IN THE COMPETITION APPEAL TRIBUNAL

Case No: 1435/5/7/22 (T)

Salisbury Square House
8 Salisbury Square
London EC4Y 8AP

Tuesday 1st October – Tuesday 29th October 2024

Before:

Justin Turner KC
Sir Iain McMillan CBE FRSE DL
Professor Anthony Neuberger

(Sitting as a Tribunal in England and Wales)

BETWEEN:

Claimants

Stellantis Auto SAS & Others

v

Defendants

Autoliv AB & Others

A P P E A R AN C E S

Colin West KC & Sean Butler (Instructed by Hausfeld) On Behalf of the Claimants.

Sarah Ford KC & Prof. David Bailey (Instructed by Macfarlanes) On Behalf of the Sixth to Tenth Defendants.

David Scannell KC & Derek Spitz (Instructed by White & Case) On Behalf of the First to Fifth Defendants.

Monday, 14 October 2024

(10.30 am)

THE CHAIRMAN: Some of you are joining us live stream so I must start with a warning. An official recording is being made and an authorised transcript will be produced. It is strictly prohibited for anyone else to make an unauthorised recording, whether audio or visual, of the proceedings and breach of that provision is punishable as a contempt of court.

Right, I think we are going to start with the hot-tubbing today, unless there are any other matters you need to address?

Housekeeping

MR WEST: There is only one point of housekeeping and that is that the Tribunal should have seen that the new supplemental joint expert report was filed on Thursday --

THE CHAIRMAN: Yes.

MR WEST: -- dealing with the additional matters raised in the exchange of recent notes. That is at tab 17 of the E1 bundle {E1/17/1}.

THE CHAIRMAN: Yes, we have seen that, thank you very much. That is very helpful.

MR WEST: I am also happy to be able to confirm that Mr Hughes has confirmed to me that the contents of that

joint supplemental expert report taken together with the proposed agreement between the parties about part numbers covers all of the contents of his most recent note. So if the Tribunal has read the recent supplemental joint expert statement, it does not have to separately read that note.

THE CHAIRMAN: So we will start with the hot tub. Obviously this is not cross-examination, this is the Tribunal exploring the issues, and then, as we have indicated, there will be an opportunity for a short period of cross-examination afterwards. Shall we invite the witnesses?

MR WEST: Yes, I call Mr Hughes and Dr Majumdar.

MR MAT HUGHES (affirmed)

THE CHAIRMAN: I was not proposing to make a ruling on which chairs you sit in, I will leave it up to you to ...

DR ADRIAN MAJUMDAR (affirmed)

THE CHAIRMAN: Thank you. Please both take a seat.

MR WEST: Can we get the witnesses to confirm their reports?

THE CHAIRMAN: Yes, do you want to do your witnesses and ...

Examination-in-chief of MR HUGHES by MR WEST

MR WEST: Mr Hughes, could you be shown tab 2 of bundle E1 {E1/2/1}. Is that your first report in this matter?

A. Yes.

Q. If you look at page {E1/2/117} of that document, is that

your signature?

A. Yes, it is.

Q. Could you now turn to {E1/4/1} of the bundle. Is that your reply report in this matter?

A. Yes, it is.

Q. If you look at page {E1/4/117} of that document, is that your signature?

A. Yes, it is.

Q. You have also prepared a number of additional notes and calculations in this case, so could we just run through those.

The first is at tab 1 {E1/1/1}.

(Pause).

Tab 1 should be the first page of the bundle after the index.

A. Yeah.

Q. Have you got that?

A. Yes, I have, thank you.

Q. Is this a note that you have prepared on the economic estimation of price overcharge in December 2023?

A. Yes.

Q. Now, if you look now at {E1/13/1}.

(Pause).

Page -- sorry. Tab 13, so they are not separate page numbers in the bundle.

A. Sorry, it doesn't seem to be in here.
THE CHAIRMAN: Have you got a tab 13?
Can someone just help Mr Hughes with his bundle, just check it is all there.
A. I'll borrow Dr Majumdar's. That's fine. Thank you.
THE CHAIRMAN: We need to get this sorted out before we ...
Have you got -- if someone could just come and help Mr Hughes with his bundle.
A. My apologies.
THE CHAIRMAN: Can you see what he has in tab 13, or if he has a tab 13.
A. Ah, yes. Yes, I do. I do, thank you. Sorry, my apologies.
THE CHAIRMAN: Okay. All right, thank you very much.
MR WEST: Is this the joint expert statement dated 13 September 2024?
A. Yes, it is.
Q. Over the page, on {E1/13/2}, is that your signature?
A. Yes, it is.
Q. Mr Hughes, when I ask you to confirm your evidence later on, I am only asking you to confirm the part of this statement that you wrote, so the column which says "Mr Mat Hughes's opinion ..."
Could you then look at {E1/14/1}. Do you have that?
A. Yes, I do.

Q. Is this a further note you prepared on 23 September in this matter?
A. Yes, it is.
Q. Again, with your signature on {E1/14/12} of that tab?
A. Yes, it is.
Q. If you then look at {E1/16/1}, is that an additional note you prepared, this time on 10 October?
A. Yes, that is.
Q. At {E1/16/7} again, is that your signature?
A. Yes, it is.
Q. If you look now at {E1/17/1} ...
THE CHAIRMAN: Mr Hughes, have you not got a tab 17?
A. I have something different in my tab 17.
THE CHAIRMAN: Okay.
Can we -- before we start, can we just get this sorted out?
A. Or Dr Majumdar and I can share it.
THE CHAIRMAN: Well, no, I would rather you had your own --
A. Sure.
THE CHAIRMAN: -- version.
(Pause).
(Handed).
So I think we are looking for tab 17. Have you got that?
A. Yes, I've got tab 17.

MR WEST: Again, does that bear your signature on the second page {E1/17/2}?

A. Yes.

Q. At {E1/18/1}, do you have a document setting out the calculation of overcharges, but including a row for standard errors?

A. Yes, I do.

Q. Then, I am not sure if you will have this yet, at tab 20 {E1/20/1}, because I am not sure it has yet been agreed, but if not, can I hand up the document. This is your recent calculation of the damages under the spillover claim.

Does the Tribunal have this document?

THE CHAIRMAN: I have got it "intentionally left blank".

MR WEST: Mr Hughes was asked to recalculate the spillover claim and has done so, but I believe the position at the moment is that the Defendants have not yet consented to it going in the bundle, but I would like him to confirm it as part of his evidence, if we have another copy of it somewhere.

THE CHAIRMAN: Perhaps we can get that -- we are not going to refer to it in the first hour or so, can we get that sorted out during the short adjournment?

MR WEST: Yes.

THE CHAIRMAN: Sorry, the, you know, five-minute adjournment

at some point.

MR WEST: Certainly.

THE CHAIRMAN: But we must remember to go back and get that.

MR WEST: Mr Hughes, bearing in mind the point I mentioned, that when I talk about the joint experts' statement I am only asking about your column of it, do those documents set out your true and complete professional opinion in relation to the matters in this case on which you have been instructed to provide an opinion?

A. Yes, they do.

MR WEST: Thank you.

Examination-in-chief of DR MAJUMDAR by MS FORD

MS FORD: Dr Majumdar, can we look at {E1/6/1}, please.

A. Tab 6, yes.

Q. Is that your expert report in these proceedings?

A. It is.

Q. If we go within that to {E1/6/94}, please.

A. Yes.

Q. Is that your signature?

A. It is.

Q. If we look, please, at {E1/12/1}, please.

A. Yes.

Q. Is that the note that you prepared on RFQ dates?

A. Yes, it is.

Q. Then {E1/13/1}, please.

A. Yes.
Q. You should have there the joint expert statement which you prepared jointly with Mr Hughes; is that right?
A. Yes.
Q. Within that, {E1/13/2}, please.
A. Yes.
Q. Is that your signature?
A. It is.
Q. Then {E1/15/1}, please.
A. I have it.
Q. Is that your second note on by-platform sensitivity testing?
A. It is.
Q. Then {E1/17/1}, please.
A. Yes.
Q. You should have there the supplemental joint expert statement that you prepared with Mr Hughes?
A. I do.
Q. Then {E1/17/2} within that, please?
A. Yeah.
Q. Is that your signature?
A. It is.
Q. Then, finally, {E1/19/1}, please.
A. I have it.
Q. Is that the table of standard errors that you have

prepared?

A. It is.

Q. Same caveat, that when I ask you about the joint expert statement and the supplemental joint expert statement, I am only asking you in relation to your column that you completed.

Insofar as your expert reports consist of facts, are they true to the best of your knowledge and belief?

A. Yes.

Q. Insofar as your expert reports consist of opinions, do they represent your true and complete professional opinions on the matters to which they refer?

A. Yes, they do.

MS FORD: Thank you.

PROFESSOR NEUBERGER: Thank you.

The purpose of this session is to help the Tribunal understand the conclusions that can be properly drawn from the econometric evidence concerning the existence and the level of any overcharge. I am keen to use the hot tub as a way of exposing and contextualising the issues at stake in a way that is comprehensible to everyone. So far as is possible, I hope to avoid going down rabbit warrens where only economists can follow.

I should also state my appreciation of the work that the experts have shown and the degree to which they have

avoided nit-picking and concentrated on the main issues between them, and the two joint memorandums I found extremely useful in highlighting the issues at stake, so I record my gratitude for that.

The joint expert memorandum has an overview that highlights the main areas we will be concerned with in this, the first of two sessions in the hot tub. What it says is {E1/13/3}:

"The experts agree that an overcharge relating to a given theory of harm can be estimated using a before, during and after multivariate regression model and that reasonable sensitivity tests are important ...
A fundamental disagreement between them relates to whether the various sensitivities emphasised in AM1 ..."

That is Dr Majumdar's first report:

"... are reasonable tests of the robustness of the results reported in [and reference to Mr Hughes' first two reports]. This is a highly material issue ..."

The rest of that section on overcharge also mentions the disputed issue of the extent to which any overcharges found in the PSA data -- I remind people that the econometric evidence is entirely related to PSA data -- the extent to which the evidence of any overcharges found in the PSA data should also be assumed

to apply to VO and FCA.

My impression on this latter issue is that the economic experts have said all that they have got to say on the subject and there is little benefit in returning to the issue in the hot tub. But let us leave that to the end of the session and we can return to it if the economic experts disagree with my assessment and feel there is more that could usefully be done on the subject in the hot tub.

I want to start the hot tub by getting the experts to explain the common methodology which they are using before going on to look at the differences.

Questions from THE TRIBUNAL

So BDA analysis, before/during/after analysis, Mr Hughes, could you kind of explain how that would work, and can you do it in a simple context, simpler than what we have got here, the context where we know when any cartel, which may or may not be operating, was operating. There is no dispute about dates.

Secondly, it is simpler in another dimension. In the current case, all the transactions, individual transactions, are parts of long-term contracts which originally signed and then prices are amended over time, so the individual transactions are part of a stream of transactions. That complicates matters, as we will see,

but I want to concentrate on the simpler case where each transaction is separate; the classic case, if you like.

So if you could explain, Mr Hughes, how that works and what you can learn from BDA analysis, if I call it that.

MR HUGHES: So what you're trying to do, in essence, is compare prices during the cartel period with prices outside the cartel period, so that's the central piece of analysis that you do, and the purpose of the econometric analysis is to control for other things that affect prices. So they're the core building blocks, and in essence, what the before/during analysis does is it puts what's called a dummy variable which is only switched on during the cartel period and you try and assess the size of the coefficient on that dummy variable and whether it's statistically significant. If that dummy variable is statistically significant then you may conclude -- subject to the model being properly specified, you may conclude that prices were higher during the cartel period controlling for other matters that affect prices.

PROFESSOR NEUBERGER: Do you have any comment on that, Dr Majumdar?

DR MAJUMDAR: I agree with Mr Hughes' explanation. I would emphasise the point that you rightly said, sir, which

was this assumes that we know already what the infringement period is, and as Mr Hughes says, that the model is properly specified, in which case then we can place some weight on the results that come out.

PROFESSOR NEUBERGER: So the -- Mr Hughes, you mentioned the significance of the coefficient on the dummy variable, that is the overcharge. Can you distinguish how you would use this to tell whether there is an overcharge and also what the size is? In other words, the two distinct questions of existence and quantum.

MR HUGHES: So what you would do is you would look at the coefficient and you would test whether that coefficient is statistically different from zero, and there's a whole series of conventions you can apply to attest whether it's statistically different from zero and apply a threshold level and that's the essence of the test.

PROFESSOR NEUBERGER: That goes to existence?

MR HUGHES: That goes to existence.

PROFESSOR NEUBERGER: And then the size of it goes to quantum?

MR HUGHES: Yes.

PROFESSOR NEUBERGER: So these are distinct issues you might address, one is existence and the other is quantum; is that -- that's fair?

DR MAJUMDAR: Sir, can I just be clear, are we talking about the existence of an overcharge as opposed to the existence of an infringement? We're taking it as given that there is an infringement and then we're trying to understand, was there an overcharge, and if so, how much? Can I just be clear that that's the question, sir?

PROFESSOR NEUBERGER: All right. I was thinking if there is no clear evidence of -- there is no compelling evidence of an infringement, so you are using the data in this analysis to evidence both the infringement and the size of an infringement. So I think you have a comment on that?

DR MAJUMDAR: So, in that case, I think it's extremely difficult to do both. So, in my opinion, one would take a factual starting point, which is, "Is there an infringement or not", and what is the suspected time period. So the Tribunal would take a view, "We think there's an infringement and we think the infringement period is X", and then, given that information, we can set up the model to test whether, during period X, when the Tribunal considers there is an infringement, there is evidence of an overcharge, and if so, what the magnitude is.

So I think one has to have this ex-ante factual

basis for setting up the regression. I don't think that we can test both the existence of an infringement and an overcharge at the same time.

PROFESSOR NEUBERGER: It means that you are saying that you cannot use this sort of data to establish the -- to confirm the existence of an infringement? Let me get you right on that.

DR MAJUMDAR: I think it's very difficult to do that. I think there has to be a basis first. So, to -- perhaps I can explain it with an example.

PROFESSOR NEUBERGER: Sure.

DR MAJUMDAR: So I've presented, if you like, starting points for thinking about overcharge. You can think about overcharge if the Tribunal considers that there is an infringement in what Mr Hughes has called "the early period" and "the main period", I've given you some overcharges that you can take as a starting point to look at. Or if the Tribunal thinks, "Actually we don't think there's an early period effect, we think there might be something going on in the main period", then I've given you some starting points for looking at the overcharge where you can assess whether you think there's a broad main period or a narrow main period that's just OSS 2, for example, and then you can look at the overcharges that come out.

So my point would be that one has to start off with a basis for expecting an infringement in any given period and only then the econometrics can tell you something about whether there might be an overcharge and, if so, how much.

PROFESSOR NEUBERGER: I would be interested in your views, Mr Hughes.

MR HUGHES: Sir, I think I would express the issue similarly but slightly different. You're basically looking for a theory of harm, so is there a plausible theory of harm in a particular period of time, and then you would consider the econometric results of the testing for that. But I think it is -- the technique is useful for confirming whether there are, for example, early period effects or not. So where there is uncertainty about whether there is collusion or anti-competitive going on -- behaviour going on, I think testing for that and having the model confirm its presence or absence is useful.

PROFESSOR NEUBERGER: I am still not completely clear that if we go into looking at the econometric evidence on the basis that there is a claim that there was a cartel operating between two dates, but those dates are not very precisely defined, are both of you saying that I cannot hope the econometric evidence will provide

support or lack of support for that hypothesis?

MR HUGHES: My view, sir, is that it will provide support for there being anti-competitive behaviour over that period of time.

PROFESSOR NEUBERGER: And Dr Majumdar?

DR MAJUMDAR: So my view is, it really depends on how certain the -- one is. So -- so, for example, I would say that one -- if -- if it's completely uncertain as to -- as to when it was, then the econometrics really can't tell you very much because the model will be misspecified. It will -- on the other hand, if there is -- to go back to my example, if the Tribunal thinks there's an early period/a main period effect, not 100 per cent sure what it is but it's probably covering that period plus or minus a few months, then the econometrics can shed light on that. Equally, if the Tribunal thinks actually there's probably only something going on to the extent that there is during, for example, OSS main period 2, then the econometrics can shed light on that.

But I think if the uncertainty is broader than having a, sort of -- then it's very difficult to allow -- for this econometrics to, if you like, rule in the existence of coordination.

PROFESSOR NEUBERGER: Fine.

Let us move on from that.

THE CHAIRMAN: Do you have any further comment on that?

MR HUGHES: No, that's fine.

PROFESSOR NEUBERGER: Let us move on from that and look at some of the issues which arise with the before/during/after analysis. There are various references to the omitted variables problem.

Dr Majumdar, could you describe what the omitted variables problem is?

DR MAJUMDAR: Yes, sir. So, when one runs these before/during/after regressions they have to be properly specified, which means that the variables included in the regression must all be important determinates of the price in this case. So we would need to have granular cost controls which determine the price for each contract and ideally would vary within the contract just to see -- to allow the model to explain how prices move, we would need to understand demand condition to control for the influence of demand, which could go various ways which we can come to perhaps later; we would then need to control for various other factors, time effects, various characteristics of the products and so on. So, essentially, what we're trying to do is we're trying to put in all of the relevant variables to explain the price, and then, having used all of

the relevant variables to explain the price, we ask the question: well, is there evidence of an infringement on top of that?

If there is a variable missing, then when we put this dummy in for the cartel, what the dummy variable might pick up is it may pick up the existence of a cartel or it may pick up the existence of something that's not in the model and that is an omitted variable.

So let me explain that -- I appreciate that's a bit sort of abstract. Let's suppose costs are not properly accounted for in the model and costs are very high during the early period, then when we put in a dummy for a cartel during the early period we might see that the dummy is positive and we might see the effect is large. Do we then assume that that's a cartel effect? Not necessarily, because it might simply be picking up that there's a cost influence that is driving prices, causing them to be higher, that's not actually in the model. That's the problem: when you have omitted variables, you can't distinguish between a cartel effect and effects from other variables not in the model that should be in the model.

I appreciate that was a bit abstract. Is that -- is that clear, sir?

PROFESSOR NEUBERGER: Mr Hughes?

MR HUGHES: So I agree what -- agree with what Dr Majumdar's said in the sense that if you have variables which are correlated with the cartel dummy and those variables are omitted, then it is possible that you have what's called omitted variable bias so that the cartel dummy will capture both the effects of the cartel and those omitted variables.

I just want to pick up on three details. The first of those is, Dr Majumdar's indication of all the range of things that need to be included in the model should not be interpreted as a counsel for perfection. There is no perfect econometric model that captures everything in the universe going on. That's the first thing.

The second thing is you don't generally know the direction of bias when you have an omitted variable because you need to know what's going on.

The third -- third detail is that sometimes these effects are important and sometimes they're not important. So you need to have a reason for believing that what you've omitted from the variable was correlated with the cartel dummy, so Dr Majumdar gave the examples of costs being higher during the cartel period in a way that wasn't otherwise being captured during the model. So -- so it -- so what you've omitted needs to -- you need to believe it would make

a difference to the results.

PROFESSOR NEUBERGER: Dr Majumdar?

DR MAJUMDAR: Thank you, sir.

I mean, just to comment on what Mr Hughes has just said. So I agree, of course, that no econometric model can be perfect, but that's not what I said. I said that one has to include the most important determinants of price, of which cost is, I would suggest, clearly one.

In terms of not knowing the direction of the bias, that's true, sometimes we don't. Sometimes we can infer, either from theory or from some external evidence, which way the bias would be. But even if we do not know the direction of the bias, there still is a question of how much weight one can put on the results if one is reasonably confident there's some important information missing.

So, I don't want to go down the rabbit hole, but just to give an example, if -- we know there is not granular cost data that allows us to work out cost for any particular contract, so I would think that that is an important piece of information a good econometrics model would have. Now, it's no fault of anyone that we don't have it, it's just the data aren't there. But, to my mind, that at least informs us as to how much weight one can put on results when there is ultimately an

important variable missing.

PROFESSOR NEUBERGER: Can I just understand, because it seems to me self-evident that if you prove, say, that prices on average were 10% higher during 2000 to 2010 than they were between 2010 to 2020, that there may be -- there may well be other things to which such a price increase -- price difference could be attributed, like changes in the competitive condition of the parties that -- I do not know, it would be things like COVID and financial crises, that surely it is inevitable with this sort of analysis that the number that comes out of it cannot be firmly and confidently attributed to an overcharge, and the problem seems to be endemic; is that not right?

DR MAJUMDAR: That would be my view, sir, yes. I think, unfortunately, the data are not granular enough to control for all those important effects that you've just mentioned.

PROFESSOR NEUBERGER: Mr Hughes.

MR HUGHES: I'm going to try very hard to answer your question before I sort of comment on Dr Majumdar's response. I think any econometric model -- and I agree with Dr Majumdar on this -- needs to be properly specified as best you can, it's constrained by the data and it gives you the best available answer that you can

get. That's all that you can hope for.

I also don't think econometric modelling are a substitute for thinking. So you get a result and there will be uncertainties, as Dr Majumdar said. I think the question and area of disagreement between us is, where you do observe patterns of overcharge, do you think they arise by chance, or do you really believe that there's other extraneous factors that the model hasn't captured that are driving those results? I think that's an area of difference between Dr Majumdar and myself, and I'm going to park any comments on the costs variables and other things until -- I assume you're going to come to them.

PROFESSOR NEUBERGER: We will come to that, indeed, in more detail. Fine. We will come back to the omitted variables, but I just wanted to clarify whether we are using the term "omitted variables" to mean actual quantities we could put into a regression which are not there, they are identifiable variables which have been omitted from a regression, or are we talking much more generally about all sorts of extraneous factors that are impossible to control for?

DR MAJUMDAR: So, in the way I'm talking about it, sir, and the way I focused on it in my reports, I've essentially identified two areas of potential omitted variable bias,

namely because the cost controls that we have are, unfortunately, just imperfect, they are very aggregate and do not allow us to look at contract-specific costs, or even within contract costs, and likewise demand variables -- I appreciate we're probably going to come to this, so --

PROFESSOR NEUBERGER: Yes.

DR MAJUMDAR: In which case, I'll just stop at demand and we can pick it up later.

PROFESSOR NEUBERGER: Fine.

MR HUGHES: I just want to clarify that when you specify an econometric model you have something called the error term, the bit that's not explained by the model, and all models will have an error term because no model can capture everything in the universe that might affect the dependent variables. So I think the whole basis of econometric modelling is it allows for that uncertainty. The uncertainty that causes us trouble is only the uncertainty where, again giving Dr Majumdar's example, the thing that you've omitted is correlated with the variable of interest. If it's not correlated with the variable of interest, then I don't mind. If costs -- if costs are just generally higher, no problem, but it's if they're higher during the cartel period, that's what causes the difficulty.

PROFESSOR NEUBERGER: But to put that point into context, and then I will move on from this because I think we have exhausted it more or less, but to put that it in context, your dummy variable which you are worried about things being correlated with is on one during the cartel period and zero outside the cartel period and there are lots of changes in the world which may well be correlated with that, things which are different in the 2000s from the 2010s.

MR HUGHES: Yes. Yes, sir, that's exactly --

PROFESSOR NEUBERGER: I was just trying to establish, in my mind, these results have always to be taken with a degree of caution, because there are other explanations.

MR HUGHES: Yes. Yes, sir.

PROFESSOR NEUBERGER: Fine.

Let me go on to talk about ... the coefficient on the dummy is what is normally called the overcharge and that -- how should I interpret that? Is it in terms of, supposing the effect of a cartel varies over time or varies across products, what -- how should I think about that number? Mr Hughes?

MR HUGHES: So -- so what the coefficient captures is it captures the average effect on prices during the cartel period. So that's what it's capturing. So, on average,

the effect of that is -- is whatever the dummy is. It may well be the case, going back to your -- the premise of your question, it may be, sir, that there are periods of time where that effect might be different and therefore you might want to allow that dummy variable to have different values over time.

PROFESSOR NEUBERGER: I am coming to that.

MR HUGHES: And because it is an average the thing that causes trouble in life is if -- and forgive the colourful analogy -- if you put my head in the oven and my feet in the freezer and you ask me what the average temperature is, you're going to get quite a misleading result, because one part of me is very hot, one part of me is very cold.

So I think it's important, when you think about that dummy variable, that if you think there are distinct periods of time, you allow for that in the modelling and test whether there are distinct periods of time.

PROFESSOR NEUBERGER: Dr Majumdar?

DR MAJUMDAR: Thank you, sir.

So I would agree there's an average effect, and in terms of what the coefficient is picking up, it's a percentage, because we've -- the way the model is set up is in logs, so it's a percentage relative to the "but for" price, which is, assuming that there is a cartel

and assuming there is an infringement period, the coefficient picks up the percentage that prices are higher during the period covered by that dummy variable compared to the so-called non-infringement period.

PROFESSOR NEUBERGER: Can I come to another. We talk about "before, during and after". Is it right just to think in terms of clean prices and dirty prices, in general? Is that the sensible -- (overspeaking) -- clean prices are prices which are unaffected by the infringement and dirty prices are prices which are affected by the infringement; is that right?

DR MAJUMDAR: Yes, sir.

MR HUGHES: Yes, sir.

PROFESSOR NEUBERGER: Right, that is useful. Thank you.

I would like to move on to the more pertinent thing for this case, which is when the cartel period is not known precisely. I am interested in, going back to something we were talking about before, can it -- if I am unsure about whether the cartel period is, can I use -- how can I use the data, if at all, to confirm that there is an overcharge and separate that from the question of trying to quantify the size of any overcharge.

I just want to know, there is a claim that there was a cartel operating at this -- in broadly this time, I am

not very precise about the period; how can I use the data, if at all, to confirm the claim or to disprove -- confirm or weaken the support for the claim?

DR MAJUMDAR: In my view, I don't -- I don't think you -- you can, sir. To my mind, econometrics can shed light on the length of an infringement period where you have a good idea that it's, for example, roughly between -- I don't know, I'm just making up something -- January 2008 and December 2011, if you thought it was roughly there, then you might be able to use econometrics to test whether it's a quarter before or a quarter after either side, you just sort of -- I mean, there are various techniques you could use. But I think when there's so much uncertainty that you don't have a good ex-ante starting point to say, look, I think this is my infringement period I'm going to test for an overcharge. I just -- unfortunately, I just don't think that we can use econometrics to assess and rule in the existence of an infringement. I think we have to take as a -- as a starting point a fact pattern that says there was or there wasn't one and only then can we test for an overcharge.

So, sorry, let me be clear, when I say there was or was not one, I think we need to take a factual starting point that says I expect there to be a dirty period here

and clean periods here and then, only then can we run the analysis to shed light.

PROFESSOR NEUBERGER: Mr Hughes?

MR HUGHES: So the European Commission's practical guide on damages specifically says that you can use econometric testing to work out whether the -- to assess for the end period or the late period of cartels, whether they start winding down towards the end. So I think it is fairly standard practice to consider what happens if -- if there are -- if you try a different date and then test whether there is a statistically significant effect earlier or later.

So I think econometric modelling is useful for testing this. So I think you can test for both an early period, a main period and a run-off period, particularly in the circumstances of this case, where we do have some documents which anchor, I think, potential early period dates so that it can be tested for statistically using econometrics.

PROFESSOR NEUBERGER: Yes, please.

DR MAJUMDAR: Thank you, sir. I mean, just, if I remember correctly, the quote that Mr Hughes refers to is one that implicitly says that we know there's been an infringement. So this goes to my point about having some ex ante information as to where to start, if

I remember the quote correctly, sir.

PROFESSOR NEUBERGER: Without going back to outside authority, because I think actually it is not particularly binding, I am just confused. If we take the primary claim in this case, it talks about a period extending from as early as 6 November 2002 -- sorry, I am referring to the 4APOC, which is {A/3/16}, paragraph 39, which summarises the principal claim, and it says:

"Over a period which extended from as early as 6 November 2002 and in any event from 6 July 2004 until at least as late as 30 March 2011 ..."

I just wonder why, if one finds evidence of -- if one says that is the dirty period and the clean period is some period afterwards, why one cannot simply test for that?

MR HUGHES: Sir, I would agree with that proposition.

PROFESSOR NEUBERGER: And Dr Majumdar?

DR MAJUMDAR: So one can test for it on the basis of making an assumption about the length of the infringement period. So one can say, if I proceed on the basis that that is the infringement period and I can test for it but the results are conditional on the assumption that has been made, so I will assume that this is the infringement period, I will then test for an

overcharge, given that assumption, this is the estimate that comes out. I don't think that this -- but finding something I don't think allows us to say, ah, but therefore -- sorry, let me start again. Finding evidence of an overcharge on that basis, I don't think allows to us rule in that the assumption was correct in the first place quite simply because there are so many other things, indeed you mentioned them, sir, there are so many other things that could be going on in that period, which makes it very difficult to control for all of the other influences.

PROFESSOR NEUBERGER: No, I understand that the econometric evidence is not going to be totally compelling either way. All I am asking is whether, if there were compelling econometric evidence that there was an overcharge in that period relative to a later period, whether that would be material for confirming or rejecting the primary claim.

DR MAJUMDAR: Sir, when you put it to me that way, when you say "there is compelling econometric evidence", I think what -- what is compelling econometric evidence? So, to my mind, compelling econometric evidence is when one starts off with a factual -- factual basis and then uses that to inform the regression. I fear that this is going the other way.

PROFESSOR NEUBERGER: Sorry, I put it wrongly. I did not mean there was compelling econometric evidence. I mean, if a well-specified model --

DR MAJUMDAR: Right.

PROFESSOR NEUBERGER: -- shows that the dummy which is associated with the dirty period is positive and significant, we understand there could be many explanations of why this could be true and so on, but I am just saying, is that useful evidence to take into account when deciding whether the claim is correct?

DR MAJUMDAR: Understood, sir. Thank you for -- thank you for that helpful clarification.

So, if we are confident that the model is well specified, and if we see, having controlling -- having controlled for all of the things that we think we should control for, there is a higher price during that time you mentioned, sir, then I think that is -- it doesn't rule in an infringement, but I would agree that that would be useful information.

PROFESSOR NEUBERGER: Mr Hughes?

MR HUGHES: I think I mostly agree with Dr Majumdar, but I think it's the balance of what we're discussing here. I think I would need to believe that it's a coincidence that the econometric modelling is finding an overcharge when there isn't one, and I would need to believe that

it's happened by chance in some manner and I'd need to believe in particular that there's some specific specification issues or data issues that have led to that result. So I would attach a lot of weight to the econometric results, subject to Dr Majumdar's clarifications of the model specified etc.

PROFESSOR NEUBERGER: Yes, because I just want to establish whether all this time we are spending on the econometric evidence can go to -- is relevant to considering the validity of the claim and then obviously it can also be used for working out, if the claim is justified, how much the damage is, but I am trying to focus primarily on the role of the econometric evidence in establishing whether the claim and the alternative claims are correct, and as I understand it, we agree that it has a role, but quite the weight that one will want to attach to it depends on the belief that one has in the model and the possibility of any overcharge being accounted for by other things and so on.

DR MAJUMDAR: Yes, sir, the belief that one has in the model based on the underlying facts and so on, indeed, sir, yes.

PROFESSOR NEUBERGER: Fine, fine.

I am interested, if one has got uncertain dates and one is trying in this way to get a measure of overcharge

in order to confirm or not the existence of an infringement, what is the strategy in using -- sorry, what are the alternative strategies for interrogating the data? I am thinking in terms of, at one extreme, just keeping the clean data and the dirty data and having a simple dummy and throwing away the other data, I am thinking in terms of having multiple dummies. I just wonder, what is the best way and what are the pitfalls and advantages of different techniques.

Mr Hughes, you have obviously been thinking about this a lot.

MR HUGHES: So, I think, where you have uncertainties the -- what I think the purpose of econometrics is is to get the data to tell you what the answer to that question is. The advantage of using dummy variables is you don't throw away the early period or the late period or anything else and you -- you ask the question of the data as to whether there are statistically different effects during different periods of time. If you find them, you keep those dummies in the model and you think, "Well, there's evidence that prices are higher in the early period, there's evidence of a wind-down period towards the end of the cartel when the various cartelists started leaving the cartel", and you would include those variables in the model if you find them to

be statistically significant and that they make sense, and if you don't find them to be statistically significant, you drop those variables.

So I think my preference, as a generalisation, my preference would generally be to include dummy variables where I think there are different effects over time. I think that's preferable to the alternative of just throwing away data, because, particularly in these sorts of real life cases that we're discussing, we have a relatively small number of data points and throwing away data points means that it's going to be -- what we call the statistical power of the model will go down; it will be harder to find an effect, if there is one. So -- so my clear preference is the dummy variable approach and get the data to tell you whether there are early period effects, and if there aren't, you don't have that dummy in the model, and I prefer that to abandoning data and getting rid of data.

PROFESSOR NEUBERGER: Dr Majumdar?

DR MAJUMDAR: So, I think one has to be very careful with circularity here. If one says, "I'm going to look at a very uncertain period and I observe there are low prices here and high prices here", and I say, "Well, I'll put the low prices in the clean period and the high prices in the dirty period", one is bound to find an

infringement, because the way that one has allocated time periods to clean or dirty is -- is in essence bound to give rise to high prices in the dirty period. So that is the key pitfall with adopting this approach, and which is why I say that one has to start with a clear view beforehand of what the infringement period is. As soon as you go into the data and say, "Low price, well, that must be clean; high price, well, that must be dirty", one is bound to find an overcharge. So I think that's a critical point.

The second point would be that, again, and I -- when there are so many uncertainties, if the uncertainty is only to do with the infringement period, that's one thing, but if the uncertainties reflect a range of other factors, we've already talked about cost and demand, the RFQ dates we're bound to come on to as well, if there are all these other uncertainties, then the ability of the econometric model to identify likely infringement or possible infringement here, clean period here, is further reduced. So if there is uncertainty, econometrics doesn't necessarily solve it, because the econometrics is affected by those same uncertainties, and I think -- so those are the two key points I would make: great care with circularity and similarly the uncertainties don't affect only

the infringement period, they actually affect the entire model.

PROFESSOR NEUBERGER: Mr Hughes.

MR HUGHES: I think, to be quite clear about the method I've applied, what I've tried to do is I've tried to have an evidence base from documents as to when the starting point of the early period was. So I haven't arbitrarily chosen that date on some sort of data mining basis, I've looked at where the prices were systematically higher in the period and where I find for two of the three categories they are systematically higher for the third period, I've kept that dummy variable in the model, so -- and that's -- so, I'm letting the data answer the question.

What I'm not doing, to be quite clear, is I'm not randomly choosing periods of time and saying, "Well, they're a bit higher there, a bit lower there", I'm definitely not doing that. So I've got an evidence base from documents that suggests that collusion may have occurred earlier and then I ask the question of: is that the case or not? Is that variable statistically significant or not?

PROFESSOR NEUBERGER: Can I, before pursuing ... I just wanted to ask a somewhat more technical question. Imagine that the early period and the main period are

the same length, they have the same number of contracts and whatever, and you just -- it is a technical question for my own information really. If you have separate dummies for the main period and the early period and you say -- you find that there is a zero overcharge in the early period and a 40% overcharge in the main period and then you rerun the regression with a single dummy, do you get a figure of 20%, more or less, or do you get something different?

MR HUGHES: So -- so I think the answer to the question will depend upon the distribution of the data points, how many -- how many data points you have in the early period and how many data points, because that will drive the weight that's given to the average. But, in principle, you'll get an averaging effect. But the fundamental point is a point, sir, you made earlier, which is, the whole basis of these comparisons is to compare dirty prices with clean prices, and if you start mixing them together, your -- the dirty prices that are too high will come down and the clean prices that are lower than the dirty prices will come up, and the more mixing you do of those two, the greater the risk that you don't find anything at all. So you might entirely compromise the ability of the model to find any overcharge whatsoever.

PROFESSOR NEUBERGER: But it should not -- but splitting the whole period into two sub-periods should lead to the -- an estimate of the overcharge which is the same average overcharge as the average of the -- the appropriately weighted average --

MR HUGHES: Yes, generally speaking -- your proposition is generally right. The other thing that -- sir, I think the proposition is generally right.

The other thing that happens is, what you have is you've got data over time, so you observe -- so the way -- the way the model works is, for individual car parts of a particular type, which we have what are called "fixed effects", so the model works out, on average, an airbag of type 2 is somewhat more expensive on average than an airbag of type 1, okay? And then you -- and then the model says, during the cartel period controlling for that factor, do I observe that the price of the airbag is higher during the cartel period? Now, for that to work, you need to have a distribution of data points during and outside the cartel period. So if you -- if you have too long a cartel period where you have a single period, then you'll lose granularity on your observations, it will be harder to make the in and out comparison that you'd like to make.

PROFESSOR NEUBERGER: Dr Majumdar.

DR MAJUMDAR: So I think your original question was: if we have the same length of early period and main period, essentially, do we get an average effect? I think the answer to that is yes, that's what we would expect to get. If we -- if we don't get an average effect, that suggests that there's something -- or rather, if we have, for example, a high coefficient in the early period, a lower coefficient in the main period, and then when we run the two together we don't get an average effect, that perhaps suggests there's something unstable in the model, because we would typically expect to get an average effect by having that single dummy variable.

I think we would also want to look at the nature of the coefficients as well. So, for example, if one has a very high coefficient suggesting a high early charge in the early period and a much lower one suggesting a much lower overcharge in the main period, I think we would ask ourselves, well, why is that? But maybe we're going to come to that --

PROFESSOR NEUBERGER: Yes, surely.

DR MAJUMDAR: Okay.

MR HUGHES: Can I express my point, repeating my colourful metaphor from earlier about the head in the oven and feet in the freezer? If a head in the oven is set on the convenient, you know, 30 degrees, it might not be

too bad, but the freezer will still be very cold so the averaging together will not give you the proper -- the proper effect. So I think -- I think a lot of this depends upon the differences between the two periods in time and also the distribution in data points.

DR MAJUMDAR: If I may, sir, my response to that is we would ideally have information that your head was in the oven and your feet were in the freezer and then we could come to that.

MR HUGHES: I think, by the end of this, you might wish your head was in the oven!

PROFESSOR NEUBERGER: I am still kind of lost about why we should get into such problems about the definition of the period. Supposing that one of you does a regression with the two periods, in the example I had 0 and 40%, and says there's no overcharge in the first period, there's 40% overcharge on volume in that second period, and the other of you blithely ignores the first and second period, the freezer and oven, or whatever it is, and says, actually, there's a 20% overcharge on twice the volume, it does not make any difference as to quantum, so it does not seem to be a very important issue as quantum goes. It may be an important issue as to statistical significance, but is that right?

The only worry then about having -- combining a dirty

period with some of the clean period, the main problem is you may lose power to detect a significant overcharge. Have I got that right?

MR HUGHES: I think you will be systematic -- so if you -- what you're describing is making a measurement error in these things and you are mixing together the clean and dirty --

PROFESSOR NEUBERGER: Yes.

MR HUGHES: -- so the coefficient will go down --

PROFESSOR NEUBERGER: Yes.

MR HUGHES: -- because you are mixing together clean and dirty and you may cease to find it to be statistically significant as a result of that, but your description is correct, sir.

PROFESSOR NEUBERGER: So one could, in principle, run both and see whether it is in fact true that the effect one sees -- whether the story is consistent with that. I mean whether what has happened is the two numbers -- the numbers are all consistent for the estimates and in one case you find significance and the other case you do not.

MR HUGHES: I think you can definitely run -- I think we should be very clear about what you're -- what you're doing -- what one would be doing in that scenario. So econometricians don't -- econometricians would want to

test whether the coefficient is the same on average over those two periods of time or whether it's different, and if it's different over those two periods of time, imposing an untested and invalid restriction that it's the same will give you the wrong answer. So I would always prefer -- regardless of what case we're discussing, I would always prefer to have separate dummy variables if I think there's a prospect of separate effects.

PROFESSOR NEUBERGER: I am still -- the average -- if I have too extensive a period, I will bias down the figures by the fact that there is no overcharge in the clean period I am including; is that right?

MR HUGHES: Yes.

PROFESSOR NEUBERGER: Right, fine.

DR MAJUMDAR: Sir, I think one needs to be careful with that view, and, again, it goes back to whether or not the model is properly specified. If the model is perfect, other than the infringement period is uncertain, then it is correct that if you put clean into dirty and dirty into clean, it's going to make it harder to identify an overcharge. However, if the model is not well specified, then the way that the bias goes is entirely uncertain; there's already bias in the model and then this could push it -- it's unknown which way

it's going to go. So I do want to emphasise that point.

I think I've already made the other point, which -- so I agree with you that -- I agree with Mr Hughes that you can test for whether two coefficients are different, and if they are statistically the same, you can just run a single dummy. I agree with that. If they're statistically different -- and I know we're going to come on to it, sir -- then I think one needs to ask the question: if they're statistically different, do their magnitudes make sense? Because if they don't, the model may be misspecified.

PROFESSOR NEUBERGER: I understand.

I have got one more question -- one more area, which I think is fairly straightforward, and I think probably then it may be a natural place to take a break. This concerns the nature of the -- a fact I adverted to earlier about the fact these are not individual sales, these are a string of contracts. Perhaps Mr Hughes can explain how that affects the very broad -- in broad conceptual terms, how that affects the before/during/after analysis that we have been talking about.

MR HUGHES: So, thank you, sir. So what you observe in this case is the -- the Claimants purchased car parts over -- typically over the life of the part, although there

might be a competitive tender later on in the process. So they're typically purchasing the life of the part, and therefore what you observe is a stream of prices over time, and if there was to be a cartel overcharge, which is a hypothesis to be tested, not to be assumed, you would -- you would -- you would be able to use all of that pricing information over time, and that's what I do in my econometric model, to assess whether prices are higher on average during the cartel period than outside the cartel period, and that's the central feature of what I'm doing in my modelling.

PROFESSOR NEUBERGER: Dr Majumdar?

DR MAJUMDAR: So I think -- yes, so with the -- I think there are two issues, which is that when you have a scenario where the allocation of a supplier occurs at the RFQ stage and you know that the price that's determined there or thereabouts is going to influence future prices, because they will trickle down, either because that's agreed in the contract or they will be negotiated down or just moved down at some price amendment stage, then the subsequent prices become non-independent information, and so there's a sort of technical issue that one needs to take account for that, which I believe Mr Hughes does by clustering. But the sort of -- in some senses, the nature of competition

there is determined primarily at the RFQ stage, because -- and the prices that rise following that point are in some senses linked to the first price that -- that is determined because they are sort of percentages of that price. So I -- I would make that point.

Other than that, I would say that Mr Hughes does in his model seek to ask the question not only is there a higher price at that stage, which is called the "new contract stage", or the "new contract overcharge", he also seeks to address whether there's a price amendment effect. So we start off with the price of the contract and then we see prices move down, typically, over time, and what Mr Hughes says is -- or asks is: do I see an effect that prices fall more quick -- sorry, more slowly during the cartel, do prices fall more slowly during the cartel? And Mr Hughes does not find that effect. So, actually, everything that we're talking about today is the so-called new contract phase.

PROFESSOR NEUBERGER: I just want to be clear, though, about the basic data that we are looking at. We are looking at the prices of -- sorry, we got into some trouble earlier on about understanding. We are talking about the price of a seatbelt, of an airbag, of a steering wheel, we are not talking about prices of components of those?

MR HUGHES: Exactly right.
DR MAJUMDAR: Correct.
PROFESSOR NEUBERGER: Right.
The data we are looking at are the price of every delivery of these objects, or are we talking about the prices just at the start of production and the price amendment stage?
MR HUGHES: So, sir, in my model, I'm looking at the prices over -- so prices over time, so I'm leveraging all the available information of the prices that we have in our model, and, to use Dr Majumdar's word and he'll correct me if he wants to use a different word, is that the subsequent prices are linked to the original RFQ price, but I'm using all that, I'm leveraging all of that data in order to assess whether prices for new contracts are systematically higher during the cartel period. A tiny detail that Dr Majumdar says I don't find any price amendment effects; I do find them for airbags, but they are not something I've included in the damages. A tiny detail.
PROFESSOR NEUBERGER: Let us not get onto the findings. I was not clear that in any month in which this seatbelt is delivered to PSA, there is a price and that enters your dataset.
MR HUGHES: Yes, sir.

PROFESSOR NEUBERGER: That is whether there is a price amendment or whether it is simply a fixed contractual price which is exactly the same as a price which occurs earlier.

MR HUGHES: Yes, sir, I used prices over time.

PROFESSOR NEUBERGER: So -- and in terms of, when I think about -- assuming I am very clear about what my cartel period is for a moment, I have defined that, and you have defined it various different ways, but I have got my cartel period and I've got a price of a delivery of seatbelts to PSA in this month, which was subject to a price amendment some time earlier, was subject to an RFQ long earlier, what determines whether that transaction is regarded as a cartel -- as subject to an overcharge?

MR HUGHES: Right, so I have a dummy variable on that price and then that dummy variable gets switched off, so that -- so that part continues -- so the dummy variable gets switched off or switched on, basically.

PROFESSOR NEUBERGER: But I do not understand. What -- if I look at a particular transaction, a particular entry in your dataset, you know, whatever, this is a delivery of seatbelts at a price of so and so at this date, and it is part of some long-running contract, what determines whether the cartel dummy is switched on or

switched off?

MR HUGHES: So -- so when I observe -- so, sir, when I observe a price that's purchased in the initial period and during the cartel period, then it will be switched on and it will continue to be switched on, there will be price amendments, and then -- and then, when -- so and that's switched on for the life of the part.

PROFESSOR NEUBERGER: Right. So that whether the part is affected -- whether the part is dirty or not depends on whether the RFQ date --

MR HUGHES: Precisely, sir.

PROFESSOR NEUBERGER: -- is in the dirty period?

MR HUGHES: Precisely, sir.

PROFESSOR NEUBERGER: Right. Right, I am clear about that.

THE CHAIRMAN: Shall we take a break now? So five minutes.

(11.44 am)

(A short break)

(11.53 am)

MR WEST: Before I forget, I have got the spillover damages table.

THE CHAIRMAN: Yes, thank you very much. Do you want to just ...

MR WEST: Can I hand that up.

(Handed).

THE CHAIRMAN: Could you just remind me when that was

served?

MR WEST: I believe it was on Friday.

THE CHAIRMAN: Yes, okay, so this is a recent one. Yes.

MR WEST: There is not anything new in it, it is drawn from existing material in Mr Hughes' report.

THE CHAIRMAN: Was it annexed to ...

MR WEST: It is now going to be in tab 20.

THE CHAIRMAN: It was not annexed to a report?

MR WEST: It was not. It was set out as part of a larger table in Mr Hughes' original report. It has now been split out.

THE CHAIRMAN: So has it been sworn to already and this is just --

MR WEST: No, could I just perhaps ask Mr Hughes to confirm its accuracy?

Do you have a copy?

(Handed).

MR HUGHES: Yes, it is accurate.

MR WEST: Thank you.

PROFESSOR NEUBERGER: Thank you very much.

I was conscious in the original draft protocol put to us that there was a convention that one should alternate between the expert witnesses. I have not been doing that and I think, in many cases, like the current, where I want to talk about the design of the model, it

is appropriate to ask Mr Hughes to speak first, and obviously I will try to ensure to the best of my ability that I am totally fair between the experts.

I want to now turn in more detail to the data. I do not think this is at all contentious, because you both agree on the dataset, as I take it.

Could you explain, Mr Hughes, briefly about why you are using PSA data and then go on to explain what is in the dataset? I was thinking that one way of doing that might be, Dr Majumdar's got a table, table 4, which sets out the dataset, which is at {E1/6/27}, if you are comfortable using a table that you did not originate, but it may provide a useful visual aid to describing the dataset, or you may prefer to do it some other way.

THE CHAIRMAN: This is table 4.

PROFESSOR NEUBERGER: Sorry, table 4.

Just so that we know what is in the dataset.

MR HUGHES: So, sir, your original question, just to make sure that I answer the right question, was why have I used PSA's data?

PROFESSOR NEUBERGER: Yes.

MR HUGHES: Okay, very good.

In order to estimate the overcharge accurately, what you need to do is you need to be able to control for the technical characteristics of the parts so that you

don't treat apples and pears differently, or you do treat apples and pears differently as appropriate, and you also need to have the best available information that you can have on request for quotation dates and the only dataset that properly covers both of those things is the PSA dataset and that's why I've used that dataset.

The Vauxhall/Opel dataset and the FCA dataset doesn't contain sufficiently detailed information and that's the fundamental problem.

The Claimants' -- sorry, the Defendants' datasets aren't usable because I don't have that level of granularity of information.

PROFESSOR NEUBERGER: Thank you very much.

Then can you describe what is in the dataset?

MR HUGHES: So what I have for -- for those -- I have it at the level of individual parts, so I know the characteristics of those parts and I know the prices of those parts over time, and for a selection of parts, a selection of those parts, I know also the actual RFQ dates, which are from contractual documents, which is also helpful. So that's, in essence, what I had in that dataset.

PROFESSOR NEUBERGER: Fine. Thank you very much.

I mean, I take it that there is no dispute as to

the validity or usefulness of the dataset?

DR MAJUMDAR: That's correct, sir.

PROFESSOR NEUBERGER: Right.

Then the next thing I would like to do is if I could take you through the regression in your first report. I am thinking of table 5.1, which is at {E1/2/92}. Let me explain what I think would be useful, which is to go through these numbers and explain what they mean, assuming the model is well specified and so on, that is not the issue. I just want to understand what the numbers are.

I guess the first question that I would like to ask about that is, you have got two columns, one is "Full Sample" and the other is "Excluding Outliers". I got the impression from the exchanges between the experts that they are both happier working with the "Excluding Outliers"; is that right?

MR HUGHES: Yes, from my perspective.

DR MAJUMDAR: I am happy working with the "Excluding Outliers" column, but I would -- I think it is important just to understand something about them. So although it says "Excluding Outliers", which makes it sound as if there's some potential rogue data points that one might want to exclude, this is not an exercise of lining up the data, taking the top 1 -- the top 1% and the bottom

100% and excluding them because they might be genuine coding mistakes, this technique is one where observations that have a disproportionate influence on the results are excluded. So I think one needs to be a little bit careful with the term "Excluding Outliers", because a data point that's seen -- seen to be invalid in one regression may be seen as an outlier in another, and so I have primarily worked with the "Excluding Outliers" point, however, I think, in terms of understanding the overall picture, it is useful, at least potentially useful, for the Tribunal to be aware of what the full sample results would be as well, because it's not strictly outlier exclusion, if that makes sense.

PROFESSOR NEUBERGER: I understand, but as far as we are concerned here now, there is no reason not to work entirely with the "Excluding Outliers". I am just mindful of the fact that if we are having to dart between two lots of figures all the time it makes an already complicated discussion completely impossible.

DR MAJUMDAR: I agree with that, sir, yes.

PROFESSOR NEUBERGER: So we can work on the "Excluding Outliers".

MR HUGHES: Yes, sir.

PROFESSOR NEUBERGER: Fine. That is very helpful.

Could you take us down the numbers in that table, Mr Hughes, and explain to us, and I may stop you at one or two points.

MR HUGHES: Sir, this morning, we've spent quite a long time talking about the RFQ dummies, so those are the dummies that are switched on purely during the early periods, and those early periods will vary across the category, and where I don't find them to be statistically significant in the case of seatbelts, you won't find that dummy variable in my model. So they're the first two variables.

The second --

PROFESSOR NEUBERGER: Sorry, stopping you there.

MR HUGHES: Sure.

PROFESSOR NEUBERGER: What does 0.300 mean and what do the three stars mean?

MR HUGHES: So it's -- you have to do a conversion factor to convert the coefficient, so to convert the 0.325 into an overcharge, so there's a conversion factor to be applied, which Dr Majumdar and I are using the same conversion factor, but approximately it means that during the cartel period prices are 30% -- the exact number is -- is -- is the actual coefficient I've calculated, but for the sake of these purposes, during -- they're about approximately 30% higher during

the cartel period --

PROFESSOR NEUBERGER: Sorry, I just want to say, assuming that the kind of conversion between logs and --

MR HUGHES: Yes, it's that -- it's that sort of stuff.

PROFESSOR NEUBERGER: -- is straightforward so ... and let us, to keep it simple, say, if we are looking at the column "Excluding Outliers" that what that says is that prices in the early period, all other things being equal, are 30% higher.

MR HUGHES: Precisely.

PROFESSOR NEUBERGER: That is right.

MR HUGHES: The conversion takes you to about 25 or some other number, but the spirit of what you said is exactly correct, sir.

PROFESSOR NEUBERGER: Sure.

MR HUGHES: Then you have a main period --

PROFESSOR NEUBERGER: The three stars?

MR HUGHES: The three stars is a measure -- is a standard measure of statistical significance and that means it's statistically significant at the 1% level. So you would -- you would reject a hypothesis that that coefficient was in fact zero at the 99% level.

PROFESSOR NEUBERGER: So the -- to put more flesh on it, the model says the number -- the best number I can guess is 30%, that there is obviously a degree of uncertainty

about that number, but I am pretty well certain it is not zero?

MR HUGHES: Yes, and the caveat I would have is one that Dr Majumdar's made, which just -- just to anticipate something he might be able to say but he can obviously speak for himself -- is that that assumes that the model is correctly specified.

PROFESSOR NEUBERGER: Understood.

Then go down.

MR HUGHES: Then the next variable is the main period RFQ dummy and then approximately 25% more expensive during the cartel period.

Then I have what I call a "Wind-down Dummy", and that tries to capture for the period of time from March 2010 to March 2011, which is towards the end of the cartel, is there evidence that prices were lower during that wind period -- wind-down period than would otherwise be the case, and I find that to be statistically significant at about the 10% level.

PROFESSOR NEUBERGER: Can I just put those together, the two lines, the RFQ main period and the wind-down dummy; is it correct to add those numbers and say that the overcharge in the wind down period is approximately zero?

MR HUGHES: Exactly. That would be correct, sir.

PROFESSOR NEUBERGER: Fine. Fine.

MR HUGHES: And then -- and then I have two price amendment effects which I'm looking for, which I find for steering wheels, which are the extent to which, as Dr Majumdar said earlier, the extent to which prices -- the trend in prices was different during the cartel period and I find no evidence of any statistically significant effect there.

PROFESSOR NEUBERGER: Just on that, the number of 0.02, is that a decline of 2% per month or is there some other interpretation? I realise it is not statistically significant.

A. Sure, sure. It's a decline when there is a price amendment. So it's not a per monthly change, it's when prices change is -- is the trend in those prices different? So it's a change per amendment.

PROFESSOR NEUBERGER: A 2% change per amendment.

MR HUGHES: Yes, exactly.

PROFESSOR NEUBERGER: But as you have stressed, it is not significant. Thank you, that is very helpful.

MR HUGHES: Then the next coefficient, so the two "Age Cartel", so these are how I'm trying to capture price amendment effects. And then I have an "Age Post Cartel". The purpose of the age post cartel is to allow for the possibility that after the cartel ended, prices

were somehow renegotiated back to normal again. Do I find a statistically significant fall in prices? So I test for that.

Then I have the next three -- and I don't find anything for this prior category -- for the next three I've got the age of the part, and the reason for the age of the part variable is I give -- is -- is that what the witness statements say is it's fairly common for there to be what are called "productivity discounts" in the first three years and then prices might change after that as time goes forward, and I'm looking at the trend -- this is based on the age of the parts, I'm looking at three variables there.

PROFESSOR NEUBERGER: Sorry, again, on the physical interpretation, are you saying that the products, in the first three years of their life, are on average about half a percent cheaper than --

MR HUGHES: Yes, they decline -- yes, exactly, so they -- they, yes, decline in price by that level, exactly, sir.

PROFESSOR NEUBERGER: Is that -- I mean I was just thinking in terms of the evidence we have been hearing about requiring cuts of 3% per annum in the first three years. This does not seem to be --

MR HUGHES: Sir, this would be per amendment, sir. So it would be a progressive thing over time, and also what

you observe is that the -- is that there is a productivity element, but on top of that, if there's a raw material cost change or some other change in the specification, the part of the price might go up as well, which -- so -- so the first three -- so, so it may -- it may well be that prices don't always fall precisely as you -- as the contractual productivity level indicates.

PROFESSOR NEUBERGER: But you would not -- you do not see any conflict between this and the evidence about --

MR HUGHES: No, sir.

PROFESSOR NEUBERGER: -- negotiated price declines.

MR HUGHES: No, sir.

PROFESSOR NEUBERGER: Thank you.

MR HUGHES: Then my next variable is a calendar time trend, and then I'm looking for and I've an indicator for amendments in the last couple of years.

PROFESSOR NEUBERGER: What is that for?

MR HUGHES: That's just to allow for any reductions that occurred towards the end of the period because 21 and 22 was an unusual period of time.

PROFESSOR NEUBERGER: Can I -- was that -- did you have that in your mind originally, or is this something --

MR HUGHES: Let me just --

PROFESSOR NEUBERGER: -- that you put in?

MR HUGHES: Sir, just let me check my notes, please, sir.

(Pause).

I think it's just to allow for the impact of COVID-19 and what was going on at that time, sir.

PROFESSOR NEUBERGER: Did you contemplate stopping your period -- your clean period much earlier? You have got quite a long clean period, after all, from 2011; why go on so long?

MR HUGHES: I think it's just to make the most of the data points that I have, sir.

PROFESSOR NEUBERGER: But you have the disadvantage, of doing that, that you bring in other factors which have changed, like COVID?

MR HUGHES: Potentially, sir.

PROFESSOR NEUBERGER: Did you do a sensitivity to see what happens if you shorten the clean period?

MR HUGHES: No, sir.

PROFESSOR NEUBERGER: Thank you.

Sorry, go on then.

MR HUGHES: Then the other variables are for various cost controls that I have in the model, so leather, plastic, steel. Sorry, I'm -- I made a mistake earlier, sir, my apologies. I should explain, it was nothing to do with COVID, the indicator earlier. What I find is that -- in relation to carbon steel, what I find is -- is that

there may be a different relationship between prices and -- the price of steel and the price of Occupant Safety Systems during the period of 2021/22 when there was a shock in steel prices, and I had -- and this is a -- and that particular variable is a -- is an adjustment, it's an adjustment to the constant, if you like, sir, and then I have a -- and then there -- so there's a -- there's an effect -- a general effect of steel prices and there's an incremental effect on steel prices of the period there.

So my earlier comment about COVID was nonsense. My apologies, just my memory being faulty.

PROFESSOR NEUBERGER: Fine.

MR HUGHES: Then I have aluminium, magnesium and EU27 GDP.

PROFESSOR NEUBERGER: Great.

Then the number of observations is simply the number of prices that you --

MR HUGHES: Precisely. Then the "R-Squared" and the "R-Squared Adjusted", the R-Squared Adjusted is the percentage of the variation of -- in prices that is explained by the control variables I have in the model. So this particular variance suggests that 85% of variance in prices is explained by the variables I include in the model.

PROFESSOR NEUBERGER: I was wondering -- this is an unfair

question to spring on you and you may want to look back and come back later on it. I was curious about the standard error of the regression and I was just finding it useful to have some idea in my mind about how accurately this model actually prices steering wheels, and I think it might be -- I mean, I do not think much hangs on it, it just gives me some greater sense, physically, of how it --

MR HUGHES: I believe we've sent, at the Tribunal's request, both of us have sent standard error information.

PROFESSOR NEUBERGER: That includes the standard error on the regression?

MR HUGHES: Yes, yes.

PROFESSOR NEUBERGER: Fine. Excellent. Thank you. Thank you very much.

Sorry, Dr Majumdar, do you have any comment? I just wanted to go through this so we understood what was at stake.

DR MAJUMDAR: No, sir.

PROFESSOR NEUBERGER: Fine. Fine.

I will now get on to the kind of more controversial area, the important differences between the two experts concerning Dr Majumdar's sensitivity tests, which are referred to in paragraphs 32 to 41 of the joint memorandum {E1/13/22-28}. I will try to get to

the bottom of them, in the sense of exploring what the issues are, though I suspect that some of the disagreements are common across several of the tests, in which case I will not discuss them all.

I think, from the -- if we get back to the question we broached earlier about the extent to which these regressions help on the question of existence of an overcharge as well as the size of the overcharge, and I guess, before going into the detail of the disagreement on the sensitivities, I just wonder whether one -- I think it would be useful to us to just explore, in general terms, which are the appropriate tests or analyses of the data which would help us understand the relevance of the econometric data to the three distinct claims brought by the Claimants. This may be something you will need to think about quite hard, because it is not a problem that you have directly addressed, but it is an important one, because the Claimants have, I think, four grounds in their "but for", arguing for their claim, and that -- one of those is the econometric evidence supports the claim, and then later they go on to use the econometric evidence to talk about quantum.

So I think it is essential that we form some view about how much the econometric evidence does bear on

the claims, and since the claims are different, I think it might be useful to look at each of the claims in turn.

So if you look at the principal claim, the primary claim, it is over a period which extends -- this is from paragraph 39 of the 4APOC {A/3/16}, which I referred to earlier, so it says:

"Over a period which extended from as early as 6 November 2002 and in any event from 6 July 2004 until at least as late as 30 March 2011 (hereinafter 'the Cartel Period'), a group of undertakings ..."

Etc. I do not need to read it all out. I guess my question is, if this claim is true, what would you -- what sign of it would you expect to see in the data? Then obviously we would look to see whether we found it.

But, Dr Majumdar, maybe you --

THE CHAIRMAN: Do you need to re-read paragraph 39 or have you got it in mind? It should come up on the screen.

DR MAJUMDAR: I don't have it in front of me. I think it's ...

THE CHAIRMAN: It should come up on the screen.

DR MAJUMDAR: Oh, yes, I do now, thank you.

THE CHAIRMAN: Could you just, both of you, just read it, sorry, to make sure there are no cross-purposes.

(Pause).

DR MAJUMDAR: Yes, sir. So -- so my understanding then is essentially there is an allegation that there is an overall cartel, that the Defendants then were charging higher prices to not just each one of the Claimants, but others as well, and that it's not 100% clear from this, but I presume that it applies to all of the products in the sense of it is airbags, seatbelts and steering wheels as well. In that scenario, then the way that one might look for that in the data would be, firstly -- and all of this is conditional, of course, on having a well-specified model, I don't -- I think I don't need to repeat myself on that, but this is a very important point -- in principle, with a well-specified model, one would look at a cartel effect over the period claimed by the claim, but because the claim is one that, as I understand, at least covers airbags, seatbelts and steering wheels, I would expect then to see a similar picture, so that the results from the airbags model, from the seatbelts model and the steering wheels model would tell us a similar -- a similar picture for exactly that same period in -- in line with the sort of claim of this sort of overall cartel, as I understand it, impacting all of the products. So I think that's how one would do it. One would look at a dummy variable

covering the period suggested here and a consistency of effect across all of the three products.

PROFESSOR NEUBERGER: So you would have a -- you would -- sorry -- take as given the model, as you say.

DR MAJUMDAR: Yes, sir.

PROFESSOR NEUBERGER: Fine. Then what you would look for, you would have a single dummy which would cover the entire period, even though the length of the period is somewhat ambiguous, and you would look for an overcharge in that period and treat all the rest of the data as clean?

DR MAJUMDAR: Yes, sir. I mean, absent information to tell me that I should be splitting the period up, absent factual information to tell me I should be splitting up the period in a certain way and understanding why I should be doing it, I think that is the implication of this -- of this claim, sir, yes.

PROFESSOR NEUBERGER: When you were talking about consistency between the estimates, do you mean consistency in the sense they all show a significant effect, or are you going further and saying they should be a similar size effect?

DR MAJUMDAR: I would not necessarily expect them all to be a similar size effect. I think it's -- it's possible, certainly theoretically possible, to have different

cartel effects on different products, so I wouldn't necessarily expect the same size. However, if the claim is that there's a consistent period of collusion throughout the early period and the main period, then I would expect there would be effects consistently found, yes. That seems to be the implication of the claim here.

PROFESSOR NEUBERGER: You mean --

DR MAJUMDAR: In terms of finding consistently an early period effect, a main period effect, when we look at airbags, ditto for seatbelts, ditto for steering wheels. Apologies if I wasn't clear, but that's what I meant, yeah.

PROFESSOR NEUBERGER: Mr Hughes, I realise you have produced a model for a variety of purposes, including working out the overcharge and so on, quantum and so on, but if you were specifically addressing the question of the -- of whether this claim is supported by the data, what would you do?

MR HUGHES: I think the first thing to say is the claim is not my report --

PROFESSOR NEUBERGER: Understood.

MR HUGHES: -- in the sense that I don't think it's my task to support the claim, it's my task to -- given my duties to the Tribunal --

PROFESSOR NEUBERGER: Sure.

MR HUGHES: -- to test what I've got there.

So the basis of the claim, as I understand it, is that there's evidence of collusion that goes back to November 2002. So that's -- that's the basis of the claim, and how I've approached that issue for the purpose of testing whether that's the case or not is I've looked for -- it was an exercise of my judgment, I've looked at the documents which vary by product category and said, well, what's the earliest date that it seems reasonable to test for from those documents, and then I've taken those dates to define an early period and then I've got the main dates from the -- the Occupant Safety System 1 cartel decision. So I'm looking at these -- I'm looking at these, and I look at this at the level of individual product categories, although this is expressed as a single claim. So -- so how -- so, again, taking -- I am going to repeat Dr Majumdar's point, assuming the model is correctly specified, then what I have found is I have found early period effects for two of the three product categories, but not seatbelts. That -- so I don't find an overcharge going back as far in time as -- for seatbelts as I find for the others, but I do find during the main period of the Occupancy Safety Systems 1 cartel dates,

I do find statistically significant overcharge.

I don't find a cartel -- find that the harm continues right to the end of the cartel period, I actually find a wind down effect.

PROFESSOR NEUBERGER: I understood all you found, but what I am wondering about is, if I look at the claim, the principal -- the primary claim, there does not seem to be anything in it -- I may be wrong -- that would distinguish an early period from a late period. As far as I understand the Claimants' argument, there was a cartel, there was evidence from the Commission, which is the Commission findings, there is some other evidence that there was stuff earlier. There does not seem to be anything in it for wanting to separate an early period from a late period for the primary claim.

I am not sure why, in trying to see whether the evidence supports the primary claim, it is obvious that one should separate the period into two.

MR HUGHES: I think the -- the evidence that we have is of different natures, in the sense that we have a clear adverse finding from the European Commission as regards Occupancy Safety Systems 1, which gives you a clear set of dates, but the evidence that we have for the other periods is more tangential. There is documentary evidence, but there's uncertainty around those dates.

1 And I think -- I think the -- to presume that
2 the effects are the same and constant over two periods
3 of time would not be -- would not be a prudent
4 assumption and not one that I think would be consistent
5 with the data, given that I find early period effects
6 for two of the three categories, but not with seatbelts.
7 PROFESSOR NEUBERGER: Do you have anything to add,
8 Dr Majumdar?
9 DR MAJUMDAR: Thank you, sir.
10 I mean, only that, if the evidence is more
11 tangential in the early period, that may be something
12 that we'll come on to when we talk about the magnitude
13 of the effects, but I understand that this is a later
14 part of the conversation, sir, or I'm happy to make my
15 point now. I mean, in essence, I'm saying that I might
16 not expect a high -- a higher effect during the early
17 period than in the main period when we have the OSS
18 cartels in operation, sir.
19 PROFESSOR NEUBERGER: Let me get on then to the secondary
20 claim, which is at paragraph 43 {A/3/25}, I think.
21 Again, just read it to yourselves.
22 DR MAJUMDAR: Sorry, paragraph?
23 PROFESSOR NEUBERGER: 43.
24 DR MAJUMDAR: Thank you, sir.
25 (Pause)

PROFESSOR NEUBERGER: So my question -- I will ask Dr Majumdar to lead then this time -- is: would you expect the empirical -- the dataset you have got to be differently affected by the secondary claim than the primary claim? Is there some distinct test we should do, or is it the same test?

DR MAJUMDAR: I think the -- if I understand this correctly, it's essentially saying that the same Defendants would still be involved in cartel activity with respect to the Claimants, other -- except, rather than one single cartel, as I read this, it says there's a collection of them essentially with the same effect -- well, it doesn't mention effect, so let me withdraw that comment, but essentially it's -- if I understand correctly, it's saying there's the same coverage but just achieved not with a single cartel but with a collection of cartels.

Given the data we have, which is PSA purchase data, and given the assumption that both Defendants were in -- in the cartel, it's not obvious to me that we would do something different, because there's no information here on the cartels or the cartel periods, it just seems to be a sort of general claim that there were a whole bunch of cartels, in essence -- and the words don't say it here, but in essence having a similar coverage of -- as in the first claim. So I sort of see this as a --

PROFESSOR NEUBERGER: Empirically indistinguishable?
DR MAJUMDAR: With the data we have, I think -- I think so.
PROFESSOR NEUBERGER: Fine.
Mr Hughes, do you --
MR HUGHES: Yes, sir.
PROFESSOR NEUBERGER: You agree that it's empirically indistinguishable.
Mr Hughes, what about 3, which is the second alternative claim, which is at paragraph 44 {A/3/25}? It may be worth reading out:
"In the further alternative, even if there was no cartel concerning supplies of OSS to PSA, FCA or Vauxhall/Opel, the effect of the cartels established in the Commission Decisions (and the findings of the other regulators pleaded above, so far as relevant) would have been to increase the prices charged by the cartelists of supplies to OEMs other than those which were the targets of those particular cartels, by tending to lessen the degree of competition in the market in general and thereby to increase prices in the market."
How would one test for that? What would one expect to see in the data, if that was true, Mr Hughes?
MR HUGHES: I think this third alternative is envisaging that, because of the collusion relating to -- as found in OSS 1 and OSS 2, and potentially for earlier

arrangements involving other -- other named OEMs, earlier, if there's involvement there, then there -- there was basically two things going on, which was there was an incumbency principle, where you were -- a form of customer allocation, and I think the contention that's being advanced here is that if you agree an incumbency principle in relation to some customers, that may well reinforce tacitly the incumbency principle in relation to other customers. So that's the first point.

And secondly, if you achieve high prices for certain customers, that may manifest -- i.e. targeted OEMs, that may manifest itself also in reducing competitive uncertainty in relation to non-targeted customers. So I think the effect would be similar, in terms of what you're looking for, in the sense you would expect to see higher -- if this effect -- if this theory of harm holds up, you would expect to see higher prices and of a similar methodology or approach that -- that I've adopted in Hughes 1.

PROFESSOR NEUBERGER: So the empirical implications, the reflection in our dataset of the third claim would be pretty similar to what you would expect to observe under the first and second?

MR HUGHES: The nature of the cause -- yes, sir, but the nature of the cause of that effect would be

different, namely --

PROFESSOR NEUBERGER: Sure.

MR HUGHES: -- the causal mechanism is different.

PROFESSOR NEUBERGER: Yes.

MR HUGHES: The principle by which they -- the Defendants might have charged higher prices, which would then need to be tested for, would be a similar -- would be a similar methodology.

PROFESSOR NEUBERGER: But, essentially, the process which I go through in interrogating the data to say, "Does it support claim 1 or claim 2 or claim 3", you are saying that process is the same; is that right?

MR HUGHES: Yes.

PROFESSOR NEUBERGER: Yes.

Dr Majumdar?

DR MAJUMDAR: So I take a different view on this point. To my mind, I think one can be a little bit more subtle with the empirical tests. So, this is the spillover mechanism, the idea that coordination with respect to non-Claimants somehow affected prices to Claimants, and in that world, I think one can ask the question: should we look at a period that is just OSS 2, because at that time the European Commission found both parties to be involved in an infringement with respect to certain non-Claimants? So if there was a spillover effect,

since both parties were involved, perhaps that is the obvious time to identify one. So I think I would want to have a look at -- to see if there's an OSS 2 effect.

I would also then want to extend that to see if there is an effect for OSS 1 and 2, i.e. where either Autoliv, or Autoliv and ZF/TRW were involved in an OSS infringement found by the European Commission, because even though there might be less of a spillover effect when only Autoliv was involved, one might at least test for that.

So I think there are different empirical tests that one can -- can look at to assess this particular theory of harm, not least if the evidence of collusion is more tangential in the so-called early period, because I think it's important to remember that a spillover effect can only arise if there is some pre-existing collusion, effective pre-existing collusion with respect to a group of non-claimant OEMs. If that doesn't exist, there's nothing that can spill over, and because there hasn't been a finding by the European Commission in respect of collusion to non-OEMs outside OSS 1 and OSS 2, then I think one can rightly be open to the possibility that there are no spillover effects arising in the early period, which

points to my proposed test, which would be focusing on the OSS 1 period and the OSS 1 period plus the part of -- sorry, the OSS 2 period plus OSS 2 -- plus the part of OSS 1 when Autoliv was involved. So I do think that this particular theory of harm points us to different -- different empirical tests.

The other point that I would make, which we may come back to, and if so, then I won't elaborate on it in great detail, is that I would -- I would expect that a spillover effect would be substantially smaller than an effect that comes out of explicit collusion. So another, if you like, empirical test is, we can look at the magnitude of the coefficients and think: is this plausible from a spillover effect? Should I explain that --

PROFESSOR NEUBERGER: Yes, please.

DR MAJUMDAR: So -- okay, thank you, sir.

So my thinking is -- is as follows. The spillover mechanism is, first, we have an existing cartel with respect to non-Claimants. So let's take OSS 1 and OSS 2, for example. Now, the European Commission said that this was sometimes effective, sometimes not effective, so we know there was an infringement, but the Commission itself states that, for OSS 2, there were many times that that was not successful. So point

number one is, first of all, you need an overcharge in respect of the named customers -- the named OEMs in OSS 1. So that's the first point: there needs to be an overcharge and sometimes there wasn't. That's what the Commission says.

Then that overcharge needs to spill over such that the Defendants alter their pricing behaviour. So there's a matched part. So if there's benchmarking, for example, then, let's say -- let's talk about Autoliv, just for -- so I don't refer to the Defendants, just hypothetically. So Autoliv would have set a higher price to a non-claimant, and then for some reason there's some benchmarking and that influences the Autoliv price to what I'm going to call "a matched part", i.e. a similar part that is supplied to a claimant. That's the benchmarking theory of harm. Now, there's -- so that's the sort of second hurdle that needs to be jumped over.

The third hurdle then is that -- how -- how well do these parts match. Maybe the parts --

PROFESSOR NEUBERGER: Sorry, can I cut short a bit --

DR MAJUMDAR: Yes.

PROFESSOR NEUBERGER: -- because I do not want to get too much into the non-econometric. I can see your --

DR MAJUMDAR: Can I finish my point then, sir?

PROFESSOR NEUBERGER: Yes, please.

DR MAJUMDAR: Thank you. In that case, I'll keep it very short, and I would, at some point, be grateful if I could just go through the various hurdles at some point, because I do think it's important.

So essentially what I'm saying, there's many hurdles to jump over. Because of that, I would expect this to occur infrequently, and moreover, because it's not explicit collusion targeted on the Claimants, I would expect the effects to be smaller. So we have the combination of something I expect not to occur very often and when it does occur not to have a big effect, therefore I wouldn't expect to be seeing a material overcharge from this -- this particular claim.

PROFESSOR NEUBERGER: Fine.

I accept -- I understand your view, which you expand on in your report anyway. If there is some overcharge, what would be the pattern of it and how would one test for it? I can see that you do not really believe in it, or you believe it would be quite weak and you might never find it, so it might be there and you would not find it, but how would you test whether it is there at all?

DR MAJUMDAR: Yes, sir. So I think I would test for it using the -- the same approach in the sense that we

would still use the cartel dummy approach, but I would test for, firstly, an OSS -- what I call "OSS main period 2", i.e. a dummy variable that only captures the period in time when both Defendants were part of OSS 2, and the thinking behind that is, if both parties are coordinating with respect to named OEMs, that -- and the Commission has said that that's what they're doing, that seems to be the most obvious time to consider the spillover effect to be likely. So I would consider that period, and then I would also run a separate regression, so run a separate test where I expand that period to be not just OSS 2 but also the Autoliv part of OSS 1, the point there being: well, if Autoliv was involved in a cartel, then maybe something spills over. So those are the periods that I would test. So that's different from the discussion that we had about the first two claims.

PROFESSOR NEUBERGER: Mr Hughes, what are your views?

MR HUGHES: So one of the differences between this third element is -- is that it assumes that the cartel's established in the Commission decision, so -- and I think the -- I would see this as a question. You've got three alternative hypotheses or claims, and whether there are early period -- you wouldn't expect to find early period effects in the -- in the third permutation

of those, in the third permutation, so there is -- so I agree with Dr Majumdar, there would be a difference there quite simply because it refers to the effects of the cartel in -- in -- the effects of the Commission's decisions. So -- and if you do observe early period effects, there's sort of two possibilities.

The first possibility is that one of the other theories of harm might apply, i.e. there was a cartel of a broader scope or broader nature that was leading to higher prices. Or, alternatively, there's some -- some feature of my model that doesn't capture the -- doesn't properly capture what's going on with prices and controls of prices, but I do -- you do observe, nonetheless, that prices are higher in the earlier period, and so I think -- I think the early period is -- is a feature -- would still be a feature of these models, but how you would think about them and interpret them would be a bit different.

Very briefly, if -- if -- if you don't mind, just to comment on Dr Majumdar's other points. In essence what he was saying was: well, you would need to have a cartel over here (indicates) involving the named OEMs and that would need to have had some effects, okay? But Dr Majumdar hasn't looked at all at whether there was any effect in relation to the named cartelists, so

I can't make any inferences or assumptions about that.

PROFESSOR NEUBERGER: I mean, I wanted to steer clear of views about all the other evidence that has been presented in this case about the -- which go to support or undermine the claims and wanted to focus -- because I understand you end up assessing all that data and coming to different points, but I am just wanting -- I think it is really important that we try to understand whether the empirical evidence you have -- sorry, the econometric evidence you have worked so hard to compile actually shifts views to the left or to the right, and it may be that, as experts used to judging econometric evidence, even if you disagree about where you start from, you both agree about how much you shift in the light of the evidence. That was my hope.

I think, at that stage, I would like to turn to -- I guess it is, finally, to question 35 of the joint memorandum, which is to do with adding the wind-down period to the main period, and so we are looking at -- I think it is -- is the most helpful thing to look at Dr Majumdar's report, pages 49 to 50 is the reference I have got for myself? Sorry, that is {E1/6/49-50}. I hope that is right. Yes, "Sensitivity ... to the Wind-down effect" {E1/6/49}. So, yes, if you could re-read that and then look at the table 10, which is on

the following page {E1/6/50}.

(Pause).

Are you happy about that?

Maybe I should ask Dr Majumdar to explain exactly what he has done in this.

DR MAJUMDAR: Yes, sir. So, as you rightly mentioned earlier on, Mr Hughes' wind-down dummy covers the period of time from March 2010 to March 2011, there or thereabouts, and Mr Hughes includes that because he presents evidence that there were dawn raids around about that time, and so Mr Hughes' hypothesis is, because of the existence of dawn raids at that time, even though this is within the infringement period identified by the European Commission, the nature of dawn raids becoming public could mean that any coordination, any collusion that there was would have stopped or wound down. So what Mr Hughes does is presents a factual basis for distinguishing between the wind-down period and the rest of the infringement period as defined by the European Commission, which I think is a reasonable approach, to be clear, because a factual basis has been given and an ex-ante expectation has been given for which -- for the likely effect.

I -- I make the point that that relates to -- that

relates to the OEMs affected by the OSS 1 and 2 decision. I say that, in principle, that's a valid point, but at the same time, if the concern is spillover effects, how do we know that they stop immediately, for example? We should be open to the idea that they might not. If the Tribunal, for example, were to find evidence of infringing behaviour within this period between March '10 and March 2011, then the Tribunal might think, "Oh, perhaps the wind-down period is not -- is not quite so relevant". So it was being open to the possibility that the wind-down effect might not arise and therefore presenting a sensitivity on that basis. And I should add, for example, when Mr Hughes presents his wind-down dummy for steering wheels, that -- in fact, I think we talked through it earlier when we were helpfully going through Mr Hughes' report, that was statistically significant only at the 10% level, which is -- we can debate this, but the convention, one normally looks at 5%, and so arguably that was not statistically significant, or at least a reason to have a look to see how things change if one drops the wind-down dummy.

So this is simply presenting this information for the Tribunal's awareness that the results are not robust to -- removing the effect of the wind -- of

the wind-down period. It's no more, no less.

PROFESSOR NEUBERGER: Mr Hughes, I obviously want you to reply, but can you just first confirm whether the -- sorry, let me put it this way. As I understand Dr Majumdar's test, all he has done is remove the wind-down dummy from your equation and done nothing else to the model. Is that right, and do you accept that this is what happens, as a programming fact, as it were?

MR HUGHES: Yes. Yes, sir, all that Dr Majumdar has done is drop this dummy and I -- and I consider his result to be mathematically correct.

PROFESSOR NEUBERGER: Fine. So where did you respond? I mean, clearly the numbers are rather different on the second row from the first row, and I was just -- you do not feel this is a good sensitivity test?

MR HUGHES: No, I think the entire purpose of the -- one of your earlier questions is: what are we trying to do here? What we're trying to do is we're trying to compare dirty prices and clean prices, and if I believe that prices may have fallen -- and I think there -- and there's a mixture of things, both the dawn raids that Dr Majumdar referred to, but also the number -- the participation of the cartelists fell away over time, and if you combine those facts together, I think it was

sensible to test where the prices were lower during the cartel -- or during this period of time, and I do find that they were lower and I find that -- and to assume that they weren't lower is effectively mixing together clean and dirty prices again, which will compromise your ability to find an overcharge.

PROFESSOR NEUBERGER: Can I just try and pursue a little bit more what happens if you put your two models together. Let us stick with steering wheels. I think, broadly speaking, as we went through the regression, the -- in Mr Hughes' regression, the net effect of the overcharge on steering wheels in the wind-down period is approximately zero. So if I interpret Mr Hughes' results correctly, he is saying there is a 25% overcharge in the main period excluding the wind-down period, so something like four years, I think, or so, four years of 25% and then one year of zero, and then Dr Majumdar's evidence is that over the five years, or whatever is the precise number, there is an average overcharge of 6% -- no, 5.76. How should I reconcile those two results?

MR HUGHES: Sir, one of the -- sir, one of the answers -- one of the points we discussed earlier this morning was, when you do the averaging, it's also affected by the number of data points, so -- so some periods will

have more data points in them and they'll be given more weight, and some periods will have less data points and will be given less weight, and also the model as a whole includes all the variables in the model, so changing the specification may well have a wider effect than you would expect.

But my central point is mixing together clean and dirty prices is just a bad idea, and if you have reasons for believing that prices fell towards the end of the cartel period, then it's sensible, if the econometrics suggests there was such an effect, to have a specification that adopts that. And all that Dr Majumdar has found is that prices indeed did fall, otherwise you wouldn't get his results, but you wouldn't find the average of nothing.

THE CHAIRMAN: Can I just ask a more basic question?

So there was the date on which the dawn raids took place, which may have alerted various parties to the issue, but you have -- how does the -- how does this tell? So you have got a -- and I appreciate we are going to go on to discuss it, but let's take the 30-month figure. You have got an RFQ which is negotiated during the cartel period, you have then got 30 months before the start of production, let's say, and then you have got an item in production perhaps for

a number of years after that. Can you just explain how that timescale is dealt with when it comes to your analysis of the wind-down period?

MR HUGHES: So across the entire model, where we have known RFQ dates, we use those, but those inherently link back. So what -- what I have are start of production prices and then I have a known RFQ date, so I shift those data points to the period of time where I think contractual prices will conclude, and if the contractual prices concluded in the wind-down period, they -- they will have a dummy -- an incremental dummy variable applied to them.

THE CHAIRMAN: Is that your understanding?

DR MAJUMDAR: Yes, sir.

PROFESSOR NEUBERGER: So just following up on that, I understand your point about dilution, but it still does not seem to account -- sorry, you said the comparison between the whole main period dummy, and separately doing the last year and the remainder of the dummy, that that could partly be accounted for by differences in volume. Is that in fact the case, do you know? Is it easy to confirm? Because there would have to be quite a lot more volume per year in the wind-down period for that to be an adequate explanation.

MR HUGHES: So it's not volume, it's -- it's number of

observations. So it's the number of observations rather than the weight given to those things. But, inherently, what ordinary squares, the technique we're using does is it just produces an answer. So -- so it -- and -- so there's a mathematical algorithm that produces the answer that you've got there. So I don't think you can look at this just from a plausibility perspective, or weight of observations. What -- what the econometrics model is telling you is that it's, quite simply, if you change the specification, you get different results. It doesn't tell you why you get different results, you just get different results.

PROFESSOR NEUBERGER: But I see that you are getting a change in answer from a change in the specification. I think what is at issue is whether it is a reasonable change in the specification which should be a valid sensitivity test, or whether it is an obviously poor -- whether it is a poor change in specification -- a poor specification, in which case, getting a lousy answer from a poor specification does not tell you very much.

MR HUGHES: Sir, I agree with you entirely. If you know that prices were lower in a particular period of time, because that's -- because that's what the econometrics are suggesting, then assuming that they weren't lower in that period of time would be a specification error. So

I would agree with you strongly.

PROFESSOR NEUBERGER: If the lower prices are detected at a level which is not statistically significant, would that still hold?

MR HUGHES: I think I'm going to make a couple of caveats. So I think my view would be, yes, I don't think the statistical significance test of 5% or 10% is a bright line test. I said earlier I don't -- I don't think any econometric results would substitute for thinking, by which I mean thinking critically, I don't mean in a favourable manner to me or Dr Majumdar, as the case may be. If you're observing that there's evidence that price is lower, even if it's at the 10% level and not at the 5% level, I think that's something you should take into account.

I think, also, when you're interpreting statistical significance tests, this is quite a short period of time of a year, and therefore the power of that test to find that prices are lower is relative -- this is an incremental dummy on top of the other; that power of that test would be relatively low. But if I have a reason for believing, from the data and from the econometrics, that there's -- the prices were lower in that period, that would be my preferred specification.

PROFESSOR NEUBERGER: I understand it is your preferred specification, but does it mean the alternative specification is not one we should take seriously?

MR HUGHES: Yes.

PROFESSOR NEUBERGER: Thank you.

DR MAJUMDAR: Well, naturally, I would dispute that. I mean, I don't want to repeat what I've already said, so maybe I'll just make two quick points.

Firstly, it seems to me entirely reasonable to consider this at the least for steering wheels, because convention would say that one would drop the wind-down dummy because it's statistically significant only at 10%, and -- and also not significant at all in the -- in the full sample, i.e. the one that does not exclude outliers. So that would be a reason for certainly looking at the steering wheel sensitivity.

I would also reiterate the circularity point here. So Mr -- so I do accept Mr Hughes' point that he has provided a factual reason for why one might expect lower prices, namely the dawn raid. So I accept that point. And Mr Hughes says, as a reason, because of that, I might expect lower prices, so he provides a factual reason but also tells you which way the prices would fall, so I accept that putting the wind-down dummy in is -- I have no -- no problem with why he's put it into his

regression.

However, it does proceed on the basis -- or certainly not taking any account of this sensitivity proceeds on the basis that the wind-down period is a -- is a clean period, and it goes back to my point, well, if we always say that lower prices are clean prices and higher prices are not clean prices, then we will find an overcharge, so that's why I think it -- because there is some uncertainty about this, I mean, would we expect any infringing behaviour to stop straight away? We might not. It might take some time to run off. If the spillover effect is one that's just sort of burnt into the memories of people, why would they suddenly stop? So I just think we should be open to thinking about this as an alternative way of viewing the data, sir.

PROFESSOR NEUBERGER: Thank you very much. I am going to come on, but I should think after lunch, to -- I was going to go backwards through the joint memorandum and I was going to consider questions 34 and 33 {E1/13/23} in that order, but I think we will do that after lunch.

THE CHAIRMAN: Yes. Please do not talk about the case over lunchtime, even with each other.

(12.58 pm)

(The short adjournment)

(2.00 pm)

PROFESSOR NEUBERGER: Welcome back.

I think what we were going to look at now was question 34 of the joint expert report and I think the right reference, which is about whether one should have a sensitivity of Dr Majumdar with a single dummy for the main period and the early period, and so that is {E1/6/46-48}. I hope. Right. I think it is probably easiest if we turn to table 9, wherever that is {E1/6/47}, which has the data. That is it.

Perhaps, Dr Majumdar, you could tell us what you have done here and then I will again ask Mr Hughes to confirm that he is happy that you have done what you have said you have done and that there is no dispute about what the numbers are, only about what the numbers mean.

DR MAJUMDAR: Yes, sir.

So table 9 considers a number of different ways of, firstly, defining the main period, and then, secondly, if we consider the early and main period together, how one defines the cartel dummy. So "OSS Main Period 1" is where we focus only on main period effects and we define the cartel dummy to be the period when OS -- both parties were in OSS 2 and Autoliv was in OSS 1, so that's when one or both parties were party to

a European Commission infringement. "OSS Main Period 2" is where only OSS 2 was going on, so both parties were party to OSS 2 but does not include the Autoliv period of OSS 1.

The third row is "MH1 Main Period", so that's the main period that Mr Hughes has presumed, so again, here, the cartel dummy is only in the main period, it's not in the early period, but this -- but here, the main period is defined as per Mr Hughes' approach.

The fourth row, "MH1 Early + MH1 Main ...", is where we adopt a cartel dummy for the early period and a separate cartel dummy for the main period, as Mr Hughes has done, but we apply it for airbags, seatbelts and steering wheels.

And then, finally, "MH1 combined periods" is where we assume a cartel effect across both the early period and the main period, but we restrict that to be a single cartel dummy, i.e. we don't have a separate one for the early period and a separate one for the main period.

What I reported here are the coefficients for the main period cartel dummy. There is another table in the bundle, if we need to look at the early period as -- as well, sir, if that would be helpful.

PROFESSOR NEUBERGER: Fine, we may turn to that.

I will want to concentrate, in the first place, on

what you have called your "MH1 combined periods".

DR MAJUMDAR: Yes, sir.

PROFESSOR NEUBERGER: But I just wanted to confirm first with Mr Hughes that it does what it says.

MR HUGHES: Yes, sir, it does.

PROFESSOR NEUBERGER: It does, fine. Excellent.

So can you go into more detail? I think we are not going to retain all those different combinations of dummies, so we will take it more slowly and focus on the "MH1 combined periods", the last line of that.

DR MAJUMDAR: Yes, sir, thank you.

So the thinking here is that -- well, actually, just to remind everybody what it is, so I'll take a step back. So this is where we proceed on the basis that there is an infringement both in the early period and the main period and we apply a single cartel dummy for the entirety of that period. So there is no separate dummy for early period, no separate dummy for main, there's a single dummy across the entire period.

Then what we see in the table are, firstly, for airbags, we see that the coefficient is 0.01, so that's approximately a 1.6% overcharge, however it is not statistically significant. Seatbelts, -0.0114, so approximately an -- well, there's an undercharge, essentially a zero effect, but it's not statistically

significant.

Then, finally, for steering wheels, we see 0.3, so that's approximately a 30% overcharge, which is statistically significant at the 1% level.

So that's what this row means.

Why did I consider it reasonable to consider a single period dummy? My thinking was as follows. I am open to the possibility of breaking cartel periods into different portions, however, before I would want to do that, I would need a good factual reason for doing so. I would need a basis for splitting it into early and main and I would need a prior expectation as to what I might see if I did that, and there is -- there has been no factual basis provided by -- by Mr Hughes in -- in his reports for why one would expect a high early period effect and a low main period effect, for example. If anything, I might expect the other, the reverse. So, essentially, all I'm doing is I'm saying, because at the moment -- or, sorry, not at the moment. Because I am unaware of a good reason to break the cartel period into two, I will simply see what happens if I apply a single cartel dummy, which is a standard effect -- a standard approach. We talked about that earlier on, sir. This is essentially -- what it should do is just give you an average cartel effect.

So what do we then see? Well, we see for airbags, if one does that, there's no overcharge; for seatbelts, if one does that, there's no overcharge; for steering wheels, if one does that, one finds a 30% overcharge. So there's a -- we've materially changed the findings from Mr Hughes' preferred model.

PROFESSOR NEUBERGER: Mr Hughes, please, and I am really interested in -- I think you are arguing not only that this is inferior, but it is a sensitivity which is not worth -- which should not be admitted as a serious sensitivity; is that right?

MR HUGHES: Yes, it is.

PROFESSOR NEUBERGER: Yes. Please.

MR HUGHES: So Dr Majumdar emphasised two points of his objection to having two separate dummies. One was that there was no factual basis for there being two separate dummies, and the second one is his prior expectation is that the early period effects will be smaller than the later period effects, okay? I think the whole context of this case is there's uncertainty about whether there are early period effects, and therefore it's appropriate to test whether there are such earlier period effects, and if I find them to be statistically significant, then I should include them in the model.

So if we take the seatbelts example. I don't find

any early period effects in my model, and if you add together lower prices in the prior, earlier period and the cartel period, I'm not surprised that adding together positive and negatives produce a number that's close to zero. So I think -- I think the first point is a factual point that I think it's appropriate to, if the model reveals that there are early period effects, you should include an early period dummy. I don't find them for seatbelts and I don't include it.

His second point is he has a prior expectation that the early period effects will be smaller than the later period effects. I don't have any such prior expectation; I'm asking the data to reveal what is the best estimate of the extent to which early period prices are higher than -- than the main period. I don't have any -- I don't have any reason for believing one particular form or period of collusion would lead to higher or lower prices.

PROFESSOR NEUBERGER: Dr Majumdar?

DR MAJUMDAR: Thank you, sir.

So a couple of points. Now, I will go back to a point I made before lunch on -- on circularity here, because, in essence, if we say I'm asking the data to reveal, what that -- it goes back to this point, if I don't see an early period effect, if I don't -- if

I see low prices in the early period, I will assume it's the clean period, therefore I will find a positive main period dummy, because, in essence, I'm allocating periods -- I'm allocating periods to clean or dirty based on whether I see low prices or high prices. So I am concerned with that approach. So that's the first point.

The second point, just to be clear, is I didn't say I would expect, I said, if anything, I would expect the early period effects to be smaller. Why? Well, because the European Commission did not find an infringement in the early period. So earlier on, before lunch, we had a discussion when we were talking about, for example, the third -- the third claim or the third version of the claim, for example, and we were saying that actually, under that scenario, we -- we wouldn't expect early period effects. So -- so what I'm saying is it's important, to my mind, for the Tribunal to be aware, if we proceed on the basis that there are early period and main period effects, and if we're not sure which way they should go, it seems to me perfectly reasonable to apply the standard approach, which is a single dummy which should give you the average effect. It's as straightforward as that. And it's interesting that what we see is that the -- the lack of robustness

1 when we do that. To my mind, that is a reason to
2 enquire further: what is that? Is that simply because
3 there's no airbags effect, is it because there is a huge
4 misspecification in the model that's given, it's a very
5 high early period dummy, for example? So it seems to me
6 a sensible piece of analysis to do and, to my mind at
7 least, it calls into question the reliability of
8 Mr Hughes' model.
9 PROFESSOR NEUBERGER: Can I focus on one point which
10 troubles me particularly. I mean, it seems to me there
11 is not a -- which is, again, the question of
12 consistency. If we look at airbags, there is reported
13 elsewhere -- and I think Dr Majumdar's pointed us to
14 another table which has the early period as well, but
15 I think it is from Mr Hughes' report, there is a 29%
16 effect in the early period on airbags in Mr Hughes'
17 report, and in the main period there is an 11% effect.
18 Then Dr Majumdar does a regression where he uses
19 a single dummy for the entire period and comes out with
20 a 2% effect, and it seems to me there is a worry these
21 numbers are very different, 29% early period, 11% main
22 period, taken together 2%. I am not sure how to
23 interpret this. It seems to produce an estimate of
24 overcharge which depends very much on how you divide up
25 the period. Is that wrong? Should I think about it

some other way?

MR HUGHES: So -- so one of the comments I -- I made earlier was how the econometrics works. Let's suppose we have just one cartel period at the moment, how the model works is you have a -- you have part fixed effects, and so you assume that a part is systematically more expensive or less expensive than average over time, and then -- and then, so long as you have a distribution of that part inside and outside the cartel period, you can identify whether that part in particular is more expensive in the cartel period. If you don't have observations split over time, you won't be able to identify it. So you need to have enough distribution of parts.

So one ancillary consequence of having separate time periods is where I have parts that are predominantly purchased during the early period and the main period, what the econometrics can do is work out the relative price -- the relative price differences between parts in the early and the main period, and then the model can then work out the early period and the main period effects in absolute terms.

PROFESSOR NEUBERGER: So I am just trying to follow through the consequences of that. Does that mean that the more dummies I put in, the more reliable the result, or

the less dummies I put in, the more reliable the result?

MR HUGHES: So what -- if you have in this particular case having more dummies, having two dummies --

PROFESSOR NEUBERGER: Yes.

MR HUGHES: -- enables the model to give you a relative difference where you've got observations between in the early and the main, it enables that data to still inform the overcharge assessment in the two periods. So in this particular instance, having those additional dummies in, gives you a statistical benefit in terms of you can work out the relative prices, because you can only identify -- you can only identify any effect on any cartel period if you have a distribution of prices over different periods of time.

PROFESSOR NEUBERGER: But if I thought that there was a distinction between -- within the main period, for example, between the period when both of the Defendants were in a cartel and the earlier part of the main period and introduced another dummy for that, would I get a still better estimate of the overcharges?

MR HUGHES: Conceivably, you might, if the effects were different. Conceivably, you might. I haven't done that specific analysis and nor has Dr Majumdar.

PROFESSOR NEUBERGER: But I am just worried that the conclusions I draw on the overcharge seem to be

quite sensitive to how I divide up periods when I have got no very strong grounds for dividing up the periods one way or another.

MR HUGHES: I think -- sir, I understand what you're saying, sir, but I think the question here is, we do have Commission decisions, Dr Majumdar's emphasised that we have Commission decisions, and we have less information in relation to the earlier period, there's less documentary -- less documentary material, and therefore it seems sensible to consider whether the results are different in that period of time and to allow for that.

PROFESSOR NEUBERGER: But --

THE CHAIRMAN: But -- sorry.

PROFESSOR NEUBERGER: Go on.

THE CHAIRMAN: So you are taking out the period of the Commission decision, but the Commission decision of course does not relate to these Claimants. So if we just say that our hypothesis is that there is cartel activity as against the Claimants from 2003 through to the end of whatever the end of the period is, in those circumstances, if that was the hypothesis you were testing, it would be appropriate to use a single period; is that right?

MR HUGHES: No, because I think what you want to -- going -- what you want to have is you want to have an assessment

of clean and dirty periods. So -- so what we have from the Commission's decision is we have collusion starting on certain dates in OSS 1, Autoliv then colluding in relation to OSS 1 at a later stage, and therefore you have an -- so the whole period of OSS 1 is subject to collusion and all that happens in -- at a later stage of OSS 1 is Autoliv joins that collusion. So the early period of time, before, as Dr Majumdar here, his OSS Main 1, is still a period where there is collusion going on, it just isn't affecting -- according to the Commission, at least, it just isn't affecting Autoliv.

THE CHAIRMAN: So what is the hypothesis for the early period that we are testing?

MR HUGHES: Sir, the hypothesis we are testing for the early period is, given that we have documentary evidence that's suggesting collusion involving the Defendants started earlier, it's sensible to have -- to test whether there's evidence that prices are higher during that early period.

THE CHAIRMAN: So the hypothesis is collusion during the early period?

MR HUGHES: Yes, sir.

THE CHAIRMAN: For the later period, the hypothesis is collusion for the later period?

MR HUGHES: Yes, sir.
THE CHAIRMAN: So why are they being -- it seems to be the same hypothesis. Why are they being treated separately?
MR HUGHES: It's the same -- sir, it's the same hypothesis, but I want to test whether that hypothesis is actually supported by the data or not, rather than concluding that it is, because it's possible that there was no early period effect, but I want the data to tell me that, I don't want to presume that that's the case.
THE CHAIRMAN: So in what circumstances would it be appropriate to look at a single period?
MR HUGHES: So I think it would -- so I think it would be appropriate to have a single period if you think the cartel effects were uniform over that whole period, and I don't think the cartel effects -- on the basis of the evidence that I've seen, I don't think the -- I don't think it's right to presume that the cartel effects are uniform over that period.
THE CHAIRMAN: Thank you. Thank you very much.
PROFESSOR NEUBERGER: Can I just understand on that last point. I would not have thought that it would be part of the hypothesis that cartel effects would be uniform anyway. Is that part of the hypothesis?
MR HUGHES: I think, in terms of being uniform, one -- one

of your comments earlier today, sir, was, "When I measure a cartel dummy, I'm working out the average effect", okay? So, yes, in that sense. But where you have distinct periods of time, which seems to be a feature of -- and I don't mean anything prejudicial by this, but seems to be a feature of these cartels or whatever words the lawyers want to use, it seems appropriate to test whether those effects are different over time and that's my point.

PROFESSOR NEUBERGER: One other technical problem. I mean, you mentioned the fact that part of the difference might come because there are some items -- I do not know what the right term is -- some articles which are only sold in one period and not in another period and they drop out of the comparison, and then when you introduce different periods, they then start to play a part. So part of the shift in numbers seems to be a question of putting a different amount of weight on different parts of the evidence, and what I am wondering, if that is what is happening, is whether that suggests that some of the differences we are seeing between different ways of doing it are simply to do with the way that choosing the dummy chooses which data to include and which not to include.

MR HUGHES: So I think the first part is what the method --

you're absolutely right, some of the difference of results, particularly in relation to airbags, not in relation to seatbelts and steering wheels, is much the same, or it's similar either way. But that's certainly the case in relation to airbags, is the model -- if you have a single dummy, then the model disregards some data points, or gives them very little weight all together, and those data points therefore no longer contribute to the calculation of the overcharge across the two periods, and therefore you're not making the most of the available data to inform your overcharge assessment, which is what I'm trying to do. But that -- that is -- that is a statistical quirk of the model rather than something I built in anyway; it's just how the data's distributed.

PROFESSOR NEUBERGER: No, no, I take the point. It's -- I guess it comes down to the following question: given the way the model puts more or less weight on different observations depending on where the dummies -- how the periods are defined, does it not make sense then to do a sensitivity analysis where you change the periods, as in the MH1 combined periods? Does that not make it precisely a sensible sensitivity?

MR HUGHES: I think, sir, the question then comes as to what the consequence of that sensitivity is. I have no

objection to any of, in principle, Dr Majumdar's sensitivities as things to explore. I think the question is, if the consequence of applying that sensitivity is you effectively disregard certain data points, then I think I would prefer a sensitivity that doesn't disregard data points, because I think data points should fundamentally be informing -- informing the results and conclusions I draw.

PROFESSOR NEUBERGER: I think this has been a bilateral conversation. I am sorry, Dr Majumdar.

DR MAJUMDAR: No, not at all, sir. I mean, I don't think -- I mean, a sensitivity test does not disregard observations. I think the point of a sensitivity test is understanding how robust a model is and whether one makes changes, so here, applying the combined period, which I had understood from our earlier discussion was the -- the way that one would test claim 1 and claim 2, and what we see is there is a material change in the coefficient for airbags and the coefficient for seatbelts. So -- so, to my mind, this is an entirely reasonable thing to do, and it's not about disregarding data, it's about sort of weighing in the round the various pieces of evidence. So I'm not saying that one completely throws Mr Hughes' model in -- in the bin, I'm simply saying that one has to view the results from

that model in line with all of the sensitivity tests and then come to a view as to where one thinks the overcharge should be given a pre-assumed fact pattern. So if we -- we can presume an early period and a main period effect, we can look at certain regressions and say, if I proceed on that basis, I'll look at these regressions, or we can just look at a main period effect and say, if I proceed on this basis, I'll look at these ones and take a view.

PROFESSOR NEUBERGER: Mr Hughes?

MR HUGHES: I think I have said all I wanted to say unless you have a follow-up question.

THE CHAIRMAN: So in looking at different periods, I mean, within the middle of the main period, we have one of the most profound economic effects or impacts that we know in living memory at least with the 2008 financial crisis, and one might think it a reasonable hypothesis that that would impact the market, whether it ends up neutral or not, it would no doubt impact negotiations, potentially less demand for motor vehicles, the stresses of having to keep people employed and so forth, and neither of you seem to have said, "Well, I'm going to try and isolate 2008".

Asking you first, Dr Majumdar, in all your sensitivities, interestingly, that is not one, unless

I am misunderstanding, that you have used. Can I ask you, why is that?

DR MAJUMDAR: Yes, sir. No, it's an excellent question.

So this ultimately comes to -- comes down to how one models demand. So, as you rightly say, the financial crisis was in essence a huge demand shock, so I do discuss modelling demand and one can look at it.

I think demand is very complex, and I would think that we need at least two demand controls. So one would be an aggregate demand control, which potentially could pick up the drop in activity. So if you look at GDP or registrations, that -- that would pick up the overall sort of higher level --

THE CHAIRMAN: Dr Majumdar, sorry, I do not mean to interrupt. That is not actually what I meant.

DR MAJUMDAR: Right.

THE CHAIRMAN: You could deal with this by just saying, "I'm going to look at the main period or, if you prefer, the early and the main period prior to 2008", and look at that, and then you can test 2008 through to 2012 or whatever and compare them both to a clean period out in the ...

DR MAJUMDAR: I see. Apologies, I misunderstood your question.

Okay, so we would -- so the question is, if we drop

articles which have an RFQ date within the financial crisis period, just in essence, just say, look, that was just special --

THE CHAIRMAN: Or analyse them separately, yes.

DR MAJUMDAR: Yes, one could do that. I fear that one would -- I fear there are two issues. One is that one would lose data.

THE CHAIRMAN: You would lose data points.

DR MAJUMDAR: And we're already -- in terms of actual numbers of new contracts, we're already down in a small sample, so although we have many data points, because a lot of the data points are linked to the original contract, in terms of, if you like, independent contracts we actually have relatively few, so that would -- I think there would be an issue there of actually losing an important number of data points.

There would also be a technical issue, which I suspect I won't be able to solve thinking on my feet right now, which is that when Mr Hughes, in his model, models how prices change over time, if we drop that period, we're actually -- so, if you remember, Mr Hughes explained we have a price at the contract and we have a price amendment and we'd actually sort of slice out part of that, which could create some technical problems, which I must confess, I would need to think

about, but I -- not a fantastic answer to your question, sir, but I think it would be actually quite difficult to do in a -- in a -- well, in a sensible way, sir.

THE CHAIRMAN: Mr Hughes, did you have any comment on that?

MR HUGHES: I think Dr Majumdar's correct in the sense that we have to be careful in these sorts of models, where we have a relatively small number of contracts, in dropping data points, which is why I think it's important to look at prices over time. So I think -- I think that's a fair observation.

I think it's quite hard to capture the effect of the global financial crisis in -- in sort of models with a relatively small number of variables. This is not a -- this is not a simple thing to capture, so I think it's difficult to capture.

I think you could -- but I think what I would say is that this might suggest that when I find -- if one were to find prices were higher over the cartel period -- the main cartel period and that were to include the financial crisis, there may be some risks that the cartel variable, picking up Dr Majumdar's point earlier, if you add the financial crisis depressed prices, then there must be some risk that I -- the fact that that hasn't been captured and that occurs during the cartel period may have depressed the assessment of

cartel overcharge that I find in that period. But that's not something I've specifically modelled.

THE CHAIRMAN: Dr Majumdar?

DR MAJUMDAR: Thank you, sir. I think one needs to be careful with that argument. So this was my second point about demand and why we need at least two demand controls, which is that we know that when an article, there's a new contract, there are production costs -- new production costs associated with creating that article. I understand that where those -- well, those production costs, if they are going to be recouped over expected volumes, then during a period of the financial crisis, expected volumes will shrink and therefore, all else being equal, production costs would be spread over fewer volumes which would increase price. So while Mr Hughes presents an argument for why you might expect prices to fall, equally there's one why you might expect them to rise.

So I don't think that we can infer a direction of bias on -- on that basis. So I do discuss that point in my report, although I don't solve it because we do not have the granular demand control, demand sort of expectation data that we would need to put that into the regression, sir.

THE CHAIRMAN: Thank you.

PROFESSOR NEUBERGER: Thank you.

Can we go then to "OSS Main Period 1" and "OSS Main Period 2", which are at the top of the table. If you could explain, Dr Majumdar, what exactly you are doing here. For example, do you have a wind-down period dummy and so on. How have you done it?

DR MAJUMDAR: So I do have a wind-down dummy, so I've retained that aspect of Mr Hughes' model. What I sought to do was to try to retain as much as I could of Mr Hughes' model and then just make one change. So the wind-down dummy is retained and for "OSS Main Period 1" there is no early period effect, there is only a main period effect, but the main period is defined to be OSS 2 plus the Autoliv part of OSS 1. In fact, I can probably find a diagram. Would it be helpful or is that sufficient?

PROFESSOR NEUBERGER: I think I am clear about it.

DR MAJUMDAR: Okay, very good.

PROFESSOR NEUBERGER: It is a period where at least one of the Defendants was in a cartel.

DR MAJUMDAR: Exactly right, sir, yes.

PROFESSOR NEUBERGER: Yes.

DR MAJUMDAR: Yes.

Then "OSS Main Period 2" is just the period when both Defendants were in the cartel, sir.

PROFESSOR NEUBERGER: So the implication of that, using the "clean" and "dirty" language, is that before they were in a cartel is clean, and then during the cartel is dirty, and after the cartel is clean and the wind-down period is left to be determined by the model?

DR MAJUMDAR: That's exactly right, sir.

PROFESSOR NEUBERGER: Thank you.

So now tell us what conclusions we are being asked to draw from this.

DR MAJUMDAR: Yes, sir. So, here, again, I go back to my point, I'm trying to provide the Tribunal with useful information depending on the fact pattern it comes up with. So if the Tribunal were to take the view that early period effects were unlikely but the Tribunal were to take the view that there might be something going on in the main period, then what this allows the Tribunal to do is to ask the question: well, let's suppose the Tribunal was concerned that effects, if they arose, would only be during OSS 2, for example, because there was a spillover effect that was most likely to occur then, if it occurred at all. Then you could use this information to assess -- or it's a starting point, because there are uncertainties and robustness checks and all the rest of it, as a starting point for where the overcharge might be.

Alternatively, if the Tribunal's view were that's a bit too narrow, I think it makes sense to look at OSS Main Period 2 plus the Autoliv component, then this gives you information, again, with the starting point for where overcharge might be, which you would then want to robustness check against RFQ dates and other various tests. But that's the idea. It's showing what happens, as you said, sir, by treating the clean period to be clean beforehand, so no early period effect, and then clean afterwards as well, sir.

PROFESSOR NEUBERGER: Before I let Mr Hughes come in, I just want to clarify one point then. We are discussing this under the general heading of sensitivity --

DR MAJUMDAR: Yes.

PROFESSOR NEUBERGER: -- but as I understand what you are saying, it is not an alternative estimate, it is not an answer to the same question as we were asking before, it is an answer to a different question. It is not asking the question of how much the overcharge was in the whole suspected infringement period, it is asking a question which is how much the overcharge was to the -- in the PSA database in a different period.

DR MAJUMDAR: That's exactly right. It proceeds on a different basis, sir, that's exactly right.

PROFESSOR NEUBERGER: So it is not really a sensitivity test

and there is no particular reason why I should expect the numbers here to be the same as the numbers that Mr Hughes comes out with?

DR MAJUMDAR: I think that's -- I think that's -- I think that's fair to say. It's -- it's not -- you're right, it's not a sensitivity test in -- in that sense, it's more presenting the Tribunal with additional information. However, given the amount of uncertainty that there is, it may be that if you saw systematically you always found the same outcome irrespective of the presumed fact pattern, you might feel more confident. So in that sense it is, but I do take your point, sir.

THE CHAIRMAN: Can I just clarify this. So when you have picked the earlier period as being "clean", why is that forming part of the hypothesis? Is the better hypothesis, even on this model, not that we have a hypothesis as to having a clean period after 2013, that is a reasonable hypothesis, we have a clean period then, but for the early period we have no -- we just have no information one way or the other as to whether or not that is a clean period, and then why include it as a clean period? Do you have any comment on that?

DR MAJUMDAR: Sir, my -- yes, sir. So my comment would be that because the European Commission found no

infringement during that period, then I would not -- I think that's a reasonable starting point for saying, well, in that case, one should be open to there being no -- no cartel effects. So -- so one should be open to there being no -- that being a reasonable clean period simply because no collusion was found with respect to non-Claimants or the Claimants by the European Commission. So that seems to me a reasonable starting point. All the more so if the theory of harm is a spillover theory of harm, because of course in that scenario you need there to be some sort of collusion that spills over to the Claimants. So I can see -- is that clear, sir?

THE CHAIRMAN: I understand your answer, yes.

DR MAJUMDAR: Very good.

THE CHAIRMAN: Mr Hughes? Sorry, we have not heard from you for a little while on this.

MR HUGHES: I think, from my perspective, the exam question I'm trying to ask, without any presumption there's either a main period effect or an early period effect, I am just trying to get the data to tell me does -- are there -- are there statistically significant periods of overinflation in those period, yes or no. If I don't find an early period effect, I don't think it should be part of any damages claim and that's what the situation

is, the seatbelts. So I think -- I think the whole purpose of this is to let the data do the talking and choose whether there is an early period or a main period on the basis of what the data tells us. I'm uncomfortable, whether it -- whatever language you want to use, I'm uncomfortable with a modelling assumption that both includes the assumption that there's no earlier period, but also there's no -- there's no effect on prices prior to Autoliv's participation, and the cartel involving, bearing in mind we do have a Commission decision saying there was collusion involving other parties even if Autoliv wasn't involved.

PROFESSOR NEUBERGER: Can I put the question another way. Supposing one specialises the Claimants' indirect effects claim, and I fully realise that it is narrower than the claim they actually make, to say that they were affected by the fact that their suppliers, the Defendants, were actually in a cartel shown by the Commission, they make -- the only cartel that they -- that is part of their case is the cartels as found by the Commission. If that is the restriction, and then I say is there evidence in the data that they were adversely affected, their prices were higher, because of that, is this the sort of test you would do, or would you do something different?

MR HUGHES: I think the problem with this test is it assumes what it's supposed to be finding out, and in particular it assumes that the early period, or the prior period, was completely unaffected, and then it says, if you make that assumption, did-- did the Defendants -- were prices higher during that narrower period? So I think -- I think I have a conceptual question about whether that's the right thing to do. So that's my first point. So I think it's the wrong thing to do, let me be blunter.

The second thing to do, in terms of capturing this effect, all I can observe is I can observe whether Autoliv's prices are higher. I can't -- I can't disentangle little sub-periods of this, I think that's very difficult to do with very -- as Dr Majumdar's has rightly emphasised, there's a relatively small number of data points. But I certainly think -- I certainly think it would be problematic to assume that the early period and prior to Autoliv's involvement in the cartel was competitively neutral and prices were normal then.

PROFESSOR NEUBERGER: So just to follow on, if I was -- I am trying to test a claim against the data and you are saying that the best -- that claim, the best way of doing that is to run a regression model with a prior -- a before, during and after dummy, as it were, and

obviously one dummy is redundant, but ... and then what I am not entirely clear of, once you do that, if you are trying to see whether there is evidence of an overcharge during that effect -- during -- from that analysis, what would you be looking for which would support the claim that the prices are higher in the cartel period and that they -- higher than in the after period or in the before period? What would one be looking for?

MR HUGHES: If I answer and then make sure that I'm properly answering the question, sir.

PROFESSOR NEUBERGER: Yes, surely.

MR HUGHES: So my understanding of your question, sir, is -- is, for OSS 1, we know that Autoliv joined that cartel later in the process. So my understanding of your question -- and correct me if I'm not understanding correctly -- is, do you want to work out the extent to which prices were higher after they joined the OSS 1 --

PROFESSOR NEUBERGER: No, I guess -- I guess there are complexities about which -- because of the imperfect overlap. Let us try and keep the question simple. Let us suppose that we are just talking about the effect of the cartels as found by the Commission and leave aside the fact, for the moment, that Defendants were differentially involved in those cartels. What I am asking is, if you have got a cartel period which is well

defined, you are saying, in general, that the best way of telling whether there is any overcharge is by doing a before, during and after with the before and after being separate?

MR HUGHES: Yes, I would like to have, particularly -- so, yes, sir, the answer to the question is I would like a -- I would like the clean period to be as long as possible to give me more data points, particularly as, Dr Majumdar's rightly emphasised, we have a relatively small number of new contracts, so I'd like to leverage both the prior period and the -- and the later period as well.

PROFESSOR NEUBERGER: But you would have -- but unlike Dr Majumdar, as I understand it, you would like to have a separate dummy for the pre-cartel period?

MR HUGHES: Yes, sir.

PROFESSOR NEUBERGER: Fine. Fine. That the -- then the analysis you would do of overcharge would be based on the difference --

MR HUGHES: Between the completely clean period at the very early beginning and the late period and those -- those periods there (indicates).

PROFESSOR NEUBERGER: The coefficient on the pre-cartel period would have no importance in your analysis?

MR HUGHES: It was -- precisely, because it wouldn't be --

I wouldn't -- my main period cartel dummy would be based on comparisons outside that period of time, and the pre-period would just be the extent to which those prices are higher or lower, as the case may be.

PROFESSOR NEUBERGER: Dr Majumdar.

DR MAJUMDAR: So I think the difficulty I have with that scenario is that, if you do that and you see that there's a statistically significant early period effect, that's probably telling you that your model is misspecified. So, remember, here, we're proceeding on the basis of a -- of a main period effect, and if we're saying we're just going to use a dummy variable to control for anything that's going on in the early period, well, if we've got a missing variable in the early period, high costs, for example, then, yes, it's correct that the dummy variable will control to some degree for missing costs in that period, but it won't fix the problem that you have a missing variable during the main period and a missing variable in the clean period.

So, unfortunately, I don't think it's quite -- quite as simple as simply just having a dummy variable for the early period.

PROFESSOR NEUBERGER: Okay. I think we have probably exhausted on that one.

Can I move on, jumping ahead, to what is a -- what I regard as another sensitivity test, which is question 52, restriction to new contract prices only, which I think is at {E1/13/35}. Is there some other table that we might have to look at? Sorry, {E1/13/35} is the expert -- is that the expert report? Which table should we look at for new contract prices?

DR MAJUMDAR: Sir, perhaps -- let me just find the reference and I will give it to you -- we could look at {E1/19/4}.

PROFESSOR NEUBERGER: Thank you very much.

DR MAJUMDAR: I should -- let me talk you through these tables, because you may not have had much time to digest them, because I think they probably are quite recent.

So -- yes, so if we look --

PROFESSOR NEUBERGER: Could you start by just explaining the context --

DR MAJUMDAR: Oh, of course, sir, yes.

PROFESSOR NEUBERGER: -- for why we are looking at new contract prices --

DR MAJUMDAR: Yes.

PROFESSOR NEUBERGER: -- and so on.

DR MAJUMDAR: Of course, sir, I do apologise. You're absolutely right.

So the idea here is that Mr Hughes found only a new contract effect, and we've discussed earlier on this

morning that prices are linked to the new contract price. So, in some senses, the action is primarily in the -- in the new contract price because after that, prices decline and Mr Hughes doesn't find that they decline at a different rate in the cartel period or versus other periods. So the idea of this test is to say, well, given that, given that really what we're interested in is the new contract price, if we focus only on that, only on the new contract price, do we see that the coefficient, the estimated overcharge, is materially different. And so by focusing only on the first contract price, the new contract price, it means that we drop data on price amendments and focus only on the first price, and what I'm interested in is not so much statistical significance, because we're removing data which means that we have a little bit less power in -- in the test, what we're interested in is the extent to which the coefficients move around, because if there is a new contract effect, one would expect the -- the coefficient to be broadly similar, and so -- so what I'm doing with this sensitivity is asking the question: how stable are the coefficients to this model that focuses squarely on the new contract effect, which is the effect that's claimed.

PROFESSOR NEUBERGER: Fine.

I just wondered, Mr Hughes, if you wanted to say anything about this, or whether you would prefer to keep your remarks until after we have seen the data?

MR HUGHES: So, very, very briefly, I think the conceptual question we're trying to explore, something you have to be very careful about in econometrics is throwing away data points. So, inherently, I think that we're looking for prices being systematically higher over time for these parts. So what Dr Majumdar does through his methodology is he reduces the number of observations he's got very substantially, but also I have a large number of control variables in my model. So -- so there's a statistical concept called "degrees of freedom". So if you deduct the observations from the number of data points, I start collapsing my -- you get -- I lose a lot of data, not a little bit of data, I'm losing a lot of data, and the degrees of freedom I have left for steering wheels is 36 and the highest degrees of freedom I have for -- for ... is 88 for seatbelts. So it's very hard, in econometric techniques, to find anything at all when you're trying to run models with a very small number of data points.

So Dr Majumdar made the point that he's not so much interested in statistical significance but the coefficients, but if you throw away a large body of

data, which is effectively what this approach does -- this sensitivity does, it makes it very hard to find any overcharge, and I'm actually quite surprised that we -- on some of the specification or some of the product categories you do find an overcharge at all simply because of the scale of the data that's been disregarded.

DR MAJUMDAR: So my -- my response to that is, I fully acknowledge that statistical significance is, as I said earlier on, is not something that one can place too much weight on, but my point is, the prices -- I'm not throwing away contracts. Yes, it's true that we remove some information, because we remove information on price amendments, but as we discussed this morning, the price amendments are linked to the original contract price, so the action is in the contract price. I'm not throwing away contracts, I'm just asking the question: if we focus upon the main contract price, the first contract price, do we see a robust effect or not? In my opinion, we do not, hence the analyses here. So that's -- that's the aim of the sensitivity is to understand robustness of the new contract effect by focusing on --

THE CHAIRMAN: Sorry, just a very basic question. How do you know if you picked up the amendments? Are all the amendments visible?

DR MAJUMDAR: So -- so for the purpose of this sensitivity test, there are no price amendments in the -- in the data --

THE CHAIRMAN: You have taken out the amendments?

DR MAJUMDAR: Exactly right, sir. Exactly right.

THE CHAIRMAN: Have you been successful in that task of pulling out the right contracts?

DR MAJUMDAR: Yes, sir, because they are clearly identified in -- in the dataset.

THE CHAIRMAN: In the dataset, I see.

PROFESSOR NEUBERGER: Is there any -- I mean, I am just interested. You throw away a lot of data in terms of number of data points, but clearly the amount of information that you are throwing away is rather less in some intuitive sense in that they are the prices for the same contracts at somewhat later in time. Is there any sense here -- I do not know if there is a way of formalising the amount of actual information you are throwing away or is it only measured in the number of data points you are throwing away?

DR MAJUMDAR: Yeah, I don't know the answer to that question, sir, to be honest, in terms of how one would -- I mean, the point you make is right, intuitively, you're not throwing away -- the amount of data points you -- you throw away may sound large, but in terms of

information lost, as it were, that's actually small relative to that because the data being thrown away is all linked to the first price that we're keeping, but I couldn't put a figure on that, sir.

MR HUGHES: I think there's two points I disagree with in the exchange that's happening at the moment.

PROFESSOR NEUBERGER: Sure.

MR HUGHES: First of all, you are entirely -- on this sensitivity, you are entirely resting the results on a single data point rather than looking at a whole series of data points in time, and those individual data points, so a single data point, can be affected by a whole range of things, cost, demand, et cetera, so there's a whole range of things that may have -- that may affect that data point, and also -- so I think you are resting your entire modelling on one data point.

The other thing that Dr Majumdar said was important is that subsequent prices are linked, so I think you're more likely to get a representative, an actual and accurate assessment of what the effect was overall is if, rather than relying on one data point, you rely on the series of information you have on the price of that new contract over time.

PROFESSOR NEUBERGER: Sorry, this is a kind of horribly vague question, but in my mind, listening to

the evidence -- the factual witness evidence, I just kind of picture that after hard negotiation, you agree on a price of €18.73 for a seatbelt and you agree that will go down by 2% a year for the next three years and then maybe a little bit up or down. In other words, my picture of the data is that the price changes after negotiation are small, but that is only a picture and you know the data. I mean, your point -- make the point that you are taking out one data point and resting everything on it, what I do not have any feel for is whether that data is really very representative and there is very little variation within the item, or there is a lot of variation.

MR HUGHES: So, I can't answer -- sir, I can't answer your very specific question across the entire dataset --

PROFESSOR NEUBERGER: Sure.

MR HUGHES: -- that's too complicated a question. But what I have looked at is for steering wheels, we have contractual prices, and this is in one of the spreadsheets we've disclosed, we have contractual prices that were agreed for the start of production for 17 articles, okay? And what I find for those 17 articles is there's -- for many of them, there's a big gap between the contractual SOP price and the actual SOP price. So just to put that in context, what I find is

that for about a third of the parts, so for eight out of -- sorry, my apologies, for six out of 17, I find that the price differences are plus or minus 6%, but for over half, and in particular nine out of 17, I find that the price differences from the contractual price to the -- to the start of production price is plus or minus around 30% or more. So there are some big -- so there are some big price negotiations going on --

THE CHAIRMAN: After the contract?

MR HUGHES: -- after the contract is concluded.

PROFESSOR NEUBERGER: The prices that you are explaining are the actual prices, not the contract prices, or the --

MR HUGHES: So the prices I'm explaining are the actual prices that are being paid.

PROFESSOR NEUBERGER: Right, so this is a comparison between the contract price and the actual price --

MR HUGHES: So -- (overspeaking - inaudible) --

PROFESSOR NEUBERGER: -- at the start of production?

MR HUGHES: -- is a comparison of two -- what the contract said the start of production price would be and what the actual start of production price was.

THE CHAIRMAN: But the contract price is not in your model, is it?

MR HUGHES: Sir, the contract price --

THE CHAIRMAN: I thought you just took the monthly actual

prices.

MR HUGHES: Precisely. This goes to my -- so the context of the question or my interpretation, and if I've got that wrong I apologise, but the context of the question I think was if we get -- are these prices immutable things that are fixed in stone or are they things that might be high or low at a certain point and move according to various things, and my opinion is that they're not entirely fixed in stone, they're linked in the way that Dr Majumdar's described, and therefore I think it would be better not to discard the information on their overall level over time rather than relying on a single data point.

THE CHAIRMAN: But are you seeing that variation once you start production and you start supplying the item? Absent amendments, are you then seeing these variations?

MR HUGHES: Yes, you -- you do see variations, and the actual amendment -- so the -- as Dr Majumdar said already, I don't find any difference, with the exception of a small difference for airbags, I don't find any difference in trends, price amendment trends, during the cartel period and outside the trends.

DR MAJUMDAR: Sir, I just want to be clear on Mr Hughes' point. So, I think, if I understand Mr Hughes correctly, this is a piece of analysis, I'm not aware

that it's in Mr Hughes' first or second report, and it relates to 17 steering wheel -- steering wheel articles. I just want to check that -- I just want to sort of -- I'm trying to understand how reliable this -- this piece of information is, that's all --

MR HUGHES: So --

DR MAJUMDAR: -- because I'm not --

MR HUGHES: -- I was responding to a question --

Sorry, we shouldn't have side chats.

PROFESSOR NEUBERGER: No, sorry, I just, at the bottom of it, when I am looking at these data and comparing it with the original, the question in my mind is -- one hypothesis is that although you are throwing away a lot of data points, you are not really throwing away a lot of data, and therefore if you come out with a different answer, then I ought to be disturbed.

The other hypothesis is actually you are not only throwing away a lot of data points, you are actually throwing away a lot of data, because the start of production price is not that representative of the prices which follow. As far as I can see, on the basis of the evidence we have got before us, we are in no position to take a view on that ourselves; is that right?

DR MAJUMDAR: I have not done the check that you suggest we

should have done so I cannot confirm -- therefore I cannot confirm that the first price is as representative of the sort of -- of what follows. I would need to check the data, so I --

PROFESSOR NEUBERGER: But, to put it crudely, there are two possible inferences from the change between Hughes and Majumdar. One is that it shows that Hughes' model is very fragile, the other is that Majumdar is throwing away a lot of data, and it's quite difficult for us to be sure which it is.

DR MAJUMDAR: I think that's fair.

PROFESSOR NEUBERGER: Do you agree, Mr Hughes?

MR HUGHES: So I think -- so I think the reason why I'm hesitating is because -- is the -- I think information on prices over time will be inherently more valuable than taking a single data point. So I think that's -- that's the area of difference between the two of us on this point, and, again, it's not disregarding contracts but it is involving disregarding information on average prices over time, which is what my model's measuring. So I think that's my -- and I'd rather have an average that's based on lots of numbers than based on a single number.

PROFESSOR NEUBERGER: No, and --

MR HUGHES: That's all I'm saying, sir.

PROFESSOR NEUBERGER: Yes. No, but I understand, but it is -- this is -- this is really a question of a robustness check in the sense of saying: if I look at this subset of the data, does it come out with the answers -- with the same answers? It's not challenging -- it's not wanting to substitute a different estimate, it is trying to -- and what you are saying, I think, is that, well, it comes out with a different number because it has not taken account of important data.

MR HUGHES: I think that would be my answer.

PROFESSOR NEUBERGER: Yes.

MR HUGHES: I'm also -- I'd also be very worried about running regressions where I've got a very small number of data points, because, frankly, anything can happen with those regressions because they don't have much in the way of statistical powers, I think Dr Majumdar and I agree.

PROFESSOR NEUBERGER: Yes, yes. Fine. I guess it is just worth looking at the numbers just to make sure that we have seen them. Maybe Dr Majumdar can just take us through them so we know what is happening.

DR MAJUMDAR: Yes, of course, sir.

So the second row down says:

"New Contract model (considering the new contract

effect in isolation ..."

So that's the first row we should be looking at. And the coefficient you see there for the early period is 0.18 for airbags, which would compare to about 0.3, I think, with -- I should actually get -- with -- with the Hughes model. So in that sense there's a -- you go from 0.3 to 0.18 which would suggest that the coefficients are not stable.

If you go down to the one below, which is exactly the same model but just shifting the trend in time by -- not to start at the new contract date but the first price amendment date, so it really is literally just a change in how you define the trend, it's not material. What's remarkable is that the -- is the coefficient then drops from 0.18 to 0.03 which just makes me think there's something fragile in -- in that airbags model.

If we move across to the main period for airbags, we see 0.164 and then that drops down to 0.05, and this is -- is this pace all right?

THE CHAIRMAN: Yes.

DR MAJUMDAR: Thank you. So in the main period effect for seatbelts we've got 0.05, which would compare to about -- I can't remember exactly, about 0.2, so that's a lot smaller.

For the early period for steering wheels, that's

probably similar to what you see in the Hughes model for the new contract and it drops down to 0.23 on the one below, so there's not that much variation there.

And if you go, finally, to the main period for steering wheels, there's a substantial drop from the Hughes model to 0.03 here, and in the one below minus 0.02.

So what I'm seeing here is that most of the coefficients are jumping around quite a lot when we tried this sensitivity.

PROFESSOR NEUBERGER: So just to make sure I have got this right also. The difference between the two new contract model lines being so substantial says that your model is quite -- I mean your version of Mr Hughes' model is very fragile and that is the right conclusion to draw from that?

DR MAJUMDAR: Yes, in the sense -- so, yes, comparing 1 and 2, literally the time trend -- trend has just been shifted forward in time by a small amount, which is -- and that does have some material impact on the estimated coefficients, yes.

PROFESSOR NEUBERGER: But I mean, it sounds like a fair sensitivity test which works against the author?

DR MAJUMDAR: In the sense -- sorry, run that past me again? Sorry.

PROFESSOR NEUBERGER: So if I am considering how reliable the new contract model numbers are --

DR MAJUMDAR: Right.

PROFESSOR NEUBERGER: -- then the fact that a minor change which is perfectly arguable for the new contract model shifting the coefficients a lot means that the new contract model is certainly itself quite fragile.

DR MAJUMDAR: Oh, I see, sir. Well, that's a good challenge. I mean, my response to that would be, that's -- really what's happening -- it's really in airbags where you see this, and so my response to that would be I just get a sense that there's something quite fragile in that airbags model, because we've looked at it and the coefficients jump around a lot whether we look at the combined period or whether we look at this. So I think that's a fair challenge that you make, sir, but my response would be it's really in the -- in the airbags where we see this happening, which -- which could be a fragility in the airbags full model.

PROFESSOR NEUBERGER: Another point just to confirm, the standard errors on -- I mean you are reflecting the dropping of information, the standard errors on the estimates are much larger once you drop the new contract -- drop the old contracts, as it were?

DR MAJUMDAR: Well, they are -- they're shown here. So

we've got 0.096, 0.077, which compares to sort of 0.06 or 0.07, so they have gone up to some degree, as one would expect.

PROFESSOR NEUBERGER: Before I leave the question of sensitivities, I just wondered if -- I mean, we have touched on this notion of fragility a number of times. Is there anything specific about the model that makes it fragile, or -- I mean, is there some particular reason why we get quite significant changes for some reason, or have we canvassed everything there is to canvass about it? Dr Majumdar?

DR MAJUMDAR: In the airbags model in particular?

PROFESSOR NEUBERGER: Well, yes, is there something special about airbags?

DR MAJUMDAR: Well, the -- well, in technical terms, I don't know. I mean --

PROFESSOR NEUBERGER: In technical terms!

DR MAJUMDAR: We're running -- I mean, essentially, in essence, the same model is being run for airbags as is being run for seatbelts as is being run for steering wheels in terms of the structure of the model, the characteristics/controls are slightly different and they're tailored to the relevant products. Ditto the indices on raw materials. But -- so it's not obvious that there's something special about airbags in

that sense.

PROFESSOR NEUBERGER: There is nothing about modelling decisions that would make the model more stable or less stable?

DR MAJUMDAR: Not that I'm aware of, because ultimately it's -- as I say, it is really, in terms of the model set up, it's pretty much the same one applied to each -- each product.

PROFESSOR NEUBERGER: Mr Hughes, I mean, you have spoken a bit about -- over the course of the hot tub about the effect of items coming in or out of particular periods. Is there anything otherwise, any other observations you would make about the stability of the model?

MR HUGHES: I think -- I think one of the questions with this -- this sort of exercise, this table that's in front of us, is to -- is to what extent one attaches weight to -- I think this is perhaps a question for you as a question for me -- how much -- to what extent does one attach weight to alternative specifications which -- which can be put forward as opposed to the specifications that I put forward. I think one of the comments that Dr Majumdar was making -- or Dr Majumdar was making in relation to his new contract model, for example, was that he wasn't -- he was

particularly interested in whether the signs on the variables were still -- were still -- were moving around or whatever, but what you do observe is you do observe that all those coefficients continue to be positive on his main variable, main alternative, and what you've -- what you will do if you reduce the sample size is you will -- you will very much expand the standard errors. So you do find -- so -- so when we discussed standard errors increasing, if they double or increase by 50%, it's going to make it much harder to find anything at all and it's much more likely that the results that you find will be noise rather than information.

PROFESSOR NEUBERGER: Thank you.

I was proposing to turn to omitted variables, but is that a good moment to break or ...? You want to do omitted variables.

I should start, I guess, with Dr Majumdar, but before doing so, I just -- if you could explain, we have discussed omitted variables in general terms already and how these models cannot be expected to account for everything anyway. What is the -- if you could help me with the specific -- explain what the specific concerns are about omitted variables in the context of this model.

DR MAJUMDAR: Certainly, sir. So my concerns are based on both cost and demand controls. So when it comes to cost, my concern is that the only cost variables we have are very aggregate. So we do not have costs for a particular contract, which means that we can't control for contract costs and we can't see how each contract -- the cost of each contract could vary over time. We can -- we only have a very aggregate measure of cost, which means that, bearing in mind the cost, one would imagine, is a pretty important determinant of price, we just, sadly, do not have as granular data as we would like to properly model prices. So that's my first point. So that is an omitted variable.

The next question is: where is the bias? Which way may it take us? And the data from Autoliv and the data from ZF/TRW indicate that in general, i.e. on a very aggregated basis, costs were higher earlier in the period for airbags than later in the period. So the sort of costs are doing that (indicates), which suggests to me that there are -- if there is an omitted variable basis because we do not have granular cost information, the chances are it's going to be giving -- causing the high estimated overcharge, because we're missing -- we're missing a high cost in the earlier period, which means the cartel dummy is probably picking

up the missing cost variable.

So when it comes to airbags, I think we have an omitted variable that is liable to lead to overstating the early period and main period effects. When it comes to seatbelts and steering wheels, the same problem applies in the sense of we don't have the granular cost data that we would like to give us confidence in our model, but it's less clear to me which way the bias would go in terms of not being able to control for them. So that's my cost concern.

When it comes to demand, we talked a little bit about this before. In -- the cost controls used by Mr Hughes are essentially very aggregate and raw material controls, they're like indices, so they're aggregate indices that trend over time, in some instances it's just like having a time trend, so that doesn't allow us to pick up something like production cost, so if a new product arises, there's a new investment decision that's made, a new amount that's required to be spent, that then, as we discussed earlier on, is going to have to be spread over the volume -- the forthcoming volumes. We don't have any way of modelling that ... that demand, so all else equal, two parts are the same, well, one part with relatively few expected volumes and another part with lots of expected

volumes, they're going to have different prices and we just had no way of picking that up in the data. So we're missing these granular demand and cost controls which one would expect, on the basis of the facts, you know, we would expect costs would influence price, we would expect these demand factors would influence price but we just can't put them in the model.

Now, it's hard to say which way the bias would arise on those demand controls, but we know that -- so therefore it's a question of weight, how much confidence can -- can you have in a model that is -- is missing two potential key -- key influences.

Then the third one would be the characteristics. So Mr Hughes, in his model, has a few characteristics which seek to control for the -- the features, for example, an airbag, you know is it a side airbag or the size of the airbag, and there are, I think, four characteristics that controls. But what I do when I run a test -- and it's mentioned in annex 7 of my report -- I ask the question how well are these characteristics actually explaining price, and what I find is that if you group characteristics together, so if you take contracts which have the same characteristics and look at the variation in price when you -- after controlling for what all of the other explanatory variables can explain, i.e. --

should I explain that a bit further, sir?

PROFESSOR NEUBERGER: Yes, of course.

DR MAJUMDAR: So if I take a group of articles, all of which have the same technical characteristics, and if I regress their prices on all of the other explanatory variables and an article-specific dummy, so essentially pick up a fixed effect and then I plot them, that should just give me noise if the characteristics are doing a good job of explaining the price, but I don't get that, I actually get really quite a wide variation which is suggesting to me that these technical characteristics, yes, they're controlling, picking up some of the influence on price, but they're not, they're leaving a lot that's unexplained.

So the combination of those three pieces of evidence says to me that there is a lot of -- a lot of uncertainty. Now, which way would that characteristics bias go? Again, it's hard to say. But if we have a situation where characteristics, when they first join the panel, are -- are seen as non-standard, are seen as premium, then you would expect their prices to be higher, but if over time something like leather steering wheels become more accepted or, I don't know, heated steering wheels become more accepted, buttons on steering wheels become more accepted, then

the willingness to pay for those will go down and the price will go down, which would then give you an upward bias on the early period and main period effects.

So -- so these are my concerns as to why we have omitted variable bias that could give us inflated estimates of an overcharge, sir.

PROFESSOR NEUBERGER: Thank you very much.

Can I just ask, before allowing Mr Hughes to respond, these are -- it's omitted variable bias, but you are not suggesting any variables which should have been included in the model, any specific variables which would have solved the problem?

DR MAJUMDAR: None that are available.

PROFESSOR NEUBERGER: Okay.

DR MAJUMDAR: That's the point, sir. I could -- we could have a long list of variables we'd love to include that we think are important, but unfortunately, the nature of the data is it's simply not granular. So Mr Hughes will tell you that he's put in Autoliv cost data as a control and I will say to you but that is -- is nothing other than a time trend, because we just don't have the data we would like to put in.

PROFESSOR NEUBERGER: But your accusation is not that Mr Hughes has done an inadequate job and should have done more, it is that the conclusions from his model

should be treated with some caution because they do not account for everything?

DR MAJUMDAR: Exactly right. I suspect that the overcharge on airbags is overstated as a result of omitted variable bias. After that, it's hard to put a sign on the bias and therefore it's a question of weight.

PROFESSOR NEUBERGER: Mr Hughes, you have been very patient. There is quite a lot to answer.

MR HUGHES: Okay. I wonder whether a good place to start might -- might be page {E1/6/38} of Dr Majumdar's report, which is figure 5, which compares Autoliv's costs and Autoliv's prices, or prices to the -- the prices unit.

PROFESSOR NEUBERGER: Yes.

MR HUGHES: So I will talk to this chart, but just to frame my comments first. So the first -- the first point that Dr Majumdar made was that -- was that my model doesn't properly control for costs and therefore -- and in particular he was concerned in relation to airbags that I might be conflating, when I find higher prices during the cartel period, I might be conflating those high prices with higher costs, okay? So that was his specific concern.

What -- what you actually -- so if we compare the orange line and the blue line, okay? And what you

-- what you see is, with the exception of the last few years, a gap between the orange line, which is prices, and the blue line is generally earlier from sort of 2011 to the prior period of 2005, so the gap between prices and costs looks like it's higher during the period of the cartel.

Now, I am not suggesting for a second that we use that to infer the gap between price and cost and use that to infer cartel damages, but I think it just shows to illustrate that I don't think you can simply point to costs and prices and say, "A-ha, Mr Hughes has missed something", because if you start doing that, then the logical conclusion is that it looks like prices relative to -- prices were higher relative to cost during the cartel period for airbags. So I think that's the first point.

I think, sticking with the theme of cost, Dr Majumdar's worry is that costs were somehow higher during the cartel period and my model isn't properly controlling for that for all the costs variables I do choose, which include not just the cost elements that I -- that Dr Majumdar's well aware of, but also part-specific effects, the technical characteristics which he's been referring to, suppliers fix some suppliers' car more or less than others and so on.

So I think the concern that's being expressed here is -- is that I'm not properly controlling for -- there's a -- there's a potential bias because Autoliv's costs may have been lower during the cartel period. Now, that concern is a systematic concern. It's not a granular concern, it's not a part-by-part concern, it's a concern that I've somehow fundamentally misstated costs. So I think it's very interesting that when you put Autoliv's costs, imperfect though they are, in the model, it does generally bring the overcharge down, and it depends by category that you're looking at, but it does still get a statistically significant overcharge. So that's his first bucket of points on costs.

So I also agree with Dr Majumdar in terms of costs. He's not identified any better cost data for me to use, but it does seem to be the case that Autoliv's costs aren't driving anything. It's also very striking that when Dr Majumdar says these costs just follow a time trend, they might be a bit more stable for seatbelts, but I don't see a time trend in terms of these costs in relation to steering wheels, and the scale is a little bit misleading, but there is certainly variation in terms of airbags. So I don't think it's a correct characterisation of his own cost data to say that these

simply follow cost trends. To the extent that they do follow cost trends, of course, that's why I have time trends in my model and other things will affect prices over time. So that deals with the costs bucket. So I'm -- and to be crystal clear, I am not saying that the model I put forward is perfect, I'm simply saying that I don't think Dr Majumdar's concerns over costs should be overstated.

On the demand side of things, what Dr Majumdar has done is he's said, well, it's not easy to capture the various ways in which demand and cost affect prices. I fully agree with that. Again, he's got no better alternatives. One of the alternatives he did try was using PSA car registrations and, a bit like Autoliv costs, I think that is a sensible sensitivity to try and see how that affects results, and, again, when you put in PSA car registrations, which is the demand of the individual OEM purchasing the parts, that doesn't materially affect the results.

So I think these -- these are right, that's a sensible -- these two sensitivities are a sensible thing to do and the results don't seem particularly ... I agree with Dr Majumdar, there's no perfect way of capturing this, and I don't have a simple solution to how to deal with things like the credit crisis, which

you're familiar with. I don't have a simple solution to that.

On characteristics, again, I would like more granular data. If I had more granular data, I'd have used more granular data. I don't have any more granular data. He did do, in terms of his little analysis -- the analysis that Dr Majumdar summarised, I've discussed that at some length in my report, so I'm not going to -- I think, for these purposes, I think it would not be a good use -- I'll do whatever you like -- obviously I'll do whatever you like me to do, but --

PROFESSOR NEUBERGER: Good. I agree with you.

MR HUGHES: -- in essence he's trying to predict prices with a very small number of data points and I think that exercise is not particularly informative, in terms of his criticism. But I'm also -- to be clear, I'm not trying to -- I'm -- I'm including cost demand variables and characteristics in my model not because I'm inherently interested in them, I'm uninterested in them, I'm including them because I'm trying to avoid omitted variable bias. So I'm -- so I'm -- I -- again, I repeat a comment I made earlier. I don't think there should be a counsel of perfection whereby you would specify in great detail every single part characteristic, you would complicatedly model demand, which I think would be

a complicated question, as Dr Majumdar says, or somehow you would have better or more granular cost information which I -- I don't have access to.

PROFESSOR NEUBERGER: Can I just ask one question about the demand, which I -- sorry, while we are on it, about costs? You have got contracts which are extending over several years, you have prices of raw materials which are going up and down all the time. In your model, are you assuming that the price of the object is largely set on the basis of the costs at the beginning, or at the contemporaneous costs?

MR HUGHES: So I'm assuming that costs and demand have a contemporaneous impact on prices over time.

PROFESSOR NEUBERGER: So --

MR HUGHES: Actually, lagged. Actually, more accurately, a lagged period of cost and a lagged period, so -- so they're not determined instant-by-instant, but I am assuming that, if the price of an airbag is €100 and the costs have gone -- the average costs have gone down for a particular -- for various costs measures, let's say 9 or whatever, that has gone down, I assume that that will bring down that price, reflecting periodic negotiations around costs.

PROFESSOR NEUBERGER: But, sorry, given what we have heard about the nature of negotiations on costs and price

revisions, it sounds as if costs would only feed into prices with some delays --

MR HUGHES: Precisely. So that's --

PROFESSOR NEUBERGER: -- and therefore, if that is right, is it not true that your regressions would have very little power anyway to pick up the relationship between cost and prices?

MR HUGHES: So I don't have costs at a moment in time, I have lagged costs over a year, so I'm assuming the lagged -- it's moved -- it's -- so in other words, it's a year -- so it takes -- so it's an average costs over a year that affects the price. So I am -- I am effectively allowing not a lag but the effect of cost changes over time to influence prices.

PROFESSOR NEUBERGER: Can I -- and then I think we should break, but I mean, the one point I was trying to get at was, there is some discussion that costs seem to play a very limited role, explanatory role in your model. I mean, you put in lots of costs variables, but their power is very limited, and I was just wondering whether that was --

MR HUGHES: So --

PROFESSOR NEUBERGER: -- surprising, or whether it is what you would expect from your understanding of the data and the way you are analysing it.

MR HUGHES: I think -- I think one of the things that affects these sorts of models is, if you have lots of demand and cost variables and time trends, it's quite -- and Dr Majumdar's made this point in his report -- it's -- it's not surprising you have phenomenon called multicollinearity, i.e. things tend to trend together, so -- and therefore, if -- if you don't find an individual one of those to be statistically significant, it may well be simply because it's -- it's co-trending with other -- with other variables that are included in the model, and therefore you need to look at their joint significance and their joint impact.

So I don't think you should attach particular weight, where things are subject to time trends, to -- to the specific coefficients on -- on those variables, because their incremental contribution is modest because they're trending with other variables that are subject to common trends.

PROFESSOR NEUBERGER: Dr Majumdar, and then we should break.

DR MAJUMDAR: Okay, I'll keep it short then, sir.

So, just on the -- just on the point, if I may, very quickly. So this diagram that we have in front of us, one can't compare prices and costs, because the prices and costs are measured on a different basis, one is an overall aggregate Autoliv cost, the other one is PSA's

purchasing. This is more about understanding the trends and how they move, this is not about a price/cost comparison. So just to be very clear, one actually can't compare their levels.

On the point about the adding in the Autoliv cost data, what happens is, because the data's so imperfect, it only starts in 2006, so we drop most of the early period anyway, so it's just, the whole point of these charts is to say that -- in some respects, it's explaining that the data, unfortunately, is -- is poor.

On the point -- and the same -- the same point is made about demand. So I'm not suggesting that the car registrations is a solution to the problem, I'm making the point that, unfortunately, that's just not granular enough. Ditto EUG. So I don't want that to be mischaracterised as a sort of a sensitivity test seeking to solve, it's actually quite the opposite. It's just making the point that, sadly, we don't have the data.

Then the final point on: would you be surprised if raw materials are not showing up and explain, you know, less than 3% of the variation. I think I would be concerned. I mean, I take the point that they -- there are other explanatory factors in the model. But if something that is 60 to 70% of the cost of an article is having such little explanatory power, I think that would

be a concern for me.

PROFESSOR NEUBERGER: All right. Thank you very much. We will have RFQ dates after.

THE CHAIRMAN: Just five minutes.

(3.30 pm)

(A short break)

(3.38 pm)

PROFESSOR NEUBERGER: (Off microphone - inaudible) -- to deal with RFQ dates.

I am grateful to the experts for having put together a joint memorandum, which means that we do not need to go over a tangled series of past papers. I would like to get -- before I get to the numbers, I just thought we could go through, fairly quickly, some of the main issues.

Can I start with Mr Hughes to explain simply a very naive question, which is why RFQ dates matter.

MR HUGHES: So RFQ dates matter because what you want to do is you want to match contracts to periods that are inside or outside of the cartel period, or in the early period or in the main period or whatever, so -- and it's important that that matching is done properly, because otherwise you're going to be mixing together clean and dirty data points, which will compromise your ability to find an overcharge with any degree of accuracy.

PROFESSOR NEUBERGER: We have got RFQ dates for what proportion of articles, roughly?

MR HUGHES: It varies from product categories from around -- it's in Dr Majumdar's -- sorry, let me pull up Dr Majumdar's --

PROFESSOR NEUBERGER: I mean around something under half; is that right?

MR HUGHES: Something under half, yes.

PROFESSOR NEUBERGER: Do we understand why we do not have RFQ dates for some of the articles? Is there any systematic reason, or is it just unknown?

MR HUGHES: It's just unknown.

PROFESSOR NEUBERGER: Right.

So just going through some -- if you want to say something, Dr Majumdar, otherwise ...

Then this is a more complicated question and one I still have not got my mind around, which are, there are three ways of determining an unknown RFQ date. There is the one in your paper -- in your original report, Mr Hughes, and there are two other variants, which are the ones which are the subject of the joint memorandum, and I am not clear about -- I am fairly clear, but it may be worth repeating how your original method is done and I am not clear how the other two methods are done, so perhaps you could explain.

MR HUGHES: So the first method adopted in Hughes 1 is I take the start of production date, the estimated start of production date -- this is entirely for the parts where I don't know the RFQ date from contracts -- and I deduct 30 months from the date, and I'm assuming, under that approach, that that's the best approximation of when contract prices were fixed. So that's my first approach, okay?

The second of the two alternatives that I put forward was -- was simply, when I -- when I read Dr Majumdar's first report, I hadn't worked through exactly how he was doing the by-platform sensitivity and it seemed to me he was doing two things which were noteworthy. The first thing which was noteworthy was he was overwriting known RFQ dates with estimated RFQ dates. So the first sensitivity is simply to stop doing that, okay? So I don't really think that's a sensitivity, that's just using the right data.

PROFESSOR NEUBERGER: So let me just be clear. On all three alternatives that are in the table, where there is an RFQ date, that is the date that is used?

MR HUGHES: Precisely. Precisely.

PROFESSOR NEUBERGER: The differences are what you do if you do not have an RFQ date?

MR HUGHES: Exactly that. Exactly that.

PROFESSOR NEUBERGER: Fine.
MR HUGHES: So that's -- that's the second one, which I call "A", which I don't think it's a sensitivity, it's just the right way -- it's the right way of doing it.
And the second alternative --
PROFESSOR NEUBERGER: Wait a moment, sorry. I do not understand. If you do not have an RFQ date --
MR HUGHES: Fine. Fine.
PROFESSOR NEUBERGER: -- what do you do in --
MR HUGHES: So on sensitivity --
PROFESSOR NEUBERGER: -- A?
MR HUGHES: On sensitivity -- on sensitivity A -- on sensitivity A, which is the second alternative --
PROFESSOR NEUBERGER: Yes.
MR HUGHES: -- what I do is I use the known RFQ dates --
PROFESSOR NEUBERGER: Yes.
MR HUGHES: -- but I use Dr Majumdar's approach of assuming that the by-platform RFQ occurred on the earliest of an estimated date or a contractual known date. So that's -- so Dr Majumdar also -- in his first methodology also estimates RFQ dates using the same method I use of start of production minus 30 months. So where he has a contractual date which is later than that, under method A, he disregards that known date and instead uses my estimated one, whereas -- so that's -- that's

method A. So I -- I -- I use the earliest of the known or estimated RFQ dates.

PROFESSOR NEUBERGER: I am still confused, partly because of the terminology of "platform". Can you make it concrete?

MR HUGHES: Sure.

PROFESSOR NEUBERGER: Tell me a platform.

MR HUGHES: So one platform is the A9, which is the Peugeot 208, and then there's the Peugeot 2008 and that's a platform for a car.

PROFESSOR NEUBERGER: A9.

MR HUGHES: Okay. So the A9, it's got a couple of variants, okay? So -- but it's the same Peugeot 205, that's the main one, okay?

PROFESSOR NEUBERGER: Right.

MR HUGHES: So what -- what -- what the third -- what A does, okay, that -- what the by-platform sensitivity does is it says: I'm going to assume that prices were -- contractual prices were determined on the first date of the -- that I observe an OSS part for that category. So let's say it's an airbag. Or let's say it's a steering wheel. Let's say it's a steering wheel. So I'm assuming that the contract -- the contract prices were all parts associated -- all steering wheels associated with that platform are determined on that

date, they're fixed on that date.

PROFESSOR NEUBERGER: So all parts -- all three sorts of component --

MR HUGHES: No, no, just the one component. So one -- it's a different date per component.

PROFESSOR NEUBERGER: Okay. So all seatbelts --

MR HUGHES: So all --

PROFESSOR NEUBERGER: -- on the A9?

MR HUGHES: -- all steering wheels on the -- or whatever the category is you've got --

PROFESSOR NEUBERGER: Yes.

MR HUGHES: -- all steering wheels, or let's just -- I don't know the exact date off the top of my head, but let's say they're all procured on 1 January 2006, so every single steering wheel part for that platform was procured on that date regardless of differences in the start of production price -- start of production date. So if something is starting production three years later, four years later, some two years later, I'm going to treat all of those parts, despite -- under Dr Majumdar's sensitivity, I will treat all those parts as being procured on the first -- on the first observed date, the earliest date I observed the platform. So I'm assuming contractual -- I'm assuming prices are fixed at that date. So that's --

and I'm doing that under method A and method B. The distinction between method A and method B is that in method A, I choose the earliest of the estimated or known RFQ date, and in method B, I only choose the earliest of the known, because the estimated ones are just estimates.

PROFESSOR NEUBERGER: The difference between A and B only occurs then when there is no earliest RFQ date on that platform?

MR HUGHES: So the difference between A -- the difference between A and B arises where the estimated date is -- because he uses the earliest date, so he -- so the difference between the two is method A uses the earliest date, whether it's estimated or known, whereas method B uses the earliest known date, if there is a known date. So method B differs from method A in that, under this -- under this sensitivity it is presumed that the earliest known -- there's a single known -- a single contract date. So if I had one known contract date for the A9, I'm going to assume all the others are on that date. So -- so --

THE CHAIRMAN: So that if you do not know any dates --

MR HUGHES: I stick with Dr --

PROFESSOR NEUBERGER: -- for steering wheels --

MR HUGHES: I stick with Dr Majumdar's methodology.

PROFESSOR NEUBERGER: Which is?
MR HUGHES: Which is, quite simply, he takes the earliest start of production -- start of production minus 30 months, whereas, if I have a known date, I use the earliest of that -- I use the known date to replace all the un -- all the estimated dates.
PROFESSOR NEUBERGER: I am sorry being so slow, but the -- so I have got a seatbelt for the A9, and if I know its RFQ date, I put that in.
MR HUGHES: Yes.
PROFESSOR NEUBERGER: If I --
MR HUGHES: Under all three approaches.
PROFESSOR NEUBERGER: Under all three.
If I do not have an RFQ date for that supply then, under A, I use start of production for that part minus 30 months.
MR HUGHES: Yes, under my first choice, yes.
PROFESSOR NEUBERGER: Under B, I would use -- sorry, under A, alternative A -- I am going to add to the confusion -- under alternative A, I then use what exactly?
MR HUGHES: So in alternative A, I use the earliest -- earliest estimated platform date, whether it's estimated from start of production minus 30, or whether it's estimated from known contract dates.

PROFESSOR NEUBERGER: So taking my seatbelt example, I take the earliest seatbelt -- I take the earliest RFQ date on seatbelts on the A9.

MR HUGHES: Yes.

PROFESSOR NEUBERGER: If there is none such, I use the earliest seatbelt, not necessarily this one, start of production and then deduct 30 months; is that right?

MR HUGHES: Just to make sure that we're saying exactly the same thing --

PROFESSOR NEUBERGER: Well, you say it.

THE CHAIRMAN: Say it very slowly so we can write it down.

PROFESSOR NEUBERGER: Say it very slowly and say what you do --

MR HUGHES: My apologies. So this is complicated and it took me a while to work out what was going on, so ...

Okay, let's say, for the sake of argument, that the -- that the -- you have an estimated RFQ date, which is drive from start of production minus 30 months, and let's say --

PROFESSOR NEUBERGER: Of what?

MR HUGHES: Of a seatbelt.

PROFESSOR NEUBERGER: Of a seatbelt --

MR HUGHES: Associate --

PROFESSOR NEUBERGER: -- for the A9?

MR HUGHES: For the A9. So we have a seatbelt that was

first procured SOP minus 30 months on 1 December 2006, just for the sake of argument, for a seatbelt.

PROFESSOR NEUBERGER: Yes.

THE CHAIRMAN: Any seatbelt?

MR HUGHES: Any seatbelt. Any seatbelt. And then -- or there might be a series of them, but you're estimating ... all right, now --

THE CHAIRMAN: Sorry, finish that sentence? You said, "There might be a series of them but ..."

MR HUGHES: So there will typically be a series of parts for each platform for the airbags and a series of parts for each platform that are seatbelts and so on.

THE CHAIRMAN: Just stick with seatbelts. You then go for the earliest?

MR HUGHES: You then go for the -- yes, so if I have an estimated date of 1 December 2006 for seatbelts and I have a contractual date that is estimated as being 1 December 2007, for argument's sake, a year later, under method A of the by-platform sensitivity, I would say, well, I'm going to adopt -- under method A, I'm going to use the earliest of the estimated or known, so I'm going to say that the contract -- that the prices were determined on 1 December 2006 under method A, even though I know that there's a contractual date price that's later, even though I know that information. So

that's method A.

Under method B, so remembering I've got these two dates, I've got an estimated one of 1 December 2006 and a contractual -- and a known one of 1 December 2007. Instead of choosing 2006 in method B, I'll choose 2007.

PROFESSOR NEUBERGER: Fine. I think we are there.

MR HUGHES: And the reason -- and my preference -- just to be clear on these alternatives, sir, that we're discussing here, and what differs between them, I want to -- I think Dr Majumdar and I both want to use the right date for when contractual prices were -- when prices were determined, okay? We want to use the right date. The second methodology -- I prefer the third methodology, which I'm calling "method B", because Dr Majumdar's hypothesis is that every single part associated with the -- every seatbelt associated with the A9, that contractual price was determined on the same day. So the same -- and it's the earliest date of those things. So that's -- that's -- that's the premise of his by-platform sensitivity, it's the earliest first date, okay? And I prefer to assume that the earliest first date is the -- is where it's known rather than where it's estimated, because the whole -- this whole issue is about we don't have -- we don't know -- we don't know what we don't know, which

is the estimate, so I don't want to rely on estimates, I prefer to rely on method B than method A, as a generalisation.

PROFESSOR NEUBERGER: Dr Majumdar.

DR MAJUMDAR: Thank you. Thank you, sir.

I wonder if we might go to {E1/15/6}, because I think some of this could be more easily understood. I'm sure you've got it now, but I think it might be helpful if we look at a diagram.

THE CHAIRMAN: Which tab, sorry?

DR MAJUMDAR: So {E1/15/6}, and if we could blow up the top chart, which is figure 2, please.

So this is seatbelts, and all of these are platforms, so you've got A5, A7, A9, A94 and so on and so on. So if we look at A7, the black dots are the known dates. So these are -- so all of these are contracts where we know the RFQ date, which is the black dot, and we know the -- oh, I've lost it -- oh, okay -- sorry, this is -- can we --

THE CHAIRMAN: It is sideways. Do not worry, we can turn our heads.

DR MAJUMDAR: Okay. Thank you, perfect. Absolutely perfect. Thank you very much.

So we're looking, for example, at A7, and the black dots are the known RFQ dates for the A7 platform, and

then the orange dots are the start of production dates for the same platform. What you see is that you have --

THE CHAIRMAN: They all align.

DR MAJUMDAR: Sorry?

THE CHAIRMAN: They all align --

DR MAJUMDAR: Exactly. So even though you have different red dots, i.e. different start of production dates, they all align. So what sensitivity B does, it simply says, if we don't know the RFQ date but it's on the A7 platform, we'll align it with the rest of these black dots, because that's what the known ones do.

PROFESSOR NEUBERGER: And the difference between the two variants?

DR MAJUMDAR: Sensitivity A would say if there is a -- an SOP date that is less than 30 months away from those black dots, when you take -- when you subtract 30 months, you'll get an estimated RFQ date which is earlier, so you'd leave all the knowns as they are, so these black dots would stay the same, but because you'd be estimating an earlier start -- RFQ date for that platform, all the unknowns would go back, so they would actually potentially go behind those known dots, which I think is why Mr Hughes prefers B, because I think what Mr Hughes is saying, we're better off aligning with known dates than -- than with estimated dates.

PROFESSOR NEUBERGER: Would you agree with that?
DR MAJUMDAR: Yes, I would.
THE CHAIRMAN: Okay, so we can forget A?
PROFESSOR NEUBERGER: We can forget A?
DR MAJUMDAR: I agree, sensitivity B is better.
THE CHAIRMAN: Interesting though the diversion was, yes, we can just focus on B.
MR HUGHES: I think B-- if I could interject briefly, I think B is the right one. I said I had a caveat. For steering wheels, I know much less about steering wheels, because I've got fewer known dates, so I've got fewer known contracts, and I've got fewer observations. So there is -- I have some uncertainty about -- I prefer B, but I have some uncertainty, particularly as regards steering wheels, where I've got fewer known dates.
DR MAJUMDAR: If I may, sir, if we go to the panel below, you will see exactly the same thing for steering wheels. So if we go to -- yeah, it's exactly the same.
PROFESSOR NEUBERGER: If you had -- if one has to choose one -- sorry. Clearly the problem is we do not have the data.
DR MAJUMDAR: Yes.
PROFESSOR NEUBERGER: So we are trying to fill in data which we need to fill in. It would be really nice to have both your views on whether the base case, Hughes 1, or

the variant, B, is clearly superior or clearly inferior or whether it is really difficult to say very much about which is better.

I was wondering, Mr Hughes, would you like to start on that one?

MR HUGHES: So I think, going back to the exam question we're trying to get the data to do here, what we're trying to get the data to do is tell us, where we don't know something, what the best estimate of that something is that doesn't -- we don't know. So I find it difficult to have a strong preference in circumstances where I -- an absolute categorical preference in circumstances where I don't actually know what I don't know. So I think that's -- so there's uncertainty here.

PROFESSOR NEUBERGER: Yes.

MR HUGHES: So I think, in terms of -- in terms of what we do and what we don't know, you then have to start thinking about when there's a material gap, or as the gap between SOP increases, is it likely that all of these things are procured -- are -- are procured on the same date, particularly as the gap gets larger and larger, in terms of the contract -- in terms of the prices being determined. So I think you start having some uncertainties there.

One of the -- one of the questions you have there

is, where there is a gap, let's say -- and I think it's arbitrary to choose two years or any other period of time, but where there is a gap between the SOP dates, between various articles associated with a platform, do you know that that's a -- that price was determined then, or do you -- or might there have been a separate RFQ relating to that part? Now, that's not something I think Dr Majumdar and I know the answer to.

Dr Majumdar was of the view that they're -- some of these parts might be -- some of these later parts might be follow-on parts. So he was saying these things might be different, and therefore -- and for me -- so that's his conjecture: so where there's a sizeable gap, these parts might be follow-on parts. One of the reasons why he thinks they're follow-on parts is because they're procured later, and I think that's a circular argument because I don't know what I don't know.

PROFESSOR NEUBERGER: Sure.

MR HUGHES: But -- but in any event, where I observe something that's been procured later, I am left with a real question as to when its prices were determined, because it's been determined later. One of the points I made earlier today is I observe, even where I know what the -- the RFQ and the contractual prices are, those prices can often be quite different, so I'm left

with a factual question. So one way of looking at this that I thought about doing was to look at, for the sample of seatbelts, steering wheels and airbags that I include in my dataset, do -- when -- do I observe technical modifications for a given part over time across those three price series, those three series of prices? And the answer is, it varies from part to part.

But let's say there's 40 to 50% of those parts are subject to price amendments, subject to technical modifications, which were classed as such, and for a number of those -- and then the question that then arises is: if these parts were entirely to be follow-on parts, what should happen is I should cease observing prices for those parts after the -- after there's been a technical modification, but in relation to steering wheels, I only observed that for two parts, in relation to seatbelts, I only observed that for zero parts, and for -- for airbags, I only observed it for one part. So, typically, when I observe -- so when I -- when I -- when I look at prices over time, I -- so -- so, for me, I think it is more likely than not, it's not a certainty, more likely than not, that where I observe a later price, that it's not a follow -- a later part or a later SOP, it's not a follow-on date, so I think I am left with some uncertainty around this question as to

whether I prefer Hughes 1, which -- and I'll unpick this a bit further in a minute. I have a question as to whether I prefer Hughes 1 or sensitivity B, because, if you like, Hughes 1 encompasses ranges of possibilities. I -- I don't know what I don't know, but I think there's -- there's three possibilities we need to think about in terms of the stuff that I don't know.

The first possibility is that there's a -- the part in question is a platform part, okay, and -- and there was a supplier nomination decision and that part -- and that part was associated -- the original contract prices would have moved then. I still think my original sensitivity in Hughes 1 might well make sense in those circumstances if it is the case that that price isn't actually fully fixed at that stage but is subject to further negotiations before production starts, and that seems to be the pattern of facts. So there's -- there's possibility 1, and I don't know how frequent these possibilities are, because these are all dealing with things I, by definition, don't know. That's possibility 1.

Possibility 2 is there was an RFQ in relation to this part -- this part that I -- I just don't have it, in which case, the best estimate of that RFQ date is the start of production minus 30, which is what I do in

Hughes 1.

The third possibility is that this is a follow-on part, as Dr Majumdar contests, and that there was a new part number, but instead of there -- so I'm -- I'm going down his alternative hypothesis, and I admit there's uncertainty, and on that third possibility, are -- are the prices determined at the start of production, however many years ago that -- or the start of the platform one, or was there material contract negotiations after that period?

The reason for focusing on these things in the way that I've just done is because, when I go back to the theory of harm, I think that all of those possibilities, it is possible, not a certainty, because that's not -- that's not the point of the -- econometrics is to test for things -- is the best guide for whether prices were effective, or not, my methodology in Hughes 1 or the revised platform one? So I don't have a clear way of preferring. But if -- if there was a credible theory of harm, and Dr Majumdar and I seem to disagree on this, it would involve a combination of incumbency principle and information sharing affected prices over time and also possibly some potential targeting. All of those three things could have affected -- if those theories of harm apply, all of

those three things could have affected the determination of prices under three of those three possibilities, such that I think the Hughes 1 sensitivity makes sense still.

I'm going to repeat something I said at the beginning, because it was quite a while ago. I don't know -- I don't know which of those possibilities apply, because we're discussing unknown data, but I think -- I think my sensitivity, the Hughes 1 approach, still makes sense in those circumstances.

THE CHAIRMAN: But we have to -- we can discuss in due course whether this is the right question, but typically courts will try and determine things on the balance of probabilities. You have put forward three different ways of -- three different situations. One way that one might approach it is to say, on the balance of probabilities, it is likely that the RFQ date will be between 30 and 30 -- or 28 and 34 months from the start of production. That would be something. But picking a single date with these variations which you have said are just -- sorry, I cannot remember the wording you used, but you suggested there was some uncertainty around them, are you confident of any of them on the balance of probabilities or not? Is that the wrong question?

MR HUGHES: I think -- I think, in these sorts of scenarios, the scenario that I painted of possibilities 1, 2 and 3, all of those scenarios are scenarios where Dr Majumdar is advocating that the by-platform sensitivity makes sense, in the sense that either the part was procured at the original period of time, the part -- there was an RFQ or whatever, there was an RFQ or there may have been an RFQ, or there wasn't an RFQ, there was just a commercial negotiation. The point I'm making is that even if you accept all of his conjectures, what I'm saying is, under Hughes 1, I still think it would make sense, under all of those scenarios, for whatever scenarios, the Hughes 1 sensitivity would make sense even if -- even if his fundamental premise is correct, because what I'm highlighting is there could well have been contractual -- it is likely that there would have been contractual balance of probabilities, likely there would have been negotiations to finalise those prices on the basis I've just described.

So in terms of preferring -- that's my first answer. So in terms of preferring Hughes 1 to -- to the alternative, I think what that really collapses to is a question of what's the right way of dealing with steering wheels, because that's the sensitivity where it makes a material difference as to whether you adopt

the Hughes 1 approach or whether you adopt platform sensitivity B, and what I find there is that if you adopt the alternative approach of method A, or the Hughes 1, you don't get the same statistical significance under method A, you get a slightly lower level of significance, but you do still, for seatbelts, find an overcharge on seatbelts under method A, not to the same degree of statistical significance.

So I think I'm -- I'm not sure I need to arrive -- I'm not sure I need to arrive at a perfect answer to your question on the balance of probabilities. I think I can say, if I go -- if I go down Dr Majumdar's route but allow for the possibility of contractual negotiations, you get back to Hughes 1. If you stick with his -- his approach on -- on two out of the three parts, there's not much difference between the two of us. And on steering wheels, it really depends upon whether you prefer method A or method B, in an environment, though I prefer method A, I have got much fewer data points, much less known in steering wheels.

THE CHAIRMAN: But I just want to press you on this a little bit. One could say, well, I am confident they fall within a range, which is not the approach being taken, one could say, "We do not know", or one could say, "On the balance of probabilities, this is likely to be

the best estimate", and you are not saying the third, as I understand it?

MR HUGHES: I think -- I think the best estimate -- best estimate I have for -- for steering wheels would be either -- would be that there's an overcharge on steering wheels and I would go down the approach that I've talked about, in terms of Hughes 1 on the balance of probabilities, but I don't think it's clear-cut. So I think it's the best I can do in an environment where I have a small number of known data points to make inferences, and it's harder to make inferences in those circumstances.

THE CHAIRMAN: Dr Majumdar, do you have any comment on that?

DR MAJUMDAR: I have several, sir.

Okay, so the question is -- well, the original question, I think, is essentially do the -- do the experts prefer Hughes 1 or sensitivity B, and I think -- I will try to answer that question. But just by way of framing it, Hughes 1 takes the start of production less 30 months. Now, what we know from these charts is that when you look at the distribution of gaps between the start of production and the RFQ date, most of the gaps are actually even outside of a window of 24 to 36 months, so there's a very wide dispersion. In fact, we could even go up to the figure above and you

can see that on some of the chart. So -- so is it the case --

THE CHAIRMAN: Have we got the actual figures for this?

DR MAJUMDAR: We have, it's in the JES. I can't remember which statement response, but the majority of known articles have a gap between RFQ and SOP that's actually wider than 24 to 36 months. So I think one can reasonably say that SOP minus 30 is not a good estimate.

When we look at these charts, it's clear, to my mind at least, that for known platforms, the RFQ dates align. We see that in 29 out of 31 platforms, and the other -- and the two exceptions are explainable. So -- so we know that for the known RFQ dates, they all align on the same date, so therefore my starting point is: what do I do if I have an unknown RFQ date but I know what the platform is? It seems reasonable at least to say, well, if I know the RFQ date for other -- others in the platform, I'll just assume it's the same. So we know, for that platform, that most of them line up -- or all of them line up on the same date where we know the RFQ date. If I have an article attached to that platform but I don't know the RFQ date, it seems to me to make sense just to assume it's the same as all the others that we do know. So that would -- that, to my mind at least, is more likely to be accurate than

simply taking SOP minus 30.

Then we have the question of so-called follow-on articles, and there are -- there's a small -- there's a relatively small percentage of overall unknown articles but a relatively high percentage of those which have a later SOP date in the sense of the SOP date is two years or more after the earliest one of the platform. Sorry, that's probably a bit confusing, but in essence, there are -- there's a -- there's a minority of articles with unknown RFQ dates that have a start of production date later than -- two years later or more later than the earliest SOP date for the platform, and then there's a question: do we align their RFQ dates also with the known RFQ dates for the platform, or do we do something else with them? My argument is, having looked at the data -- and it might just be worth -- let me just tell you which chart to look at. So if we go to {E1/15/16}, in figure 4 -- if we could blow that up, please. In figure 4, what I've done is I've said there are some candidate follow-on articles. So these are articles which have the same technical characteristics as the original article, which is shown in blue, and they also appear to continue the -- the price trend. So they have the same characteristics and they seem to continue, as I say,

the price trend of the original article.

So the question is: what does one do with those? Do we assume they have an RFQ date at the start of the platform like all the others? Do we think that they are follow-on platforms with a different RFQ date, or something else? My answer to that is, well, it's not unreasonable to presume that they have an RFQ date at the start of the platform, because in some senses that's our best guess as to what the RFQ date should be. Even if that's wrong, what's clear from this chart is that the price is, if you like, linked to the price of an article that was determined on the platform, so in some senses, if you -- if you want to understand where the real sort of competitive point, or the -- if you like, the nature of competition occurred, it was probably at the start of the platform, because these almost always would be supplied by the same supplier that supplies that platform.

So I would say those two reasons would be good reasons for treating the RFQ date as the same as all of the other known articles on -- on that platform. So on that -- to me, that makes me lean towards sensitivity B as more likely to be a better approximation than Mr Hughes' approach.

PROFESSOR NEUBERGER: Sorry, we are conscious of the time.

Can I just then follow up. So we have got somewhat -- not totally conflicting views between the experts about the relative merits of the two. I mean, neither of you -- as far as I can see, nobody knows what the true dates are; they are both reasonable, honest attempts to try and fill in a gap and one might prefer one or the other.

I have got two questions. One is, if one looks at the regressions, I think Mr Hughes referred to this, he was saying that there seems to be -- if one treats this as a sensitivity analysis, do the results change substantially as a result of this? Mr Hughes, I think, was saying -- I do not want to put words in his mouth -- something like, in airbags and seatbelts, it is reasonably broadly confirmative, and in the case of steering wheels alone, it is markedly different. Is that a fair summary of the way you look at the numbers?

DR MAJUMDAR: It's -- it's not. Can I just -- just before we get onto this, I just want to make a point that if we do then start focusing on sensitivity B, it doesn't mean that all of the other sensitivities that we've talked out are -- are not relevant; they are still highly relevant --

PROFESSOR NEUBERGER: Sure, sure.

DR MAJUMDAR: -- it's just we would want to apply them to a sensitivity B model as opposed to a Hughes 1 model.

For me, it's a very important point, just to --

PROFESSOR NEUBERGER: Sorry, to make that point clear, what you are saying is that you think that all the calculations should be done on a B basis rather than --

DR MAJUMDAR: If we are -- so my view is, if the Tribunal were to, if you like, focus on the sensitivity B model, all of the sensitivities that we have discussed are still important, we can't just throw away the knowledge we have from those, so ... and I -- but I think that's an extremely important point, I just wanted to make that.

PROFESSOR NEUBERGER: Fine. Okay, I have got that point.

DR MAJUMDAR: Okay, great. Thank you.

Right, so the question then is focusing only on the sensitivity B results that we have --

THE CHAIRMAN: I am sorry, Dr Majumdar, can we -- I think this is going to take longer than two minutes --

PROFESSOR NEUBERGER: It is.

THE CHAIRMAN: -- and we need to rise promptly, so I think that is probably a good place to break. You will be re-asked the question tomorrow. You are not expected to remember it overnight.

DR MAJUMDAR: Thank you, sir.

THE CHAIRMAN: Thank you both very much. Of course, please

do not talk to anyone about the case overnight and we will see you back here at 10.30 tomorrow, if that is convenient.

(4.16 pm)

(The Court adjourned until 10.30 am on Tuesday, 15 October 2024)