these are not trivial things for business people. Their careers are at stake and they are very worried.

DR DAVIS: No, and I don't mean to minimise that at all as insignificant -- the significance of an infringement finding is clearly right. However, it is the case that in some past cartels, or, in particular, the one that I used to teach my students about and you may have done the same over the years, that these price books, the price list, led to the forming of an understanding, allowed an understanding which then continued and everybody understood afterwards that the -- what it meant to agree, and so that example tends to suggest -- that example tends to suggest those economists that have looked back at it, that the -- there may have been some run-off that went on for a period of time before the agreement, that is the common sense of what it meant to coordinate went away and fell apart through the reintroduction of competition, and, you know, who knows at this point whether that kind of a mechanism was at play here. It may well not have been, as you say, but it may also have been, and I think it would be premature for me to rule out that kind of mechanism at this stage.

THE PRESIDENT: Could you envisage that the run-off in terms of just the ongoing effect of market prices potentially having been raised, artificially raised through collusion, would be longer for used trucks than for new trucks, or do you think that if the price of new trucks, as it were, settled, then that would inevitably bring the used truck price down with it?

DR DAVIS: I think it is certainly possible that the overcharge on used trucks was experienced later, and inherent in the mechanism that I lay out in the report, the idea that the supply of new trucks fell and that in later years led to a reduction in the supply of pre-owned trucks, three, four, five, six years down the line, it is inherent in that mechanism that the overcharge effects come later in the process. You know, I hesitate to go very much further than that, but it is certainly the case that the mechanism suggests that the used pre-owned trucks overcharge may play out later in the -- that the overcharge -- that the run-off period would naturally, in the last year of the cartel, would actually occur later.

THE PRESIDENT: Yes. Thank you. We will just take a moment and we will then allow, as before, with Dr Lilico, if any of the respondents want to ask any questions, but we will just withdraw for just a moment. (Pause)

Dr Davis, we have nothing further to ask you. Do any of the respondents through counsel wish to ask any questions? Mr Jowell?

MR JOWELL: Yes, sir. Thank you. I'm grateful.

Dr Davis, I wonder if you could help us a little with some of your formulae, with some of your equations. You went to your equation which is in your first report {F/5/97}, and I wonder if I could just go back to that, please.

THE PRESIDENT: That's the first report?

MR JOWELL: Yes.

THE PRESIDENT: In the first of the F bundles at tab 5, page 97.

MR JOWELL: Yes, sir.

DR DAVIS: Do you mean page 94?

MR JOWELL: 94 of the internal numbering of the report. 97 of the bundle.

DR DAVIS: Thank you.

MR JOWELL: It is the equation that you took us to on total cost of ownership --

DR DAVIS: Yes.

MR JOWELL: -- when you were discussing the emissions technology, the higher operating costs. I just -- if one can just understand at a very high level the -- you say:

"The total cost of ownership equals the sum... "

And then the first item, that is effectively the overcharge on new trucks?

DR DAVIS: No. That's the price of new trucks.

MR JOWELL: The price of the new truck minus, then you have the price of the pre-owned truck. Yes?

DR DAVIS: That's right. Yes.

MR JOWELL: And then you have got your additional fuel costs, yes?

DR DAVIS: Then you have got the fuel costs associated with that truck.

MR JOWELL: With that truck, yes, and if we go over the page {F/5/98}, we see -- in fact over two pages to -- I think it is your page 97, it's {F/5/100} in the bundle, well, actually, forgive me, if we go -- no. Let us go to -- yes. Page 100 in the bundle, your page 97, and your paragraph 213, yes?

DR DAVIS: Yes?

MR JOWELL: And you are seeking here to explain your damages model, and you say that you denote the choice of relevant truck in the factual by lambda, and the choice of the relevant truck in the counterfactual by lambda dash, yes? And then you say:

"As shown in the table, the formulae differ between the procurement methods".

You say:

"For illustration, the expression in the first row of the table includes three components: First, the difference in the payment made to procure the chosen

relevant truck in the factual and that paid to procure the relevant truck chosen in the counterfactual", yes?
DR DAVIS: Yes.
MR JOWELL: So that is the -- that's effectively the overcharge on the new truck. Is that right? The new truck overcharge, in effect?
DR DAVIS: That's right. This -- so the question is whether to calculate the overcharge -- when you are calculating the damages overall, one approach would be to add up the new truck overcharge, the pre-owned overcharge and then the -- any additional operating costs that resulted from the delay. What's laid out here is taking the counterfactual truck through each of the three components rather than just the emissions overcharge, so --
MR JOWELL: Yes.
DR DAVIS: -- so this is laying out -- sorry.
MR JOWELL: Forgive me but I just want to take it really, really granularly, stage-by-stage, if you will forgive me. I don't want to cut you off, but the second -- your second point is the difference in the present value of the resale value when the relevant trucks are sold as pre-owned, so you said the first item was the -- essentially the new truck overcharge. That second item is the used truck overcharge, isn't it.

DR DAVIS: That's right. Yes.
MR JOWELL: Okay, and then the third, which I'm not concerned about for present purposes, that's the fuel efficiency point, yes? Any damages from lower fuel efficiency.
DR DAVIS: From the -- yes, the increased operating costs, yes.
MR JOWELL: And then when we see your table opposite there on page 101, {F/5/101} we see those three elements, and the -- and the first one is the procurement method is cash price contracts outright purchase; yes?
DR DAVIS: Yes.
MR JOWELL: The first expression at the top, that is the product -- that, effectively, is the discounted value of the new truck overcharge; yes?
DR DAVIS: That's right. Yes.
MR JOWELL: Now, the next element is --
DR DAVIS: Or perhaps more precisely, it is the overcharge brought forward to the current date.
MR JOWELL: To the current -- yes.
DR DAVIS: Yes.
MR JOWELL: And the second is the discounted, or the time-adjusted value of the pre-owned overcharge; yes?
DR DAVIS: That's right. Yes.
MR JOWELL: And what I notice about that is that it's got

a minus sign before it; yes?
DR DAVIS: It does, yes.
MR JOWELL: And whereas for the fuel efficiency there is a plus when we come to the third component; yes?
DR DAVIS: Yes.
MR JOWELL: And the reason it's got a minus sign is because, in calculating damages to a new truck purchaser, you are subtracting not adding but subtracting the used truck overcharge.
DR DAVIS: That is true, yes.
MR JOWELL: So if you are a new truck owner, just to be clear, and you only bought new trucks, your damages go down the higher the used truck overcharge gets on your model here.
DR DAVIS: On this model for the cash price -- on these equations or for the cash price contracts?
MR JOWELL: Yes. That's correct.
DR DAVIS: Yes. That's correct.
MR JOWELL: That's correct, and the same is true for cash price contracts, hire purchase, lease purchase and finance lease, the next one down? Because again it is a minus.
DR DAVIS: It is, although you will notice for the non-cash price contracts there is not an element of the pre-owned -- there are only two elements to the

equation, not the total.

MR JOWELL: For the non-cash price.

DR DAVIS: For the non-cash price.

MR JOWELL: But for the two cash price --

DR DAVIS: There is a negative, absolutely.

MR JOWELL: There is a negative, so for every cash price contract, whether it is an outright purchase or a hire purchase or a lease-purchase or a finance lease, the higher the used truck overcharge, the less amount that any new truck purchaser gets in your model here. Is that right?

DR DAVIS: Written down in the table, absolutely. The one thing I would say is that our conversations on this topic over recent weeks have -- and indeed over last week -- that's brought out that the overcharge on used trucks that is appropriate to deduct from the -- that is appropriate to deduct from the overcharge on new trucks, the mitigation, should, in fact, be based on the methodology which is for mitigation, so it really should be based off the residual values for the cash price contracts which are leases, for the cash price contracts which are outright purchases it should be the prices which are paid for -- paid to the claimants for their pre-owned trucks, and I know that there have -- that -- sorry, I'm forgetting which expert brought this out, but it has been pointed out that there is potential for intermediaries to draw a distinction between the used truck prices and the prices you get when you sell your used truck, and I agree that it's going to be important for us to take that into account as we -- for me to take that into account as I -- in actually implementing this calculation.

MR JOWELL: Yes. So that's a complexity, then, in how the calculation is to be arrived at, but if I could just put it to you in general terms, if you take, for example, the -- I think we understand it is a bit over a third of the RHA's class that are just new truck buyers, only bought new trucks, if you calculate a higher used truck overcharge, that is going to inevitably reduce their damages, am I right, on your model here?

DR DAVIS: So you are subtracting off the mitigation, so yes, it would reduce the damages. I do think the -- yes.

MR JOWELL: Okay. Thank you. Those were the only questions I had about new and used trucks. Could I just ask you a little bit, very quickly, about the fuel efficiency and the emissions?

You mentioned that it's dependent on -- that likely harm in the form of higher fuel costs is likely to reflect mileage, but there are a number of other factors as well that might reflect fuel efficiency, and if I could ask you to go to your second report which is in {F/9/81} please, paragraph 181 and following of your report.

DR DAVIS: Sorry, did you say paragraph 181?

MR JOWELL: Paragraph 181. In your internal page numbers it is page 81 as well as the bundle. Also in the bundle it's page 81.

DR DAVIS: Yes.

MR JOWELL: And you refer there to Mr Cussans' evidence about the most important factors affecting the fuel efficiency of a truck, and they include driving style, weather conditions, wheel alignment and tyre condition, topography and journey type, load, aerodynamic efficiency and other factors like general maintenance and overall mileage, and you then, in paragraph 183, you suggest various ways in which you might try to model these things, these factors. Do you see that, Dr Davis?

DR DAVIS: Sorry, I was in the second report whereas I think you are pointing me to the fourth report.

MR JOWELL: Forgive me. Have you got the -- I'm not trying to --

DR DAVIS: Yes.

MR JOWELL: Have you got it?

DR DAVIS: Got paragraph 183.

MR JOWELL: Yes, and we have -- so driving style, you say a proxy might be obtained from on-board telematics, and then we have, for example wheel alignment and tyre condition, you suggest that you will get the dealership R&M records and then in relation to measures of topography you suggest that there could be measures of the variance in height within a certain radius of a PCM's headquarters, and I suppose my question for you, Dr Davis, is; are you really seriously going to be able to construct a model and get hold of all of this data at this level of granularity? Is this really a realistic exercise on reflection?

DR DAVIS: So I think the answer to that question is -- my expectation at the moment is yes, but I want to be clear that I say, "Yes", because fundamentally what I will need is some data on -- or measure of fuel efficiency and then variables which are -- which are the drivers of that fuel efficiency.

Now, to me, fuel efficiency is important in the industry, it is important for customers, particularly in some applications, and it is important for the manufacturers and dealers, presumably because it is important for customers, and important for the hauliers because it's an important component of their costs, so a priori, being able to collect information on fuel efficiency does seem likely.

Now, can we get enough data to -- on fuel efficiency to capture all of the heterogeneity that you point to, I think, you know, it is true that we will have to see, ultimately. I can't stand here now and say we will definitely get enough information, but I do expect to get a considerable amount of information, and I do think it is plausible to -- I don't think there is any problem measuring the height of -- and how it varies across the UK. That's not particularly problematic, having worked with such data, geographic data previously, you know, and weather conditions, again, there is some information on that, so constructing variables which explain the movement in fuel efficiency proxies, I should say, for fuel efficiency does seem to me to be an exercise that we should be -- that I should be able to undertake. How much of the variation in fuel efficiency that can be explained using the data which it is possible to construct will really be -- is really a question for down the line, but it does seem to me to be credible that there is, you know, a real focus in this industry on fuel efficiency that when people make their decisions about which truck to purchase, they do so, presumably, in an informed way, and that being able to capture that mechanism for what drives the variation in fuel efficiency and how it -- across trucks, and therefore how it would change if you had bought a different truck does seem to me to be an exercise which is -- which there is a decent prospect of undertaking to a -- but with, I would certainly acknowledge, with, potentially, with approximation in mind, so there is no surety here that we will observe everything that we need to, or be able to construct -- and, you know, driving style is a good example of a variable that it seems particularly difficult to observe, and I don't really know what is going to be available at this point. You have pointed me to Mr Cussans' remark about telematics which I thought was an interesting point, because it is true, I understand, that haulage companies worry about fuel efficiency, and it may be that the latest technology is -- was not -- that's currently available was not there in the early part of the sample, but it may be that there is -- there are alternatives which will, nonetheless, provide a level of information that can be used, but, you know, I don't want to -- it is clear in this respect of the methodology that the -- that I have explored, tried to start the process of exploring what data would be available for -- the fact is that Mr Cussans raises, and there is clearly some data that would go to some of those factors at least, and if we have data on the drivers of fuel efficiency and we have an observation on the fuel efficiency that varies across trucks, then at that point it is a methodology that can be, yes, realistically -- that there is a reasonable prospect that it can be deployed.

MR JOWELL: I take it that you haven't sought to obtain any of this data on, for example, service records or telematics from any of the RHA's registered customers, though.

DR DAVIS: I have not.

MR JOWELL: Thank you. Sir, have I no further questions.

THE PRESIDENT: Mr Harris, I don't know if you have appeared because you want to ask a question.

MR HARRIS: Mr President, thank you. Yes. Unless anybody else who is a respondent had a question, I have something very short, if I may.

THE PRESIDENT: Yes. Yes.

MR HARRIS: Can I please just, Dr Davis, show you one piece of evidence and then ask you a couple of short questions on a similar topic to Mr Jowell? So for those on the link, the evidence is to be found in a so-called, "Confidential file", but the bit I want to show is not confidential. The reference is {E/IC2/29}, and it is some factual evidence of Daimler's, or more accurately Mercedes Benz' witness, Mr Belk, and page 29 of the bundle is paragraph 87 of the witness statement. As I say, this part is not confidential.

THE PRESIDENT: So 87, paragraph 87 is not confidential?

MR HARRIS: Yes. Not confidential.

THE PRESIDENT: Have you got that bundle, Dr Davis?

DR DAVIS: Thank you. Yes.

MR HARRIS: Dr Davis, I don't know if you have seen this before, but if you could just cast your eye over it, in particular the indented subparagraphs (a), (b), (c) and (d). I don't want to catch you out, you see.

DR DAVIS: Okay.

MR HARRIS: Just read it to yourself just so that I know that you know what it says. Okay? And I think I would be right in saying, wouldn't I, Dr Davis, you have got no reason for gainsaying or contradicting the facts in this part of the witness statement.

DR DAVIS: Sorry, I'm not sure I understand your question, but --

MR HARRIS: You don't have any reason to disagree with the facts as set out in (a), (b), (c) and (d)?

DR DAVIS: No.

MR HARRIS: And do you see, therefore, that there are various types of different trucks posited with some chassis cab costs and then body costs, and, of course, broadly speaking, it's right, isn't it, that the more

complicated and, if you like, weighty the body, the more the cost of the body, especially relative to the truck. That's a fair summary of this evidence, isn't it?
DR DAVIS: Certainly the more -- I don't know whether, "Weighty", is the right way of describing it, but certainly if the truck is -- if the body is very complex and requires sophisticated engineering then it certainly seems highly plausible that it would cost more to produce and therefore cost a bigger proportion of the overall truck.
MR HARRIS: Yes, and by, "Weighty", I meant not literally weight, although that's an element, but sophisticated and complicated and therefore requiring more technology, so you agree with that point.
DR DAVIS: Yes.
MR HARRIS: Thank you, and then can I now -- you can put that to one side, that bundle. We don't need that again, thank you. Now could I take you, please, to your expert report. I think it is the first one, so that's to be found in F/5/1, and in particular, please, to your Table 14, the page reference is {F/5/37}. It's internal page 34 of your report, Table 14.
DR DAVIS: Yes.
MR HARRIS: It is right, isn't it, that this table splits down the sample group for the sample that was collected

by those instructing you from the RHA sample. That's right, isn't it?

DR DAVIS: Yes.

MR HARRIS: And I think I'm right, just before we get started on the detail, that that was a sample that was selected by the RHA and/or by you as opposed to in conjunction with any of the defendants, isn't it.

DR DAVIS: Certainly not in conjunction with any of the defendants. This was a sample which was constructed of -- in two phases, first of all --

MR HARRIS: Well, is this -- I'm so sorry Dr Davis, I've just got an eye on the clock. Do I need to know that in answer to the question did you choose it with the defendants or not, I think the answer to that question was, "No", right?

DR DAVIS: So the answer to that question was, "No", but you asked an additional question I thought which was whether this was produced by me and/or the RHA and the answer to that is that there was a trial group of 12 claimants who were selected by the RHA, or their representatives, and then I asked for -- and that was really to try and develop the spreadsheet that we were putting together to collect the information on, and then I asked for a random sample which -- of, I think, 30 potential claimants, and then the information was collected from

that random sample.
MR HARRIS: Thank you very much. I'm so sorry, then the data that came out, that's in this table, right? So Table 14 shows a large variety of different types of truck, doesn't it, so, for example, there are lots of sleeper trucks and then there are lots of day trucks. So you would expect just generally, Dr Davis, and I appreciate you are not an industry expert, but nevertheless you have been immersed in this case for some years, you would expect generally speaking a truck with a sleeper might have a different sort of mileage than one without a sleeper cab. Is that right?
DR DAVIS: Sounds -- that sounds plausible.
MR HARRIS: That's good enough for now, Dr Davis.
DR DAVIS: Okay.
THE PRESIDENT: Well, let Dr Davis finish his answer.
MR HARRIS: Sorry.
THE PRESIDENT: Yes, you were saying that sounds plausible?
DR DAVIS: It sounds plausible to the extent that if you -- clearly if you are driving the truck 24 hours a day by having -- and you have a sleeper in there because there is another driver then that sounds like using the truck intensively. If you have a single driver who is sleeping in the truck, perhaps that's more about making deliveries efficiently so that you are using the truck

during the day only, but you are able to go from A to B to C without returning to home base, and then it's less clear that the mileage would be very different in that kind of a use compared to having a home base and putting a driver in to a truck in the morning and bringing them out in the evening.

MR HARRIS: Thank you. It is right, isn't it, it's also plausible that there will be differences in the mileages across the different categories. So, for example, there may be different mileages if you are doing livestock which is one of the categories in this table as opposed to refuse collection, or different if you are doing a gritter as compared to refrigerator. Those sorts of things follow plausibly as well don't they.

DR DAVIS: They do. Absolutely.

MR HARRIS: And then just -- I'm going to come back to Table 14, but in my bundle, so you might want to put one finger in there, because I'm going to come back to it, but just -- I'm now looking at -- in my bundle it's tab 7 of Bundle F1, and can I just draw your attention to your {F/7/1} report of 3 May 2019 which I think is the third report, and the bundle reference here is {F/7/165}.

DR DAVIS: I think it is the second report, isn't it?

MR HARRIS: It may be, yes. Second report. I'm looking at the bullet points, and it is internal page 164 of that report, and it is bundle page 165. You referred to this paragraph in your oral responses to the president earlier as being the source for the response rate on fuel economy being 27 per cent to your sample class. Do you see that in the first bullet point.

DR DAVIS: I do, yes, although --

MR HARRIS: And the one I wanted to ask you about was the third one, because Mr Jowell and I were just asking you some questions about mileage, and the third bullet point, is this right, have I understood it correctly, that in the sample that you and the RHA chose in the manner you described a moment ago, even the sample response rate on mileage is only 8 per cent.

DR DAVIS: That is correct, yes.

MR HARRIS: Thank you, and then very nearly there, thank you for bearing with me Dr Davis, is it not also the case, we can look it up if we have to, that another key part of your regression for the total cost of ownership, so the point that we are on, as Mr Jowell showed you, was not just the mileage for fuel efficiency purposes, but also the repair and maintenance costs?

DR DAVIS: It is if we want -- if you -- if -- in order to do the -- calculate the TCO including the repair and maintenance costs, then we would clearly need some data

on repair and maintenance costs, absolutely.
MR HARRIS: That's right, and is it not also the case, and here I'm going back to where my finger was left a moment ago, so tab 5, page 37, your Table 14, just looking back at the ones that you have identified in your sample, I think this is fair, isn't it, Dr Davis, you would agree with me, it is perfectly plausible to think that the repair and maintenance costs of a long distance sleeper articulated lorry may well differ significantly from a refrigerated day lorry or a day livestock carrier or, frankly, any of the others. That's a fair assumption, isn't it.
DR DAVIS: It certainly sounds plausible, whether -- obviously I have got no data or expert knowledge to provide anything behind that, but intuitively it sounds --
MR HARRIS: Exactly my point Dr Davis, thank you very much. I don't have any further questions, Mr President, members of the Tribunal.
DR DAVIS: Okay but can I just -- I mean, these -- I would like just to add something if I may, which is --
THE PRESIDENT: Yes?
DR DAVIS: -- I think I'm being pointed to the idea that -- the question of whether or not the data will be available, and it is clearly the case that collecting

data on these issues will be challenging from the claimants. What I have said is that there will be some data available, so the 8 per cent, for example, in respect of mileage, you know, let's think about what that means if there are 100,000 trucks in the claimant group, right? 8 per cent of 100,000 means 8,000, data on 8,000 trucks. If there are 200,000, 300,000, 400,000 trucks then you have data on 16, 24 or 32,000 trucks, and so the potential for a significant empirical exercise even with an 8 per cent response rate is there. It may also be the case that data from others will play a role in other areas, for example in respect of R&M costs, it may be that the dealership records -- dealerships have detailed records on R&M costs that are available through disclosure, so we will have to see what data is ultimately available, but I don't think that it is, a priori, unreasonable to use what will ultimately be a substantial database, even if the 8 per cent response rate is where we land, in a way that will certainly not undo all of the -- not account for every dimension of heterogeneity, but still has potential to allow us to account, for example, for the difference between sleeper trucks and non-sleeper trucks. If people do drive sleeper trucks further, then it should be feasible to have a -- we have a measure of fuel efficiency or mileage in this example, it should be possible to run the regression of mileage on whether or not there is -- the truck is a sleeper truck or not, and then that will pick up the difference which will then allow that information to be used in the TCM methodology, so I do think that it is the case that on the basis of even the sample information, that there is good reason to believe that an empirical exercise will be feasible that picks up a significant amount of heterogeneity, maybe not everything, but certainly a significant amount.

MR HARRIS: Thank you, and in light of that answer can I just follow up, then? It's right, isn't it, Dr Davis, that as at any of your reports, or in your oral evidence today you can't say to the Tribunal that you have got even an 8 per cent recovery -- or response rate for every one of the types that you have set out in your Table 14, can you? So whilst you say that you might get something like 8 per cent across-the-board, you can't say that you have got 8 per cent response rate or you will get that or anything for tippers and 8 per cent for skip wagons and 8 per cent for refuse collections and refrigeration, et cetera, et cetera, all the way through your table. You can't say that, can you?

DR DAVIS: That's right, and ultimately it may prove to be the case that it's not feasible to use the methodology to pick up, to understand how mileage did vary for some subsets of trucks, and that is certainly the case. We may end up there, but that isn't to say that you shouldn't be able to pick up a significant amount of it, and for those truck categories which are purchased frequently, obviously the -- at this point it is -- would seem more likely that you would be able to -- you will have more data on those categories of trucks, and so --

MR HARRIS: I understand. Thank you.

DR DAVIS: -- it may not be across-the-board but certainly an exercise which picks up a considerable amount of heterogeneity, but we may need to narrow down the focus of the exercise down the line.

MR HARRIS: Thank you, and one other topic, and just one question on this other topic.

THE PRESIDENT: Well that's the last question, Mr Harris.

MR HARRIS: I quite agree sir. As I understood your evidence it's been that you think there will be a run-off, but as at today you can't say how long it will be, but is it not right, as a matter of conceptual approach, Dr Davis, that in this market, if there has been a run-off for the reasons that you have given, there will be a symmetrical or broadly symmetric run in period?

DR DAVIS: Certainly in respect of the pre-owned trucks it does seem plausible that if the effect -- you think the effects are arising three, four, five years later at the end, then better address the question of whether or not that means that they don't arise for the first three, four, five years of the infringement period. Yes. I think that's definitely going to be a question we are going to need to look at and unpick.

MR HARRIS: Thank you. No further questions. Thank you, Mr President.

THE PRESIDENT: Very well, Dr Davis, thank you very much for your evidence. You are now released as a witness. We will reconvene at 10 o'clock tomorrow when there will be one hour for submissions from the respondents. We would ask you, please, to coordinate as between you how they are given, then after a short break Mr Flynn will have two-and-a-half hours until about 2.30, 2.40, and then Mr Thompson will have two-and-a-half hours for reply.

MR FLYNN: Sir, might I just ask whether you meant the other way around, which I think was what was agreed the other day? Mr Thompson first and then --

THE PRESIDENT: Mr Thompson first. I think that's right. We said the same order, didn't we, as we started.

MR FLYNN: We did. I'm in the Tribunal's hands but that is what you said the other day.

THE PRESIDENT: I think that's what we said, yes. You are quite right.

MR FLYNN: Thank you, sir.

THE PRESIDENT: So 10 o'clock tomorrow.

(4.53 pm)

(The hearing adjourned to 10 o'clock on 27 April 2021)

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