IN THE COMPETITION APPEAL TRIBUNAL

Case No: 1284/5/7/18
1290/5/7/18

Salisbury Square House
8 Salisbury Square
London EC4Y 8AP

Thursday 26 May 2022

Before:
The Honourable Mr Justice Michael Green
Derek Ridyard
Sir Iain McMillan CBE FRSE DL
(Sitting as a Tribunal in England and Wales)

BETWEEN:

Royal Mail Group Limited
BT Group PLC and Others v DAF Trucks Limited and Others **Claimants**

v

DAF Trucks Limited and Others **Defendants**

A P P E A R AN C E S

Tim Ward QC, Ben Lask and Cliodhna Kelleher (On behalf of RM/BT)
Daniel Beard QC, James Bourke and Daisy Mackersie (On behalf of DAF)

Thursday, 26 May 2022

(10.30 am)

THE CHAIRMAN: Good morning, everyone.

So we resume today. I assume Mr Ward is still connected to us and can hear us.

MR WARD: Yes, thank you.

THE CHAIRMAN: Good morning.

All right. So we are on to global financial crisis.

MR JAMES HARVEY (continued)

PROFESSOR DAMIEN NEVEN (continued)

Questions by THE TRIBUNAL (continued)

MR RIDYARD: Okay. Well, we will start off with a gentle warming-up exercise. The first question -- perhaps, Professor Neven, you could start on this one -- just standing back, we are talking here about the demand effects of the global financial crisis, the GFC, how in principle could the GFC distort or affect the attempts to measure the effects of the infringement?

PROFESSOR NEVEN: It is important to control for the global financial crisis because, if you do not, there may be a bias in the estimate of the infringement and, in order to see this, I think it is useful to distinguish the effect of the global financial crisis that may be taking place during the infringement and those lingering effects of the global financial crisis that are taking

place after the end of the infringement.

So let us first think about what is happening during the infringement. If you do not control for the financial crisis properly, you will not actually take into account the fact that the prices were low because of the financial crisis, which basically is to say that, I mean, if you fail to control for this, you are going to fail to control for the fact that the prices would have been higher in the absence of the financial crisis, which means that you are going to underestimate the effect of the infringement.

The opposite effect is taking place if you are failing to control for the financial crisis or the lingering effects of the financial crisis that are taking place after the end of the infringement. So if you fail to control for this effect, you will have the opposite bias.

MR RIDYARD: So what are the lingering effects, the after-effects?

PROFESSOR NEVEN: You have to look at the profile of the fall in demand. What you see is that the demand is really falling in 2008 and it stays low in 2008/2009, it is starting to pick up in 2010 and then it is sort of picking up again in 2011, but it takes a long time to recover. So it is important to control for the fact

that not only the demand actually fell sharply in 2008/2009 but also to take into account the fact that it took a long time to recover, so that what we observe in 2011/2012, which are important periods for the identification of the infringement, are also affected by a particular state of the demand -- also affected by the fact that the demand is low during that period.

MR RIDYARD: Mr Harvey, do you have anything to add to that?

MR HARVEY: No, I agree with what Professor Neven has said. I think the empirical complication -- one way of thinking about it is that ideally, he says, what we would like is two financial crises, one with the cartel and one without the cartel, and be in a position to compare how pricing would be between them. Thank goodness we do not have that, but that is the ideal. So some of the complications we are about to discuss arise because we do not have that sort of perfect benchmark for the pricing during the financial crisis, but the effects that Professor Neven has described and the relevance of it for the overcharge analysis I agree with.

MR RIDYARD: Okay, thank you.

The next series of questions, I think it makes sense to start with Mr Harvey and get Professor Neven's view afterwards. Obviously it is about how in the estimates

you control for the effects on demand of the GFC. In general -- we talk about experimental variation and hypothesis testing and, in general, what you want, if you are trying to do an experiment, is a bit of -- is a good bit of variation in your independent variables. So everyone agrees that demand is a factor that influences price and here we have a nice chunky effect on demand so, scientifically, as it were, in first principles you would be happy about having a big variation in this independent variable because it would help you to isolate the impacts on price. So what is wrong with your -- just using the standard demand variable to measure the effect of the GFC on prices?

MR HARVEY: Yes, can I show a chart?

MR RIDYARD: Yes, please.

MR HARVEY: So it is in that folder. It is in my first report.

MR LASK: {E/IC1} for the Opus.

MR HARVEY: Sorry, bear with me, it is, yes, {E/IC1/81}, figure 2. This is some context for the discussion we are about to have. So this is showing the annual sales volumes recorded in the MI data, which includes the crisis period and the red circle shows the volume of sales in that period. You can see that there is a pronounced drop in that period relative to the prior

few years and indeed the years that follow. So this is the chart that I saw early on in the process.

THE CHAIRMAN: Quite a spike before the start.

MR HARVEY: Yes. It is true there is variation throughout the period. In terms of how I approached the problem -- I think you had a question about what did I do first, and the first approach was indeed to include the whole period, include a control for demand. Having observed this, we also looked at what happened if we removed that period from the estimation. What we found was that, indeed, the overcharge that was estimated, having removed that period, was significantly higher. So that raised several questions in my mind: what could explain that? I think there are three sort of broad candidates.

One is that the overcharge fell -- it varied over time and it fell significantly in the 2008/2009/2010 period. In fact it would need to be negative to offset, as it were, the higher overcharge in the earlier period. That is one possibility.

The second possibility is that the model that includes the full-time period with the volume driver is not properly reflecting how pricing decisions were actually made in the global financial crisis period. Put another way, if you like, the average effect of volume changes across the entire data set on prices is

not properly reflecting the effect of the very sharp and steep decline on prices during the global financial crisis period. That is the second possibility.

The third possibility is that that data is -- I think this goes to the question, Mr Ridyard, that data is sort of instrumental and informative for understanding how pricing works across the period as a whole. The variation in volume is crucial to unpick the underlying sort of pricing model that DAF used across the whole period.

So they are the three possibilities. As we discussed yesterday, on the first possibility I did not have a strong prior that the overcharge should vary over this time period and indeed the infringement continued.

On the second possibility, we had quite a lot of evidence from the witness evidence suggesting that there was indeed something special about this period, so it referred to this being an unprecedented period of demand reduction, and indeed it was. We also learned that, during this period, the approach to pricing was somewhat different with I think all orders being elevated to DAF NV for sign-off in and around this time.

Then the third thing that varied was that I understand there was increasing concern with regards to visibility, which is the idea that how many --

basically how many truck orders do you need to get in for your factories to be operational and to be fully utilised, because I think kind of the concern is you have got labour there waiting to do their job and, if you do not have enough trucks, they are idle.

Then the fourth thing we heard about was cancellations. I did not fully appreciate, I think, the consequences of that from the witness evidence, but one consequence is the possibility that production has already started for trucks and then the order gets cancelled and you are left with a truck that has not a home. We do not see that from the witness evidence but I think Mr Ashworth referred to that.

So the combination of those things led me to believe that there was a difference in, if you like, the underlying approach to pricing during this period and that it was not just like normal changes in demand and the effect that that would have on average across the period as a whole. It was those considerations that led me to treat this period differently to the rest. In effect, I have got a concern that the average effect of volume changes, demand changes, rather, on prices, would potentially understate the effect that occurred during this period in view of those considerations.

Sorry, that was a bit longer than I hoped it would

be.

MR RIDYARD: No, there is certainly a lot there to chew over.

Just starting from the beginning, though, what you did first of all is run your regression model with your existing demand controls and --

MR HARVEY: Yes.

MR RIDYARD: -- when you did that, presumably you found you got a zero or very low cartel effect?

MR HARVEY: It was low. I think it was of the order of 1% or 2%.

MR RIDYARD: Okay. Then you looked into this and decided that it was appropriate to --

THE CHAIRMAN: Just so I understand, that is from the period -- this is the during/after period, so it is 2004 to beyond?

MR HARVEY: That is correct, yes.

THE CHAIRMAN: So that without your control variables --

MR HARVEY: That is right.

THE CHAIRMAN: -- it showed limited overcharge over that whole period?

MR HARVEY: Yes.

THE CHAIRMAN: Okay.

MR RIDYARD: Then one of the possibilities you then referred to was that what was happening here was there was an

overcharge, you know, before the GFC and then there was, if you like, an undercharge during these few years and they were cancelling out, but you said you had no priors as to whether that was the case. Is there any way in the econometrics in which you can look at the effects of the cartel year by year?

MR HARVEY: I think it is quite -- it would be quite challenging to do that, I think, because if you believe it is varying, you also need to believe that you have got adequate controls for everything else, so that, for example, an annual cartel effect is not picking up the effect of those other things changing. So I think in practical terms that would be quite challenging.

MR RIDYARD: Yes, and all the econometric approaches of both of you -- you have both just tried to do a 1/0, on, off comparison --

MR HARVEY: Well, underlying both of our approaches I think is the idea that it is at least stable and the same within the two periods.

MR RIDYARD: Yes. Then as regards the effect on pricing conduct, there were various points you mentioned there. I mean, one of them seemed to be that -- if I can sort of paraphrase maybe slightly what you said, DAF suddenly started looking at costs, just looking at avoidable costs, instead of looking at total costs or -- would

that be a way of characterising, you think, the change in their mindset?

MR HARVEY: I think that could be an indication of what I have said in the sense that they are now -- we have our cost measure, the MLO cost measure, which we are treating for the purpose of the econometric as a cost, which I think makes sense when you are full in a factory. I think when you are not, presumably there is some labour and overheads that -- they are costs that you are incurring whether you manufacture or not. So although that is not what the witness evidence says explicitly, so I am not at all trying to say that is the case, but what it is saying is that they are paying regard to the fact that the factories are not full and they want to fill them.

I think Mr Ashworth indicated or said something to the extent of sort of, you know, labour is there ready to run, and so I think it is plausible that the relevant -- the cost that became relevant from making pricing decisions during this period is perhaps different to the cost that is relevant from making pricing decisions when the demand is more buoyant.

MR RIDYARD: But the MLO cost -- I know you both examine the extent to which the MLO costs include some sort of overhead costs and I think you get an estimate of that

and it is 20% or something of cost, something of that order, I think -- 20% of MLO cost is considered to be overhead cost, is it?

MR HARVEY: It is something of that order. I am afraid I cannot remember the figure.

MR RIDYARD: When you are talking there about labour, the implication, they seem to be saying that, "Well, we are stuck with employing these people come what may", so in that sense labour would be an overhead cost in that --

MR HARVEY: In the scenario I am giving -- well, with all cost measures there is obviously a -- really one of these awful things you always encounter is sort of the extent to which a cost is truly variable, and from the description I heard the other day, it sounded like some labour would not be truly variable, which makes some intuitive sense to me. So there is some portion of that MLO cost that, during this period, could rationally be treated as an overhead.

So, yes, I think that is the sort of way I am thinking about it.

MR RIDYARD: Okay.

THE CHAIRMAN: So are you saying that there are effectively wasted costs because they are not manufacturing as many trucks as they thought they would?

MR HARVEY: I think that is one way of putting it, sir.

I am sort of putting myself into the position of somebody making a pricing choice during that time and I am looking around me and my factory is not full anymore and yet I have people sitting there, waiting to build a truck, something I would dearly like to see at some point, so I am deciding whether I take the order and make a contribution to those costs or not.

Now, again, the reason I am being slightly careful with this is that, obviously, over time, DAF could make decisions about how many people it hires at any point in time and so forth. Yes, that is what I am trying to --

THE CHAIRMAN: What, so the pricing decision is affected by that?

MR HARVEY: Yes.

THE CHAIRMAN: They would, what, reduce their prices because demand is so low and they just need the business?

MR HARVEY: They want to make a contribution to what they might view as a fixed cost at that time. So another way of putting it is, yes, they are carrying spare capacity and it makes economic sense to utilise it.

THE CHAIRMAN: That is not countered by the ordinary demand control?

MR HARVEY: No, because in a sense it is a separate route because, in our cost variable, in the econometric model, that cost variable is the full MLO cost, so the model is

predicated in a sense on the pricing decision being reflective of the MLO cost, whereas, in fact, in this period it may not have been.

MR RIDYARD: But why does -- just let us go out of the financial crisis period and talk about in general when there is just more regular fluctuations in demand. Why does pricing depend on demand?

MR HARVEY: Well, out of normal pricing -- sorry, in normal economic conditions one reason why pricing might depend on demand is when the factory gets -- well, factory utilisation goes up, the resources that you need go up to meet that additional demand, and that puts upward pressure on both the -- potentially the input costs for manufacturing trucks. That is one mechanism and it could go the other way round as well, but these things are sort of matters of degree. It depends a lot on your ability to expand production to meet the additional demand and the costs of doing that.

But, for me, it is quite possible that actually in periods of more stable or rising demand, you may not see as big effect on prices as you would do in a period where demand falls sharply and where you are left with some "spare capacity" to -- that you can use to manufacture trucks.

MR RIDYARD: Okay.

MR HARVEY: Is that...?
MR RIDYARD: Yes, I can understand the answer, yes.
SIR IAIN MCMILLAN: If I can ask, does that mean that, in your view, when demand dropped, it was important to bring in business at a much lower price and that would contribute to covering the cost of the overheads?
MR HARVEY: Yes. That is what is underlying this. It is a changing pricing model in a sense during that period.
SIR IAIN MCMILLAN: Thank you.
MR RIDYARD: Professor Neven, there is an awful lot there for you to comment on.
PROFESSOR NEVEN: Yes.
MR RIDYARD: I will give you good opportunity to make points, but how would you like to organise your thoughts on that?
PROFESSOR NEVEN: I mean, I follow instructions from you or questions from you, but can I just make a comment on this sort of last discussion which is about pricing in periods where demand is going down sharply? Pricing depends on variable cost, so you will, in principle, accept an order as long as the price is in excess of the marginal cost or in excess of MLO essentially.

So, I mean, the reasoning that is put forward here, that the contribution to fixed cost is something that matters, I think is a formulation that is a bit

misleading. I think that in all circumstances you will want to sell trucks in principle as long as the price is above the variable cost because that makes a contribution to the fixed cost, so there will always be a contribution as soon as the price is above the variable cost.

Now, what is happening in a period of reduced demand is that the willingness to pay of customers is going down so the extent to which customers are going to be willing to pay for your trucks is coming down. So, I mean, in a period in which demand is going down, DAF may be facing customers asking for low price that it would not have accepted in a period of high demand because it had an alternative; I mean, to sell the truck to a customer that had a higher willingness to pay.

So what is happening in a period in which the demand is going down is that the willingness to pay of the customers is going down and so, indeed, DAF may be led to accept offers from customers or prices from customers at the level that is lower than what it would have done in the absence of this reduction in the willingness to pay. I think this is the correct way of looking at it.

I mean, you always sell a truck, in principle, as long as the price is in excess of the variable cost, but, you know, what matters is the alternative. Is it

that, you know, you can potentially sell the truck to a customer that is very demanding in terms of price? Can you afford to tell him, "No, okay, because I will have another customer"?

MR RIDYARD: So you are putting it all on the demand curve and not on the supply conditions --

PROFESSOR NEVEN: Yes.

MR RIDYARD: -- but can you separate them out quite that neatly because the opportunity costs to DAF of giving in to a low price request, it sort of depends on what else DAF could do with that factory and those people.

PROFESSOR NEVEN: That is exactly my point, that, you know, the opportunities -- the alternative opportunities for DAF are determined by the way in which demand is changing. I mean, when the demand is changing, DAF may have sort of worse opportunities in order to try to sell this truck to someone else, so I --

MR RIDYARD: But Mr Harvey's sort of rationalisation of that was more in terms of cost, but it was saying -- was it not saying that the opportunity costs change --

PROFESSOR NEVEN: Exactly, so maybe my comment is a bit pedantic, I am sorry.

MR RIDYARD: No, it is useful and interesting.

PROFESSOR NEVEN: Because I think really the demand -- the effect is a demand effect and I think that the

formulation is important to understand what is happening here. So if there is indeed -- if you accept that there was a demand effect, a willingness to pay off customers in going down, DAF has fewer alternatives. I think it is -- you know, you anticipate that DAF indeed is going to accept prices at, you know, a lower level, and that is the normal effect in which the demand affects the pricing of trucks.

You know, when the demand is very high, the willingness to pay of customers is very high, DAF has lots of opportunities to sell trucks at high prices. I think that what we are observing here in the financial crisis is really a reduction in customers' willingness to pay, but this is the way in which demand works normally so there is nothing special about this. So this is really, truly, a demand effect.

SIR IAIN MCMILLAN: In the United Kingdom, during the global financial crisis, the levels of unemployment did not go up to anywhere near the levels that were expected. My question is: was that a factor in the DAF situation as well? Did they keep themselves over-resourced in terms of the MLO which had an impact on their pricing policy?

PROFESSOR NEVEN: I have not looked into what has been DAF's policy in terms of the retention of workers during that period. I remember -- so I do not have precise

information. I remember some conversations suggesting that DAF's general commitment to its workforce in particular in the Netherlands -- because I remember this comment about the Netherlands in particular -- was such that they actually kept most of the workers.

SIR IAIN MCMILLAN: Okay. Mr Harvey, do you have anything to ...?

MR HARVEY: I do not. The only brief observation I make is that that they started to look at visibility, "visibility" being I think -- I may get the definition of this slightly wrong, I think, but it is -- how long your factory can continue running at the agreed build rate with no more orders --

SIR IAIN MCMILLAN: Right, yes.

MR HARVEY: -- is sort of suggestive that, at least over some period, the fact they cared about that suggests they had some -- there is some stickiness in the amount of labour that they had, but I do not know whether they reduced their demands.

SIR IAIN MCMILLAN: Thank you.

MR RIDYARD: But, essentially, Professor Neven, I think your view on this is quite straightforward. In a sense you are saying that that is why demand affects price and this was a change in demand so let us just look to see how it affects price. You do not think there is a kind

of paradigm shift or qualitative change in the way in which pricing was done. It was a bigger change than had been seen before but it was just a change and it was affecting through the same mechanism as when you would try and analyse the impact of demand on price in any case.

PROFESSOR NEVEN: I am of course open to the argument that there may have been something specific, but I have not seen any evidence suggesting that there was something taking place that was different from simply the normal operation of a large reduction in demand. Of course we see during that period that the mandate structure operates more actively, but it is, you know, what you would expect because many customers have a lower willingness to pay for the trucks. I mean, they are asking for lower prices. These prices might lead to margins -- target margins -- sorry, margins that -- over IKP that are below the target margins and then the deals are being escalated to DAF NV and potentially to PACCAR.

So, you know, the increase that you see in the activation of the mandate structure I think is completely consistent with the idea that, yes, customers would -- you know, were asking for lower prices and there were fewer alternatives.

THE CHAIRMAN: So what you are saying, I think, is that the

global financial crisis did not have any other effects, other than to affect demand.

PROFESSOR NEVEN: Yes. As I said, I am open to thinking about alternatives, but I think that, first and foremost, it is an effect on demand and I have not seen any evidence suggesting that there was something else.

THE CHAIRMAN: What about increased cancellations of orders? Is that just an effect of demand?

PROFESSOR NEVEN: That is a reduction in demand. It means that your alternatives are getting poorer.

MR RIDYARD: You mentioned a couple of times this willingness to pay thing and we are going to come on to that later on in today's session when we talk about emissions, but I am just curious to understand how this -- how you see this working. In a competitive market each of the suppliers is looking at its own MLO and it knows how much it costs to make trucks, so would willingness to pay really be a big driver of the price level other than in the very short term because, if people are suddenly very willing to pay high prices for trucks, then you might expect that -- truck suppliers to pile in and sell more trucks to them until you got back to a price that equated with the costs rather than with demand conditions.

PROFESSOR NEVEN: Yes, but I think that you have to take

into account the fact that -- I mean, there is a lot of product differentiation here, I mean, so that DAF is facing customers, I mean, that of course are going to consider alternatives, but the prices are not going to fall to marginal cost, are not going to fall to the MLO, because there is this element of product differentiation.

So when we talk about a reduction in customers' willingness to pay, what we are thinking about really is that customers' willingness to pay for DAF Trucks is going down. So I do not think you can think about, you know, what is happening in terms of the financial crisis, I mean, simply as a shift in demand in which, you know, there is an aggregate demand for all trucks and this sort of aggregate demand for all trucks from all manufacturers is going to, say, shift inwards and is then going to lead to a new position in which the price is equal to marginal cost. I think that, you know, it is much more complicated than that and it is affected by a degree of product differentiation among the trucks, so this paradigm is a bit misleading.

MR RIDYARD: Understood.

Whilst we have still on my screen -- on the screen is this chart showing the variation in demand year on year. Can I just, Professor Neven, take you back to

what you have said upfront about, you know, the lingering effects of the GFC. I mean, just kind of eyeballing the chart, you could say pre-GFC a normal rate of demand looks like it was about 11,000 or 12,000 and you got to 12,000 more or less in 2000 --

PROFESSOR NEVEN: 2013/2014.

THE CHAIRMAN: 2011.

MR RIDYARD: 2011.

PROFESSOR NEVEN: 2011, that is right. Sorry. It goes back to 11,000 in 2011 and then you see that it stays at a fairly low level and goes down to 9,000 in 2014.

This is of course one way of capturing demand, which is looking at the sales. I think that of course this is a bit endogenous -- okay? -- because these are the actual sales, so this is not really an exogenous estimate of demand. So I think that in order to look at the pattern of demand, maybe you want to look at one of the charts that I have in my own reports, in which I look, for instance, at tonne-kilometres or if -- also I also look at other sort of internal measures of demand by DAF, and they show that, you know, this lingering effect is more pronounced. But if you want, I can bring you to that chart, but --

MR RIDYARD: Yes, I think it might be useful to take a look at that. Thank you.

PROFESSOR NEVEN: So this would be, I suppose, in my first report.

MR RIDYARD: Do you have the reference to Professor Neven's first report?

MR BEARD: I do not know which table he may be going to, but I wonder if it is page 37, figure 5.

PROFESSOR NEVEN: Of which one?

MR BEARD: Your first report, Professor Neven.

THE CHAIRMAN: The reference for which is ...?

MR BEARD: It will be {E/IC11/37}. I think it is the same page reference in the hard copy. Page 38, I am sorry, {E/IC11/38}.

PROFESSOR NEVEN: What you have in this actually -- in this diagram is the evolution of --

THE CHAIRMAN: Let us just make sure we are all on the right one. This is figure 5, is it?

PROFESSOR NEVEN: Yes. This is a graph that indeed shows the evolution of demand for the entire period, so it is from 1995 onwards until 2018. You have the three measures, the measures I am using to control for demand. You have the order board which is in blue, you have the average delivery lag which is in red and you have tonne-kilometres. As I was mentioning earlier, the fact that the demand did not recover is particularly apparent in measures of demand that are exogenous. This is

tonne-kilometre that you have in yellow.

MR RIDYARD: Can you explain what "tonne-kilometres" means?

PROFESSOR NEVEN: Okay. Tonne-kilometre is a measure of the demand for trucks because it is the measure of the amount of activity in the transport industry, so it is a multiplication of the volume by the distance over which this volume has been transported.

MR RIDYARD: So it is not about new trucks, it is about the total of stuff being carried?

PROFESSOR NEVEN: That is right.

What you see there is that, you know, there is indeed a fall at the time of the financial crisis and this exogenous measure is actually staying low for a longer period of time.

MR RIDYARD: Yes.

PROFESSOR NEVEN: That is why I think that there is a lingering effect and it is important to control for it.

THE CHAIRMAN: It is staying low, it seems to sort of spike at --

PROFESSOR NEVEN: You see the yellow one. The yellow one, it sort of spikes before the financial crisis and then it goes down sharply at the time of the financial crisis --

THE CHAIRMAN: Oh, okay. Yes.

PROFESSOR NEVEN: -- and then it stays low.
MR RIDYARD: It does not really recover until 2015/2016.
THE CHAIRMAN: Well, there is another big drop in 2014.
PROFESSOR NEVEN: Then there is another big drop there, that is right. There is another big drop in 2015.
THE CHAIRMAN: What is that due to?
PROFESSOR NEVEN: It is a macro-economic shock. Again you see it is short-lived. You know, we have been trying to enquire about this and I think the best explanation we can come up with is a reduction which is actually due to the expectation of increase in the prices of natural resources. I mean, that is the sort of explanation that you have for the fall in demand at the time, so -- okay, that is the best explanation that we could come up with. It is also, you know, just pre ... That is the macro-economic shock.
MR RIDYARD: It is useful to see the two charts there.
Mr Harvey, do you have any comments on this before we move on to the next topic?
MR HARVEY: The only observation, reflecting on the discussion around willingness to pay, I think, you know, there may well be some upward and downward pressure on prices that is driven by sort of, if you like, the demand side in and of itself. But my sort of intuition would be that margins in this market would be driven by

the strength of rivalry between the competitors.
I think the way the pricing decisions would be affected principally on the supply side, that is to say the extent to which the reduction in demand gives rise to the types of effects that I was speaking about earlier in terms of the way the factories are utilised.

MR RIDYARD: Okay, thanks.

Okay. Let us just move on then to the actual -- the use of the dummy variables that, Mr Harvey, you have adopted. You have decided in your econometrics to apply a dummy variable to 2008, 2009, 2010. Why did you choose that particular approach and why did you not try harder, as it were, to understand what was happening to demand and to use a more variated demand measure rather than the sort of 1/0 measure of a dummy variable?

MR HARVEY: So there are various options for controlling for sharp changes in demand. One of them is the dummy variable approach. Another approach would be to essentially augment the whole model so essentially split the model into two parts: one part that has the relationship between prices, cost, demand and the other co-variants and another part of the model -- sorry, in normal times, the other part of the model tries to do the same thing in the global financial crisis period. So, put another way, one example would be to allow the

strength of the reaction of prices to demand to differ during the financial crisis period compared to outside of it.

I did not do that. Partly it is -- to have that degree of flexibility within the model is demanding, but, also, you run into a sort of similar problem, which is: how do I inform how to make those adjustments and changes to the model? I have some information from the witness evidence regarding how they approach pricing decisions but I do not have full information regarding how they viewed costs and so forth to allow me to do that. So that is another approach and that is the reason I discounted it.

The third approach is the suggestion by Professor Neven, which is to almost split the demand variation, look at demand over time and say, "Well, there are some particularly high periods of demand and some particularly low periods of demand". I had not thought about doing it in that way, honestly, at the time of writing the report. I did reflect quite hard on the suggestion that was made. The difficulty that I run into with that approach is that I then need to specify some other benchmark for what a high or low period of demand is. So it seemed to me that it did not really tackle -- the underlying concern almost was that the

application of the dummy variables was somewhat arbitrary. I disagree with that because I based it on the evidence that I had, but instead what you do is supplant it with some other arbitrary threshold that I need to decide how to apply.

The second thing that happens with that type of approach is that, depending on where you set those thresholds, you bring in other periods outside of the financial crisis that you call "high demand" or "low demand", and since the whole enterprise was motivated by the witness evidence telling me that something during the financial crisis, that is the thing that matters, I did not think that was a particularly good way of going about the analysis. But these are the sort of options that I considered.

MR RIDYARD: Professor Neven.

PROFESSOR NEVEN: Yes, there was a lot. Now, maybe what -- if you would allow me to structure the discussion in that way, without interfering with the sequence of questions that you had anticipated further, shall I explain what are the consequences of using a dummy approach, you know, and why this is a particularly --

MR RIDYARD: Yes, okay. That is fair. Yes, please.

PROFESSOR NEVEN: Then I would look at the alternatives that Mr Harvey has mentioned.

MR RIDYARD: Yes.

PROFESSOR NEVEN: Now, I think that it is -- the first thing to realise is that the introduction of dummy variable has two important consequences. I mean, one that I think we will discuss further later, which is that by introducing a dummy variable for 2008, 2009 and 2010, Mr Harvey is reducing the population of trucks over which he undertakes identification. Identification of the infringement dummy in this approach here is undertaken by comparing the prices of Euro 5 and Euro 5 EEV trucks during the period of the infringement and after the period of the infringement; okay? But the important point is he is only directly using Euro 5 and Euro 5 EEV trucks for the sake of the identification of the infringement.

When he is introducing a dummy for 2008, 2009 and 2010, all the Euro 5 and the Euro 5 EEV trucks that are sold in these three years are no longer used for the sake of identification.

MR RIDYARD: This is because those are the only trucks that are common to the during and after period?

PROFESSOR NEVEN: Exactly, yes. That is right. That is important and of course this will fundamentally affect the identification.

Now, then you need to think about the other

consequence of introducing these dummies.

THE CHAIRMAN: Sorry, in terms of reducing the population, I think Mr Harvey's evidence was that it was by about 10%; is that right?

PROFESSOR NEVEN: No, it is 10% over the entire population of trucks --

THE CHAIRMAN: Okay.

PROFESSOR NEVEN: -- and it is about 50% of the trucks that are used for the sake of identification in the before period --

THE CHAIRMAN: Thank you.

PROFESSOR NEVEN: -- so it is a very substantial reduction in the population of trucks that are used for identification.

Now, let us look at the other consequence of introducing these dummy variables. The consequence of introducing these dummy variables is that the normal demand controls will not play the same role in explaining the level of prices as they would do in the absence of these dummies. This has important consequences for identification and leads to an upward bias in the estimate of the infringement. Maybe the best is to walk you through that reasoning and maybe the best is to go through my second report, table 4 of my second report, which I think is tab 8 in my bundle. It

is {E/35}.

THE CHAIRMAN: Is it IC35?

MR BEARD: You do not need the IC, it is just {E/35} because none of it is confidential so it is just in there.

PROFESSOR NEVEN: Sorry, it is not table 4, it is table 3.

MR RIDYARD: Page number?

PROFESSOR NEVEN: In my own pagination it is 24. I think in the court's pagination it is 26.

MR BEARD: {E/35/26}.

PROFESSOR NEVEN: So what you have in that table is in the first column the estimation which is performed by Mr Harvey, so it is in euro and it has the dummies for 2008, 2009, 2010. What is important is to look at the coefficient of the demand variable, the normal demand variable used by Mr Harvey, which is DAF UK sales volume. You see that in that estimation the coefficient is equal to 0.004, so it is a very small magnitude.

You then consider the second column and you look at the results of the estimation. We can, for instance, look at the estimated overcharge and you see that the estimated overcharge barely changes. So if you remove this demand variable in Mr Harvey's estimate, it really does not affect the outcome.

What is even more telling is what is happening to this demand variable if you remove the dummies

introduced by Mr Harvey. As Mr Harvey has explained earlier, if you remove the dummies, you have an estimated overcharge which is 1.3%, so it is very small. But what I want to emphasise here is the fact that the sign of -- not only the sign but the magnitude of the coefficient of the demand variable increases by a factor of 10. So the main insight from this table is that if you introduce the dummy variables, this mutes -- this reduces the impact that the demand variable can have in explaining the prices.

Let us look at the consequences of that for the sake of identification. We know that before the financial crisis, so before 2008, there is a period of high prices. If you do not have demand variables that explain the high prices, these high prices will not be controlled for by demand to the same way. Mechanically it means that you are going to increase the extent of the estimated overcharge because the price before the financial crisis will be less well explained by demand so they will be explained by the only variable that can pick up a difference in price before and after, which is the infringement. So the fact that you reduce the impact of the demand variable, you do not allow the demand variable to play a role, has the consequence that the high prices before the financial crisis are no

longer explained by demand, they would have to be explained by the infringement dummy.

The same holds with respect to what is happening after the end of the infringement because we know that, as we explained before, as we saw before in the graph, after the end of the infringement we have a period of relatively low demand. Now, if these prices in the period of relatively low demand are not explained by -- the fact that they are low is not explained by the fact that the demand is low, again, mechanically, this will attribute the low prices to the difference -- to the infringement -- the only factor that changes before and during [sic], which is the infringement.

So this is why I think that, for these two reasons, using a dummy variable is a serious concern. I mean, using the dummy variable has two effects: it reduces the population of trucks used for the identification of the infringement by 50% in the before period and, second, it leads to this mechanical bias in the infringement which is due to the fact that you control less well the prices before the financial crisis and you control less well the low prices after the end of the infringement.

MR RIDYARD: Okay. Let us give Mr Harvey a chance to comment on that.

MR BEARD: Just before he does, I just notice on the

transcript -- I do not think that there is any doubt about this, given the period we are talking about -- we are not talking about before and during and I think Professor Neven, referred to "before and during".

THE CHAIRMAN: I understood that.

MR BEARD: I do not think it is a controversial issue but just a note for the transcript.

MR HARVEY: So Professor Neven raised two points. One was in relation to the Euro 5 issue and the second one relates to the interpretation of figures in this table. On the Euro 5 issue, that is something that I looked into. There are still I think in the region of 12,000 Euro 5 trucks in the infringement period which I can look at.

The other thing that I did was to conduct a sensitivity analysis where I look at the overcharge only considering Euro 5 trucks, so a smaller sample. The results of that sensitivity analysis show a similar and statistically significant overcharge.

MR RIDYARD: So you agree that your approach knocks out 50% of the observations but you are saying there is still plenty left to --

MR HARVEY: It controls them out but there is plenty left to do a comparison with.

MR RIDYARD: Yes.

MR HARVEY: I think it is a legitimate prior concern but in practice it does not affect the answer.

On the interpretation of these tables, your attention has been drawn to two things. The first is the low responsiveness of prices to demand in the first column of that table and then the large increase in the third. I interpret this somewhat differently to Professor Neven. There is variability in demand outside of the financial crisis period and I have shown you that chart, so I interpret this as saying when you add in 10% of observations during the financial crisis period, it has a very large and significant effect on the estimated parameter.

Another way of putting that, another interpretation of that, is that indeed during that period responsiveness of prices to demand is very high, and that is completely consistent with what I have just discussed, which is there is a period in which prices and demand responsiveness -- sorry, the responsiveness to demand -- sorry, prices to demand is lower and during that financial crisis period it gets stronger. So I do not think there is any -- this table does not show us that there is something wrong with the modelling that I have done. In fact I read this table and it suggests that it is completely consistent with the idea that the

effects of demand are particularly pronounced during that period.

Then, finally, the last related -- sort of the last related point is really what you are being told is the 10% of observations during the financial crisis period are informative, so the pricing that took place outside of it, and more than that, it is critical for estimating this model.

THE CHAIRMAN: I think, if I understood your evidence earlier, these figures essentially led you to wonder why they were so dramatically different when you included the dummies and when you did not include the dummies, so that was the reasons then that you went on to give for why you adopted the dummies.

MR HARVEY: Yes, so it is right -- what I am saying is the interpretation of this table does not imply that the model in column 1 is incorrect. What it is showing is that there is a strong demand response -- sorry, a strong price response to demand during the financial crisis period and that potentially it is different from a price response outside of it, so that is wholly consistent with the approach that I have adopted.

THE CHAIRMAN: Thank you.

PROFESSOR NEVEN: Would it be a good time for me to respond to this?

MR RIDYARD: Yes.

PROFESSOR NEVEN: The first observation I want to make is that the sensitivity that has been mentioned by Mr Harvey just right now about he estimating his model on Euro 5 trucks only is not a sensitivity because we know that the infringement dummy is estimated by Euro 5 trucks so the infringement dummy is estimated on that population of trucks, so it is hardly a surprise that, if you just look at that population of trucks, the results are not going to be fundamentally changed. So I do not think this is a very informative sensitivity.

But, more importantly, with respect to the issue that he is raising here, what he is saying is that, looking at this coefficient, it sort of tells him that the responsiveness of price to demand outside the financial crisis and during the financial crisis might be different and he is saying this because, essentially, in the first column, the coefficient of the demand variable is not estimated using the demand variation during the financial crisis because this is completely absorbed by the dummies and he is saying that, "Okay, if I estimate demand in that period, this is what I get".

Now, the first observation with respect to that is that: how do you estimate the effect of demand on prices when demand changes? So from that perspective, the

financial crisis is an important event in order to estimate the impact of demand on prices. I mean, this is an instance, this is a period, in which you have lots of variability in the data and, as we discussed yesterday already, what is essential to estimate the impact of a variable on another one is to have variability.

Now, Mr Harvey is also saying, "Well, maybe there is something specific about the response to prices, the response to changes in demand -- the response to prices from changes in demand in the financial crisis", but if, you know, that is his maintained hypothesis, he has to estimate non-linearities. He has to estimate to what extent changes in demand may have non-linear effect on prices but still allowing the demand variables to play a role.

So to completely remove the period of the financial crisis, which is a period during the demand that is mostly changing, he is really preventing the model from properly estimating the effect of demand and, as I said, I mean, if he thinks that it is really something non-linear, something specific, that during the financial crisis the reduction in demand had a bigger effect on prices, you know, a comparable reduction in demand in another period, then he has to estimate

a non-linear effect.

MR RIDYARD: I understand entirely what you are saying, but it is fine to say he should do it some other way, but I understood him to say that he did try to think about that but he could not figure out a way of finding the right non-linear -- saying "non-linear" kind of covers a whole range of possible options, does it not?

PROFESSOR NEVEN: Yes, and I proposed one because the estimation -- maybe we can turn to that table actually. That is I think table 4, which is again the estimation of Mr Harvey. It is in the same report. It is on page 32 in the court's numbering, {E/35/32}, page 30 in my report.

This is table 4. What I have done there, in response to Mr Harvey's concern about the financial crisis, is essentially to implement a demand control that is non-linear, so I basically allow the demand to have an effect on prices that is different when demand is very low and demand is very high. It is essentially allowing for a non-linear effect. So I have -- instead of defining dummies for particular years, I have defined dummies for periods in which demand was particularly low and dummies for periods in which demand was particularly high. These are what you see in that table as "p25", "p75". For instance, if you look at "Order Board",

which is one of the measures of demand that I am using, p25 refers to the state of demand is in the bottom 25% of the observation -- so that is, you know, the lowest state of standard -- and p75 identifies results, situations, in which the order board is in the top 25% of the distribution of the variable, and that is essentially, you know, an attempt to control for demand in a non-linear way.

What you see is that, if you do that -- let us for instance consider the third regression -- you see that instead of using the dummy variables that, again, were produced in column 1 and column 2, if you go to the bottom of that table that you do not see in the graph here, you will also have an estimate of the infringement -- but you see that, as we have seen before, that is right. For the first and second one the infringement is about 7%.

So you see that if you are using this non-linear control for demand, the signs are exactly what you would expect. There is a strong negative effect from the low states of demand and a strong positive effect from the high states of demand. You see that this more flexible way of controlling for demand also leads to very low overcharge.

MR RIDYARD: Just for clarification, when you say

"non-linear", I understand what "non-linear" means, but what specifically --

THE CHAIRMAN: I am not sure I do.

MR RIDYARD: It just means that -- well, explain what "non-linear" means and exactly how you have done it with these 25.

PROFESSOR NEVEN: I mean that I allow the particularly low states of demand, which is the p25 in this variable, to have a specific effect. So it is essentially the concern of Mr Harvey. He is saying, okay, when demand is very low, there is something specific. You are going to have -- response prices are going to respond differently to demand in these very low states of demand.

MR RIDYARD: So when it is linear, it just means that if there is a 5% fall in demand, it will lead to an x% and if it is 10%, it will be 2x%?

PROFESSOR NEVEN: Yes.

THE CHAIRMAN: Is this something specific you are doing in relation to that bottom 25%?

PROFESSOR NEVEN: I am basically allowing the model to tell me whether episodes of particularly low states of demand have a specific effect on prices.

MR RIDYARD: Have a disproportionate effect which is not captured by the regular approach?

PROFESSOR NEVEN: That is right.
MR RIDYARD: You are just allowing that to tell us what it tells us?
PROFESSOR NEVEN: Just allowing the model to tell me whether this is the case.

You see that when -- I am allowing for this non-linear effect that Mr Harvey is worried about. You know, I have a low overcharge which tends to confirm what I was telling earlier, that simply removing all the data is really a problem in terms of identification. I mean, removing 40% of the data that is used for identification is a problem and this sort of mechanical effect that I was referring to earlier of being less well able to control for high prices before and low prices after is a concern.

Now, Mr Harvey, in his -- I think in his report --
MR RIDYARD: Professor Neven, maybe it would just be good to get Mr Harvey's take on that particular point.
PROFESSOR NEVEN: One final observation.
MR RIDYARD: Okay. Go ahead.
PROFESSOR NEVEN: Mr Harvey had raised a concern with respect to this, which was to say, "Well, it is arbitrary to define low states of demand as being in the bottom 25% of observations and high states of demand as being in the top 25% of the observations". The only

response to that is sensitivity. I mean, you basically try out with alternative definition what is a high state of demand and a low state of demand, which is something that I have done in response to the latest set of comments from Mr Harvey, and my results are robust for these alternative definitions.

MR RIDYARD: Mr Harvey.

MR HARVEY: Two points. One is at the start of that Professor Neven said that the global financial crisis is an important event for identification. Only if it is informative as to pricing more generally during this period, so I just want to re-emphasise that. So my analysis is raising the question as to whether that period is truly informative as to the pricing that took place and the period as a whole.

On the sensitivity analysis, I would like to show you a chart, which is in {E/IC52/81}. This chart I cannot take credit for, it is from Professor Neven's report, but it is a nice chart. So the blue dots on the chart -- so this shows the order board. This is a demand measure. The blue dots on the chart are showing the 75th -- those periods of demand fall into the 75th percentile, the higher states of demand, and the red dots are showing those periods of demand that fall into the 25th percentile, the low states of demand.

There are a few things. You can see there are several periods that fall outside of the financial crisis that qualify as a low state of demand and what I am saying is that is inconsistent with the witness evidence that I referred to earlier, that focuses on the financial crisis period as being the unprecedented period.

The second observation is in terms of the high state of demand. You can see on this order board variable -- if you look up from 2008, month 1, you can see it takes time for the order board to fall, but the price effects, the changes in price, happen faster, and I think kind of what is going on here is that there is some anticipation of a future lower level of demand and so there is a bit of a lag that is created here too that could affect the results.

So I am just showing you this picture. It goes back to some of my concerns with this type of approach that I outlined earlier and why I think it does not actually pick out the features of pricing that I was seeking to pick out using the financial crisis dummies. So although it is correct that it is sort of a non-linear approach, it is not picking out the period that I think is particularly important.

Further, you know, how do you change that? Well,

I could change the thresholds and find another period that would coincide with the financial crisis, but then of course I am reinstating what I already did.

PROFESSOR NEVEN: Not quite. Sorry. I mean, because indeed, as I suggested, if one is concerned about the fact that these thresholds are not necessarily informative and not necessarily correct, in order to capture what you would like to capture, you can change them. I mean, as I mentioned earlier, I have experimented other thresholds in response to these observations from Mr Harvey and I obtained the same result, so I have -- in response to his comment, I have used lower thresholds.

Now, but -- and I want to emphasise the fact that doing that is not returning to what he is doing because there is a fundamental difference between the impact of this approach on identification and the impact of Mr Harvey's approach on identification because when Mr Harvey is introducing dummies for particular years, he is actually taking all of these observations out for the sake of identification. Here, I mean, when you are using that approach, you are not taking the observations out because what you see is that you have periods of low demand and periods of high demand both during the infringement period and after the infringement period,

so you can actually use these observations in order to estimate the effect of infringement. So there is a fundamental difference there. You cannot say that you go back.

Now, finally I would like to draw your attention to, you know, one potential alarm bell, I would say, about Mr Harvey's approach, which is that the results that he gets are also very sensitive to whether he introduces a dummy for the full year of 2010 or not.

MR RIDYARD: Yes. I was exactly going to ask that question, so please.

PROFESSOR NEVEN: That is something that I have explained also in my own report, I think it is reply report, and if I remember correctly, it is table 5. So which report is that?

MR BEARD: {E/35/34}, I think.

PROFESSOR NEVEN: It is table 6. Page 33 of my report.

MR BEARD: Yes, 35 on the electronic, {E/35/35}.

PROFESSOR NEVEN: This is estimated in the context of my model, so I basically -- this is table 6. So that is an experiment that I ran in the context of my model, and so you see that in the first column you have a demand variable which is order board, you have the dummies. So 2008, 2009, 2010, you have an estimate on overcharge. In the context of my model that would be 2.8%.

You see that in the second column I have not allowed for a dummy for the second half of the 2010 and you see that there is a line that says "First half of 2010", which is then the dummy for the first half of 2010. You see that if I just do this minor change -- I mean, there is a change in the overcharge from 2.8 to .6% which suggests that introducing these dummies really affects the identification of the overcharge.

MR RIDYARD: Mr Harvey, how do you respond to that? You have used dummies that cover three whole calendar years so that does, on the face of it, look like quite an arbitrary choice.

MR HARVEY: So in response to this sensitivity I looked at, in the context of my model, whether there was evidence that there was still a suppression -- a large suppression in demand in the second half of 2010, so split the period into two and I indeed found that. So within the context of my model there is evidence that the second half of 2010 is important to include, as important as the first half. In relation to --

MR RIDYARD: Sorry, why did you choose a January to December period for the dummies because there is no obvious reason why it should correspond to a calendar year and yet it does.

MR HARVEY: Yes, it goes back to some of the evidence, the

witness evidence, referring to the period as a whole and also the chart that I saw which showed that -- which I showed you earlier, which has that particularly low level of demand throughout the whole -- throughout 2010 as a whole.

MR RIDYARD: Does it do that. Because it just has an average for each year, does it not --

MR HARVEY: Yes.

MR RIDYARD: -- so it does not allow us to know whether that stopped in November or October 31 or May 7.

MR HARVEY: No, that is true.

Can we look at the chart that we had earlier with the dots, the blue and red dots? So this shows the order board measure of demand on a monthly basis. My reading of that chart is that the state of demand is low for that whole of 2010.

MR RIDYARD: Okay.

THE CHAIRMAN: So why, Professor Neven, did you take the half year? Was there anything in the demand figures that led you to that?

PROFESSOR NEVEN: Yes, indeed, because you see that in the second part of 2010 demand should be picking up.

THE CHAIRMAN: It is picking up, yes.

PROFESSOR NEVEN: It is really picking up and so you want to include that, you want to dummy that out. What I show

is if you do not dummy that out, you get very different results.

I also would like to mention that the test which has been mentioned by Mr Harvey with respect to his own model, I do not think it is a very informative test because what he does is, instead of using one dummy for the whole of 2010, he is using one dummy for the first six months and another dummy for the second six months. But the real test is to remove it. I mean, the real test is not to introduce two different dummies.

Of course, if you introduce a specific -- again, a specific dummy for the second part of 2010, you know, it is going to be significant. But the question is not where it is significant again, the question is how sensitive is the identification to the approach that one is using with respect to the dummies.

THE CHAIRMAN: As I understand what you are saying, Mr Harvey, it is that during the financial crisis there were some different responses in respect of pricing than demand -- than purely demand.

MR HARVEY: There is reason to think that, yes.

THE CHAIRMAN: So you are unable therefore to identify the effect of the infringement during that period?

MR HARVEY: So the data during that period does not -- I cannot identify, if you like, a separate figure for

the overcharge during that period and so the assumption that is made is that the overcharge is the same throughout the entirety of the period. That is basically the identification assumption that is made because you cannot disentangle the -- disentangle the combination of the infringement and the particularly low level of demand in 2008, 2009 and 2010. I would say that Professor Neven is saying there is an identification problem created by this. Yes, what I am sort of saying is only if you think that period is informative to pricing in the round during the entirety of the period, otherwise it is actually a complication to identification rather than assistance.

THE CHAIRMAN: All right. We will have our ten-minute break.

MR BEARD: I obviously have not intervened in any of this. There is a real concern here that a number of points are being stated by Mr Harvey that are factual assertions about pricing matters and references to pricing techniques where, as far as we are aware -- and we will go back and check the transcript -- no questions were asked of the witnesses about these pricing processes even though we had the relevant pricing people here.

We will come back to it, but it is a real concern. This is obviously expert testimony but there is an awful

lot of factual assertion being put forward here.

THE CHAIRMAN: Well, you will no doubt make those points in closing submissions and also you will have the opportunity to cross-examine Mr Harvey on what he has been saying.

Right. Ten minutes.

(11.56 am)

(A short break)

(12.07 am)

MR RIDYARD: Just taking stock of where we go next. Can we just ask, on the dummy variables which Mr Harvey has used, about the interpretation of what this means for the overcharge estimates. Professor Neven, what in broad terms does it mean -- what impact does it have by having these dummy variables in the overcharge regressions? How do we interpret the -- what use is being made of the observations in those years?

PROFESSOR NEVEN: Yes, when you introduce dummy variables, say for 2008, 2009, 2010, you are essentially excluding the observation for the sake of the identification of the infringement. This is what I mentioned earlier, that by introducing these dummies, the population of trucks before the infringement -- sorry, the population of trucks during the infringement, before the end of the infringement, which is used for the identification of

the infringement, this population of trucks is reduced by half, and that is, I mean, essentially because if you introduce a dummy for a particular year, the only way to identify an infringement would be for the observations for which this particular dummy takes the value of 1 -- would be to have trucks during and after the infringement, but we do not have any. You know, in 2008 all trucks are during the infringement period, in 2009 all trucks are during the infringement period and in 2010 as well.

So by introducing these dummies which basically impose a premium or a discount, if you want, on all prices in those years, since you do not have any variation which would be associated with the infringement in those years, you cannot actually use them for the estimation of the infringement.

MR RIDYARD: That was a clear answer. Can I stop you there and get Mr Harvey's take on that particular point?

MR HARVEY: The way the infringement effect is identified uses two sources of information. One is the variation in prices over time and it is correct that, by dummying those years, the regression removes that variation over time in those years. The second source of information is that at a single point in time the variation between prices, costs and other things and the trucks are used

to help with that, so it sort of -- I think I half-agree with Professor Neven. So I do not see that they are removed from the --

MR RIDYARD: I did not see that as any disagreement. I do not think you are disagreeing at all there, are you? You tell me.

PROFESSOR NEVEN: No. I think what is important is to realise that the infringement can only be identified by the time series because there is infringement in a particular period and then there is no infringement in a later period, so --

MR RIDYARD: So by using the dummies, you are still using the information in the background, but you are not using the information to estimate the --

PROFESSOR NEVEN: Exactly. That is exact. I think the correct way to put it forward is that you are not using these observations directly in order to estimate the infringement, but, of course, it is not because you are estimating a discount for those years or a premium for these years, but still you have variation in prices in those years and the variation in prices across trucks in those years will still be used to identify other variables, that is correct, and the identification of those other variables may interact with the estimation of the dummy.

So I think these observations are not used directly but they are used indirectly to the extent that they are used in order to identify the effect of other variables which may interact with the infringement dummy.

MR HARVEY: There is agreement.

MR RIDYARD: Great.

THE CHAIRMAN: It is not taken out completely. It is used but not to identify the overcharge.

PROFESSOR NEVEN: Exactly, yes.

MR HARVEY: Not directly, I think.

MR RIDYARD: Just stepping back from -- obviously we have stepped into a lot of the detail before the break and it was a very useful discussion, if I may say so. Just stepping back from the specifics, a little bit like a question I asked yesterday, I think, there must be -- other people have fretted about the effects of the GFC on all sorts of -- understanding all sorts of relationships. Is there anything broader in the literature about how the GFC in particular or other kind of seismic shocks, if you may call them that, should or should not be taken into account when looking at empirical estimation? Maybe, Professor Neven, you could start.

PROFESSOR NEVEN: Yes, I mean, of course there is a lot of macro literature about the effect of the financial

crisis, but I mean that is not what we are concerned about here. What we are concerned about here is about the effect of a major shift in demand on the pricing in a particular sector. I mean, a lot of this sort of macro-economic literature would not be directly relevant.

There is some literature which might be relevant and suggest maybe the use of additional variables to control for demand, which is not particularly relevant for the UK but which is relevant for some of the continental countries, which is the significance of the credit crunch during the financial crisis, because during the financial crisis many buyers of trucks were actually, you know, taken out of financial markets. I mean, they could not borrow. There was a difficulty for them to borrow in order to finance the trucks. This is an effect which is very significant in some European countries, in particular in southern European countries where the credit markets really froze. That is not something which is relevant to the same extent in the context of the UK.

MR RIDYARD: Mr Harvey.

MR HARVEY: Yes, I sort of agree with Professor Neven in terms of the application of some of those findings to this case. Some of the literature does cite things like

the availability of spare capacity, some of the issues in terms of getting hold of credit and the effect that that might have on both demand and pricing decisions, but I did not uncover something that would particularly assist me in this case in terms of the approach to modelling. There are some papers that look at things like, you know, the effect of the crisis on healthcare expenditure, that type of thing, and because they are particularly focused on understanding the crisis effect, those sorts of papers will control for, you know, GDP, overall level of demand and then have separate controls for the crisis to look at that. But, yes, inherently here we are looking at quite a specific situation so it did not inform the work.

THE CHAIRMAN: One sort of overlap from what we were discussing yesterday was obviously it led to a depreciation of the pound, quite a substantial one, so that was the second sort of main event in terms of exchange rates.

MR HARVEY: Yes.

THE CHAIRMAN: Does that affect the way you should have treated the GFC generally?

PROFESSOR NEVEN: Yes, I mean, as you point out and as we observed yesterday, the depreciation of the pound is taking place at the same time as the financial crisis in

2008, so there is a challenge in identification of -- you know, trying to tease out the effect of the financial crisis which would lead to lower prices and the effect of the depreciation of the pound. Again, these two events are sort of taking place at the same time.

Now, of course, when Mr Harvey is using dummies for 2008, 2009, 2010, he is actually controlling for the financial crisis as well as controlling for the effect of the exchange rate depreciation. In particular, his dummy in 2008 is taking out, I mean, the effect of the depreciation of the pound. So he is not actually disentangling the two effects. He is not actually disentangling the effect of demand from the effect of the exchange rate depreciation.

Now, when I estimate my own model in pounds, actually, and when I use the budget rate, I can, and I can do that because of the use of the budget rate. You remember that -- I mean, the budget rate is essentially the exchange rate of the previous year, which means that what I used for identification of the exchange rate through my cost variable in 2008, the first year of the financial crisis, is actually the budget rate which is the exchange rate of the previous year, and so because there is this lag in my approach,

I can actually disentangle the two. I mean, I can actually estimate the effect of demand separately from the effect of the exchange rate because of this -- you know, there is a lag effect --

THE CHAIRMAN: When you get to 2009, then it will be taken account of.

PROFESSOR NEVEN: Yes, then what happens is of course in 2009 there has been -- actually in the data you will see that there has been a change in the budget rate. I think it was -- the first one was in 2010, I think. They did not change it until 2010 -- or 2009. I can check. But, in any event, it will always be a lag effect because the financial crisis is really hitting in 2008. All what I need is to have a lag for that particular event, which is when the financial crisis hits. I think I have -- if you want to see the budget rates, they must be in Neven -- probably Neven 2, figure 1 or figure 7.

MR RIDYARD: Is it that useful to go to those now?

THE CHAIRMAN: Sorry, I might have backtracked into what we discussed yesterday.

MR RIDYARD: But we can obviously look up that evidence.

THE CHAIRMAN: Did you want to say anything, Mr Harvey, about that?

MR HARVEY: Just two observations. One is I am not

particularly interested in controlling for exchange rates and demands sort of for their own sake so the fact that those dummy variables pick up the effects of both strikes me as potentially a useful part of the modelling.

Then the point in relation to the use of the budget rate, it is precisely around this time when I think I am quite concerned about that because you would expect, when there are large swings in exchange rates, that that, sort of, if you like -- the focus would perhaps be more on what is actually happening to exchange rates when making pricing decisions than what the exchange rate was one year ago. So it is around this time where I think the differences, if you like, between the budget rate and the current market rate would be obviously particularly pronounced. So although it has the benefit that Professor Neven has outlined, it sort of comes up cost, which is -- in terms of the way the pricing decisions were being made, you know, we should be looking at this year's or last year's figures when exchange rates move.

PROFESSOR NEVEN: I think I disagree with this for the reasons that I explained yesterday, because when I estimate my model in pounds, I have an effect that is coming through the budget rate, through the cost, but

I also introduce the exchange rate as a stand-alone variable. Maybe -- and so I pick up the effect that Mr Harvey is concerned about, is the fact that, you know, was DAF NV concerned about the prices in those episodes. Maybe it is useful to just go through the table that shows that, if you think that is useful at this stage, or ...

MR RIDYARD: Yes. Let us do that, yes.

PROFESSOR NEVEN: I think it is the first report and it is in the annex. That is I think table 19.

THE CHAIRMAN: Which page?

PROFESSOR NEVEN: In my own pagination, it is page 91.

MR BEARD: {E/IC11/91}, we think.

PROFESSOR NEVEN: So -- oh, you do not have it yet.

MR BEARD: Sorry, I am not absolutely sure which table.

THE CHAIRMAN: I am not sure about that.

MR BEARD: Table 19, {E/IC11/92}.

PROFESSOR NEVEN: It is 92 in the court's pagination.

So what you have on this graph is the results of my estimation in pounds. It is for the during/after period so from 2003 to 2017. I want to focus in particular on the column number 3. So column number 3 has an estimate of the prices in pounds in relation to the MLO cost, and the MLO cost, as you will remember, in my model, is an estimate of the MLO, which is actually the estimate

which is seen by the pricing team. It is the addition of the cost in pounds plus the cost in euro at the budget rate.

Then you see that I introduce --

THE CHAIRMAN: Sorry, you said the MLO costing, that is what they say the -- they do not see the MLO, do they?

PROFESSOR NEVEN: The MLO costing, I agree with you. They do not see MLO, they see IKP, but IKP is based on MLO.

THE CHAIRMAN: Yes, okay.

PROFESSOR NEVEN: You are correct. So essentially you have the MLO and then you see in that equation that I am also introducing the market rate for the pound, and so this is a stand-alone exchange rate variable.

You see that there is an effect coming through the MLO and there is an effect coming through the market rate. This effect going through the market rate is showing to what extent there was a reaction to the prices -- there was a transmission into the prices of the current changes in the exchange rate in addition to what would be picked up by the MLO expressed at the budget rate.

This is a table that I referred to yesterday. Actually this is a reasoning that I referred to yesterday without showing the actual results, but I think that it is useful to actually see that you have

these two effects here.

THE CHAIRMAN: Do you want to say anything, Mr Harvey, about that?

MR HARVEY: I think -- actually, there are a couple of questions I had on this table. One was, in that column, the "GBP market rate", it is the one exchange rate in these sensitivities that is small and negative. The rest are sort of material and positive. What is the interpretation of that?

PROFESSOR NEVEN: Oh, this is something that I explained yesterday as well, is that -- I mean, this negative sign is what you would expect in terms of economic principles. This is the right sign. You see that in the other regressions, so regression 2 and regression 5, for instance, where -- or in particular regression -- we are at 2 and 5 -- in which I introduced the exchange rate as a stand-alone variable, I have an identification problem and I understand why I have an identification problem. It is precisely linked to what we were discussing earlier. I mean, it is the fact that in 2008 there is a massive depreciation of the pound at the same time as the fall in demand. So I really need this lag effect in order to identify the effect of the exchange rate, so it is not a surprise that I get the wrong sign for the exchange rate if I do not exploit this

difference in timing.

MR HARVEY: Thank you.

MR RIDYARD: Now, just looking at the additional questions -- the extra questions we have on the list which we have not actually posed and I am wondering to what extent some of these have already been covered in the discussion we had before the break. Let me go through the questions anyway and then, if you think we have already covered it well or you want to comment, please do.

So the first one was -- Mr Harvey, I am going to put this to you in the first instance. The fact that you have significant results in the dummy variables, do you consider that that sort of vindicates your approach in the sense that it shows that the demand effects that you have anywhere in the model would not be doing its job during that period or not?

MR HARVEY: Yes, I think it is saying that there is an effect over and above the effect that is controlled for through the demand control. So yes.

MR RIDYARD: Professor Neven, do you have an alternative view on that?

PROFESSOR NEVEN: No, I think I disagree with this view. The fact that these dummies are significant does not show that these dummies are picking up an effect which

is related to the financial crisis. I mean, in order to show that you would have an effect that comes on the top of the demand effect, you would have to show that what these dummies are picking up is an effect which is orthogonal to the what is being picked up by the demand variables.

In such a model, if you introduce dummies, you know, any year -- I mean, you can do an experiment. You can introduce dummies for anything in the year and it will come up significant because there was always going to be some, you know, idiosyncratic premium or some idiosyncratic discount that will be picked up by these dummies.

So I think that in order to build this argument that these dummies are really important in order to pick up an effect on prices that go above and beyond, using the words of Mr Harvey, the demand effect, you have to show that they are picking up something which is really independent of the demand and has an effect on prices. So I am not surprised that, you know, these dummies are significant and I do not think that a model specification should be decided on the basis of the significance of variables --

MR RIDYARD: The point is, in your view, it does not indicate that there was something missing from the

demand measure?

PROFESSOR NEVEN: But, more importantly, when you introduce a dummy, the first question you need to ask is: how does it affect my identification?

MR RIDYARD: Mr Harvey, come back on that.

MR HARVEY: Well, the reason for introducing the dummies was not of itself the fact that they suggest there is significant effect. It was motivated by the considerations that I spoke about earlier.

It is the case, I think, that obviously when you include other control variables that in a sense overlap with control variables that are already in the model, then they may pick up some of the variation that the other control variable was picking up. So in that sense I agree with Professor Neven. But certainly that is not the motivation for the inclusion and I do think they are showing the scale as well as the significance of these estimates and suggest that there was a material downturn in price that is not being picked out by the average demand effect in the model.

MR RIDYARD: Okay. Moving on then to a question for Professor Neven. In your estimation, when you took out the GFC period and had a look at what impact that had on the overcharge estimate, you found it did change your estimate when you took out those observations?

PROFESSOR NEVEN: Yes.
MR RIDYARD: So what is the relevance of that exercise?
PROFESSOR NEVEN: I think what this exercise actually shows is that removing the observation and introducing dummies is pretty much the same thing because the estimates that you get if you are removing the observations for those years, in terms of the infringement in particular, is very, very, very similar to the estimates that you get if you are simply introducing dummies. This sheds some light on the discussion that we had earlier. I mean, essentially, introducing dummies is like removing the observation for the sake of the identification of the infringement, so this direct effect that we were referring to earlier is really the dominant effect here. I mean --
MR RIDYARD: But if you believe those observations are tainted for some reason, they are not representative of what is going on elsewhere, might that be a good thing?
PROFESSOR NEVEN: I think that -- of course there are circumstances in which you want to remove observations or introduce dummies that will sort of pick up, I mean, the idiosyncrasies of those observations, but I think that you only want to do that when you do not have an alternative and when you are confident that doing that will not fundamentally change your identification

strategy.

Here we have alternatives that I have put forward, in particular in terms of these non-linear ways of picking demand, and we know that introducing these dummies fundamentally alters the identification. It does not, you know, change the identification strategy itself. It is still identified on the basis of differences in price during the infringement and after. But the pool of trucks that are used in order to perform that identification changes fundamentally.

MR RIDYARD: Mr Harvey.

MR HARVEY: I think I sort of see the concern the other way around, that by not controlling for those differences, you compromise identification of the infringement effect.

MR RIDYARD: As regards the alternative ways of handling it, I think your evidence is that you have looked at that but you did not find one that was --

MR HARVEY: No. We spoke about this earlier.

MR RIDYARD: Okay. Our last question was just generally about the sensitivity analysis you have done. Clearly we have talked about quite a few of these, but, Mr Harvey, I will give you the first chance at this: is there anything else in the various sensitivities and cross-check analyses that have been done, looking at the

GFC issue, that you do not think we have adequately covered in the comments so far?

MR HARVEY: No, I think we have discussed the main ones.

MR RIDYARD: Professor Neven.

PROFESSOR NEVEN: Yes, there is just one, which is the sensitivity that Mr Harvey is performing, actually, and that is in his third report. Mr Harvey is estimating his model and comparing the estimates of his model with one in which the demand variable, his demand variable, so the sales of DAF, does not play any role by construction during the financial crisis because he replaces the actual value by an average. It is basically a constant and so the variation between these years 8/9/10 in his demand variable cannot play any role because it is a constant. He obtains estimates, in particular estimates of the infringement that are identical to the second decimal point to the estimates that he gets in his main model, and this, to my mind, really shows that his model is taking out whatever information there may be in the demand variable.

THE CHAIRMAN: Mr Harvey.

MR HARVEY: I feel like I might repeat myself so I am tempted not to. The fundamental question here, I think, is whether this period, the 2008/2009/2010 period, is in a sense informative to the estimation of the overcharge.

Professor Neven I think is effectively arguing yes and, more than that, it is critical to include. I think I am effectively arguing I think it is a complicated factor and we should be very careful about that and I think the same message in a sense applies to the entirety of the sensitivity analyses. That is all I would say.

MR RIDYARD: So you are agreeing that it takes them out of the equation but you are arguing that is a good thing, not a problem?

MR HARVEY: We need to control for them.

MR RIDYARD: Good. I think that covers off the GFC questions.

THE CHAIRMAN: Any clarification?

MR BEARD: Two transcript things, if I may.

Just going back to [draft] page 58 in the transcript, I think it is. This was a table that Professor Neven mentioned. Mr Ridyard said we could come to it later but I just want to make sure that it is actually the right reference. I think Professor Neven referred to his second report, figure 1, which is {E/35/13}. Is that not the right page? 15 maybe -- apologies. Yes, sorry, 15 {E/35/15}. This is the one where the page is two on. But I was not sure -- is that the chart that you were referring to, Professor Neven?

PROFESSOR NEVEN: We did not get to that in the end, did we?

No, I was looking for a chart that had the changes in the budget rate, but this is not this one.

MR BEARD: Okay. Can I suggest it might be and I am going to suggest that it is {E/IC11/82}.

PROFESSOR NEVEN: Yes, this is this one.

MR BEARD: Okay, fine. As long as we have the reference because we thought it might not be right.

Just [draft] page 46, if we could just call up {E/35/35} -- yes, so in the transcript at [draft] page 46, there is a reference by Professor Neven to the change in the overcharge -- this was a table being referred to -- going from 2.8 to 2.6 and it is --

PROFESSOR NEVEN: 0.6.

MR BEARD: We thought that was the case. Thank you. That is all I have.

THE CHAIRMAN: Thank you. Mr Ward, do you have any?

MR WARD: No, I do not. Thank you very much.

THE CHAIRMAN: Thank you. All right. That is the end of that session and now emissions.

MR RIDYARD: We move on then to how we deal with the emission standards aspects of the estimation and indeed its interpretation.

The first question which perhaps I will address to Professor Neven first of all: how does the evidence on the infringement -- the effects of the infringement, how

does that inform the econometric assessment of the possible overcharge for trucks meeting different emission standards? What is at stake here?

PROFESSOR NEVEN: Yes, indeed, the evidence from the Commission's decision suggests that -- and the Commission says that there was an agreement on the timing and the passing on of costs associated with the emission standards, so we have to consider what is potentially the effect of that. I mean, whether the premia that we estimate for the emission standard could be due to an additional coordination effect. I mean, we have sort of competing hypotheses for interpreting these premia and clearly one of them, in light of the Commission's decision, is that these premia could be the effect of coordination.

MR RIDYARD: We are focusing on the allegation that the agreement passed through a particular price rise --

PROFESSOR NEVEN: Yes.

MR RIDYARD: -- rather than the -- is the agreement or otherwise the timing of the introduction -- is that relevant to the estimations at all?

PROFESSOR NEVEN: I guess that, you know, one could have done an estimation of the timing in which one estimates a competitive counterfactual, but, you know, this is -- I do not think this is something that can be done in the

context of such an exercise here.

MR RIDYARD: Mr Harvey.

MR HARVEY: I agree with everything Professor Neven has just said.

MR RIDYARD: The second question, which I will put to Mr Harvey first of all, is the difference between the two of you on this really primarily or exclusively one about interpretation of the evidence rather than what the evidence is showing us? So you both agree that there is this price premium or this margin premium but the question is whether you can attribute that to the cartel or to the normal working of competitive forces.

MR HARVEY: I think we are agreed that there is a margin premium so I think that the issue is one of interpretation.

PROFESSOR NEVEN: No, I think that is correct. I think we both in our own model estimate an emission premium. Of course our estimates are a bit different given, you know, the specifications that we have, but essentially the issue here is one of interpretation, yes.

MR RIDYARD: Thank you. That is helpful.

So then we are on to -- Professor Neven, I will address this one to you, this whole question of willingness to pay, which we did touch on briefly already earlier this morning. I suppose just as

a general point, does the interpretation that the premium is due to willingness to pay -- does that exclude the possibility of it being an effect of the infringement?

PROFESSOR NEVEN: No. Of course. I mean, you could have sort of two explanations, one in terms of the effect of the infringement, the other one in terms of the willingness to pay. You know, they can add to one another.

MR RIDYARD: So would you agree that -- I mean, any monopoly pricing or cartel effect involves firms raising prices above the competitive level artificially, and when they do that they still sell the product to some people and those people who buy are willing to pay the monopoly price?

PROFESSOR NEVEN: Yes, the question is to disentangle it. I mean, I think that it is important, however, to keep in mind that -- I mean, truck characteristics in general lead to changes in margin. I mean, that is what we observe in general. I mean, when we -- Mr Harvey or myself, when we estimate the model, we include truck characteristics. You see that these truck characteristics have an effect by themselves.

MR RIDYARD: Can we unpick that a little bit because I think that is quite important and potentially useful. So you

are talking about the difference between one truck and another type of truck or the difference in one truck when you add more extras to that particular truck? Which are you talking about here?

PROFESSOR NEVEN: When we are estimating the model, introducing truck characteristics as a control variable, you are basically saying that trucks that have particular characteristics will tend to have a premium and this premium is not something -- it is really on higher margins, and this is the case, for instance, with respect to the power of the engine. I mean, there tends to be a positive premium. People are willing to pay more for a more powerful engine beyond I mean the cost.

THE CHAIRMAN: This is a premium over the cost --

PROFESSOR NEVEN: It is an additional margin, that is right. But I want to highlight this because that is what you would expect to have in any form of competitive interactions. I mean, if you have manufacturers competing in selling trucks that are different traded products, the outcome of the competitive interactions between them would lead particular types of products to have higher premiums than others. I mean, this is happening in all markets. I mean, higher quality products tend to have a premium which has nothing to do with the cost.

So this is not something that is surprising and I think that I want to highlight this because this is the default case. The default case is you would expect that margins will vary according to truck characteristics, and the emission standards are first and foremost a truck characteristic.

MR RIDYARD: Okay. Mr Harvey, your thoughts on that point.

MR HARVEY: I think the -- I agree with the observations in relation to willingness to pay. It does not seem to me of itself it would imply a higher margin. I think the -- the issue here is I think a little bit different to the truck characteristics elsewhere. So I think what the emission premia are picking out is obviously sustained differences in that sort of pool of trucks, so Euro 4 trucks, Euro 5 trucks, that enter the market. Now, it is possible that they have new features and those features themselves could in theory attract a higher margin, but what we really -- I think what we are really looking for is almost features that put DAF in a, if you like, stronger competitive position vis-a-vis its rivals; that is to say it allows DAF to command a higher premium that is not sort of -- can be competed away because another rival can make the same offer to the customer. So I think that is the -- I think there is sort of a bit of a difference between

individual features that might be unique to the DAF trucks versus a general change and evolution of trucks that happens across the board over time.

MR RIDYARD: Let me just stop and challenge that slightly there. Professor Neven just gave the example about more powerful trucks having higher margins than less powerful trucks or all truck-makers can make powerful and less powerful trucks, so if that is a correct description of the world, would that not contradict what you just said?

MR HARVEY: What we see in the data, of course, is higher margins relative to a sort of base specification and so it is possible that those trucks attract a higher margin because of the additional features. It may well be that there are some features that do not -- margins that do not get competed away because they are special.

MR RIDYARD: But power is not special, is it, because presumably all truck-makers can make trucks with all sorts of different power, so on that basis you would not expect to see more powerful trucks earning higher margins than less powerful trucks.

MR HARVEY: That is right. That is right.

MR RIDYARD: Professor Neven said that we do observe that.

PROFESSOR NEVEN: Yes, and I think that fundamentally it is an issue of price discrimination. I mean, when buyers have a higher willingness to pay for more powerful

trucks -- I mean, all manufacturers will discriminate, will end up having higher margins for those customers that have a higher willingness to pay for more powerful trucks. So the intuition that, you know, competition will sort of compete away all these mark-ups is I think not sound.

MR RIDYARD: Let me put that back to Mr Harvey. How do you respond to that? Let us take this instance of less powerful and more powerful trucks. Assuming that everyone can do that, so why would you then -- do you agree that you observe higher margins on more powerful trucks than less powerful trucks?

MR HARVEY: I think within the analysis you do find a higher price having controlled for costs for higher-powered trucks, so, yes, I mean that is the implication of that --

MR RIDYARD: Even though all the truck-makers can easily make --

MR HARVEY: More powerful trucks, yes, that is right. So I think another way of looking at the Euro standard emissions control is that in a sense the overcharge is changing at different points in time so you get a higher overcharge later as new trucks are brought in. So I suppose what we are looking for is whether those changes associated with the Euro 5 or Euro 4 trucks --

whether they are picking out something that is over and above the new characteristics that we have already controlled for within the regression models. So I think -- I accept that there may well be features that attract higher margins in the competitive counterfactual. Here, though, we have controlled for a lot of those features within our model and what we are left with is a premium for the Euro standard control variable.

MR RIDYARD: Yes, okay. I understand that. I guess I was just trying to get a kind of base level understanding of how pricing and margin premiums work in the truck market before we start jumping in on the specific questions of the emissions and how that might change things.

So if I was to ask you -- the proposition which you both seem to agree with is there is this price discrimination that Professor Neven described and you get higher margins on more highly specified products in this market. What is the best way for -- if I wanted to go to the data just to understand that and see that in a summary form, where would be the best place for me to go in your reports for me to get that kind of base level understanding of how pricing works? Professor Neven, do you have any clues for me on that?

PROFESSOR NEVEN: Yes, I think that, as you pointed out, we

see in our estimate then these truck characteristics that we can measure tend to have an effect, like the power of trucks. Of course, I mean, here we have an emission standard which is -- can be seen as a truck characteristic and all what we observe is a premium. So the question is: how can we disentangle the hypothesis that it is normal price discrimination from the hypothesis that it is induced by the coordination?

As Mr Harvey has pointed out, the only way to do it is to use the time series because, you know, if you tend to have a stronger effect during the period of the infringement, this could potentially be associated with a coordination effect. By contrast, of course, I mean, emission standards effects outside the information period, those for Euro 2, for instance, or those for Euro 6 -- even though we can discuss Euro 6 -- should not have that element, so -- and I think that is the essence of the test that I am proposing, is to try to disentangle the two by seeing to what extent the timing of the infringement is informative, can be used knowing that this additional effect of the coordination that we are concerned about that we want to identify -- knowing that this additional effect has to be related to the infringement. It has to happen during the infringement. That is the essence of what I am trying to use in order

to see whether what we are observing in terms of premia can be interpreted as the effect of the infringement as a top-up.

MR RIDYARD: So you get a higher effect on margins when a new emission standard arises in the infringement period than when outside?

PROFESSOR NEVEN: That is what I am trying to do.

THE CHAIRMAN: What are we assuming about the coordination that there was from the decision?

PROFESSOR NEVEN: Yes, I mean, taking the decision for what it is, the decision itself could be a coordination and we are trying to see --

THE CHAIRMAN: A coordination on the premia --

PROFESSOR NEVEN: Yes, exactly.

THE CHAIRMAN: -- to be charged on the new emission? Right. So we are assuming that there was coordination in that respect?

PROFESSOR NEVEN: We are taking the Commission's decision for granted and they are referring to an infringement and we are -- in particular with respect to the passing-on of cost, and we are asking, "Is it in the data?"

THE CHAIRMAN: It would indicate that it would be having at least some effect if it was part of the coordination.

PROFESSOR NEVEN: Is it?

THE CHAIRMAN: Right. Okay.
MR RIDYARD: That is why we are here, is it not, to answer that question?
Mr Harvey, any comments on what Professor Neven just said there?
MR HARVEY: In terms of -- just going back to the question you asked at the start, I think it was where to find information about pricing --
MR RIDYARD: Yes, I do not think I got much of an answer to that question, so if you have one I am grateful to hear it.
MR HARVEY: I am not sure I am going to give you a terribly satisfactory answer, but in the annex to my first report I do have some charts that show how the prices vary over time between different characteristics and how they are related to one another. I do not think there is a chart in there that deals with margins by groups of trucks that have different characteristics, but, like Professor Neven, the econometrics gives some indication of that.
MR RIDYARD: Just the coefficients on the truck characteristics would be the best place to look?
MR HARVEY: Yes.
MR RIDYARD: Okay.
MR HARVEY: Then on sort of the utility of comparing inside

and outside of the infringement and asking ourselves the question of whether, if you get elevated margins outside the infringement with new emission standards, does that tell us something, so there are some challenges with that in practice, I think. So for Euro 2, of which some were sold prior to the infringement, we have this issue about the aggregate cost data, so we do not have --

MR RIDYARD: Yes.

MR HARVEY: It creates some problems. Then after the infringement we have the introduction of Euro 6 trucks. The wrinkle there is that new models are introduced at exactly the same time and so it is quite hard to disentangle, if you like, a Euro 6 extra stuff included effect from the new model -- the new model effect. So I think -- I am not sure there is a huge amount you can learn. Then I suppose, even if we did not have those empirical challenges, I am not sure of itself that finding that there is a premia outside of that period means that the premia inside of the period are competitive or collusive.

MR RIDYARD: But surely in principle you could compare those premia and see if there was something different about them during and afterwards.

MR HARVEY: You could, but you would be left with the question, even if I find that for Euro 6 those trucks

attracted a premia, it does not tell me whether they should have attracted -- Euro 5 or Euro 4 trucks should have attracted a premia of 2 in the --

MR RIDYARD: Is that not why you compare the premiums during and afterwards and see if there is a difference and infer that the difference might be due to the infringement?

MR HARVEY: I am just saying I do not think you could immediately reach that conclusion if they are similar because it may well be that the Euro 6 trucks are superior and did attract a willingness to pay a higher margin whereas the other trucks not. I do not know.

MR RIDYARD: Yes, okay.

Professor Neven, any comments on that?

PROFESSOR NEVEN: No. I actually agree with Mr Harvey. I agree with Mr Harvey that, you know, this is -- what is really -- we cannot assume that, you know, whatever premia we observe for Euro 6 is necessarily a premia -- okay, let us assume that it is untainted -- that this premia which reflects willingness to pay would also have applied necessarily to Euro 5 or Euro 4 because I mean these were sort of trucks which may be attracting different willingness to pay. This is why I think the test properly should be on the significance of the infringement dummy, but that is going to take some time.

MR RIDYARD: Okay. Shall we maybe break there?
THE CHAIRMAN: That is a convenient time.
MR RIDYARD: Good suggestion, Professor Neven.
THE CHAIRMAN: We will take a break. We have a few more questions, I think --
MR RIDYARD: We have a few more, yes.
THE CHAIRMAN: -- but we will resume in the afternoon. So 2 o'clock.
(12.58 pm)
(The short adjournment)
(2.00 pm)
THE CHAIRMAN: Good afternoon.
MR RIDYARD: To carry on then on our discussion of emission standards, Mr Harvey, just looking at this whole question of willingness to pay, where does Royal Mail's evidence on its views about the attractiveness or otherwise of new emission standards -- where does that fit into the whole assessment of willingness to pay?
MR HARVEY: So Royal Mail's views, they -- sorry, I am just (inaudible) for a moment.
I think the customers generally do not want to pay more for the trucks and they did not want to pay in particular for new Euro standard trucks in and of themselves. I think what we did hear -- I forget which witness it was -- there was a suggestion that for later

Euro standard trucks that had higher fuel efficiency, that would be a potential benefit to them. So in that sense the factual evidence sort of almost points in two directions: on the one hand, not particularly wanting to pay for a new Euro standard for its own sake, but the recognition there might be some new features with the later Euro trucks that could be beneficial.

Of course, the witness evidence of itself is from one -- if you like, one claimant, so it does not tell us about the pool for the entirety of the UK, so I suppose it is limited in that respect.

MR RIDYARD: But if there was one emission standard where there was no advantage other than it was just the legal requirement and another where the new emission standard also had the added benefit of improving fuel economy, would that suggest something that could be tested then, that you could look at -- the first one you might not expect much of a margin uplift and the second one you would because they were getting something extra for their money?

MR HARVEY: Yes, I think in principle you could -- if you had two emission standards, one with enhanced fuel efficiency and the other one not, yes, I think in principle it could pick up a willingness to pay. That does not necessarily flow through, as we spoke about

earlier, to an elevated margin in and of itself, but, yes, that would be relevant.

MR RIDYARD: Did you look at that though?

MR HARVEY: No.

MR RIDYARD: Professor Neven.

PROFESSOR NEVEN: I have nothing to add with respect to the evidence on Royal Mail. With respect to the evidence more generally on whether one could identify the changes in willingness to pay related to characteristics for different emission standards, I suppose this could be done if there was more disaggregated systematic data about what these additional characteristics could be. The whole idea of controlling for emission standard as a truck characteristic is that you cannot go deeper. I mean, you treat it as a characteristic that might actually explain higher margins, but this is to some extent a black box, I mean -- but it is a black box that you accept given the limitation of the data.

Of course, what we observe is not quite willingness to pay but a change in the equilibrium price; okay? So if you were to try to track willingness to pay, essentially what you would need to do is to identify demand, which is even harder.

MR RIDYARD: Yes, okay.

THE CHAIRMAN: If they had to pay because they were obliged

to purchase emission standard vehicles, I mean, that suggests that they would not be willing to pay a premium for the enhancements; no?

PROFESSOR NEVEN: What do you mean?

THE CHAIRMAN: I mean they had no choice in the matter. They want a truck. It has to, by a certain date, comply with certain emission standards --

PROFESSOR NEVEN: Yes, but it is clear at the time at which DAF Trucks were introducing these new emission standards, they had alternatives in both instances. They had alternatives because DAF kept on selling the trucks with the earlier emission standard for a while -- not very long, but they kept on selling trucks with alternative emission standards, so they had a choice, and, of course, other manufacturers, as we have discussed last week, have introduced trucks with a new emission standard typically, you know, on the same date. So if they were not happy with the idea of paying more for DAF trucks with a new emission standard, they could have gone to a competitor.

SIR IAIN MCMILLAN: Am I correct in recalling that the customers did not want the more expensive trucks with the new emission standards before they had to anyway?

PROFESSOR NEVEN: Yes, I think what I have seen in the evidence is that, in the UK -- this is actually fairly

UK-specific -- I mean, the customers were not interested in, you know, paying more for the new emission standard by itself because they did not attach a value to being green, if you want.

SIR IAIN MCMILLAN: Yes. I should have said UK.

PROFESSOR NEVEN: Yes, it is UK-specific because in Germany it is a different thing. But clearly in the UK I have seen some evidence suggesting that at least -- some evidence from Royal Mail -- suggesting that they were not willing to pay more just because the truck was more green. They needed to have a -- in order to sustain a higher willingness to pay, they needed to have better features for the truck.

So it is not just by itself the fact that the truck was, you know, polluting less that was valuable to them. You know, they had to comply with the legislation and they had to pay more for trucks that were polluting less, but in order to pay more, they would need to have a business case, and the business case would be either that the truck was more efficient, that it was using less fuel or that the truck had features for which they had a willingness to pay. I mean, you know, the trucks that were introduced with a new emission standard may have had other features which came bundled with the new emission standard for which they had a higher

willingness to pay.

MR RIDYARD: So the enhancements that we are talking about that arose, they just happened to -- they arose at the same time as the emission standard was changed and --

PROFESSOR NEVEN: Exactly.

MR RIDYARD: -- they are factors which are not captured by cost considerations because we are controlling for those and they are not captured by other attributes which you are already measuring?

PROFESSOR NEVEN: They are not captured by other attributes that we are measuring. You know, this added willingness to pay is not captured by cost because this is a demand feature, so -- but of course these added features may have -- themselves have a cost which is going to be reflected in the MLO and in the IKP. But here what we are talking about is the demand feature, is the added willingness to pay for these features.

THE CHAIRMAN: The difference in Germany was because of the tax benefit?

PROFESSOR NEVEN: Exactly, yes. That is right. In the UK there were very few incentive schemes --

THE CHAIRMAN: Yes, in those days.

PROFESSOR NEVEN: -- for use of -- to buy trucks with new emission standards, which was not the case on the Continent.

MR RIDYARD: Okay. Let us turn, then, to the econometric results and the extent to which we can use the econometrics to try and disentangle the different effects that we have been talking about. Mr Harvey, would you like to go first on this? How do you see your econometric results as shedding light on this question about what the explanation for the margin premium is?

MR HARVEY: So in my econometric models, and I think we are -- I can probably clarify for a moment -- we are talking about only the during/after model here --

MR RIDYARD: Yes.

MR HARVEY: -- that we just spoke about before. I have included controls for truck series, so LF 45, LF 65, CF 65 -- sorry -- and so forth. I have included controls for other characteristics, including things like cabin, cabin space and that type of thing, as well as, of course, the granular MLO cost variable.

So the results of those models show that they provide quite a high explanatory power, the characteristics, so they explain a lot of the variation in prices. When I add additional characteristic controls, so axles and that type of thing, I do not find that they have a large bearing on the estimated emission standard effects. So when I add in or take away more or less controls, those emission standards do not move

around very much.

The limitation of the analysis is that a specific list of improvements associated with the new emission -- trucks with new emission standards we cannot control for in the modelling, so you are left with attempting to sort of interpret the changes and whether they would be regarded as improvements and indeed would be regarded as marginally enhanced improvements as well.

MR RIDYARD: When it comes to your estimation of the infringement effect, you are saying that all of the unexplained increases in margins that arise when a new emissions standard comes through -- all of that increase in margins is attributable to the cartel?

MR HARVEY: Yes.

MR RIDYARD: Professor Neven.

PROFESSOR NEVEN: Yes, I think that I can shed some light on the extent to which the premia that I estimated for the new emission standards are not due on average to the effect of the infringement and maybe the best would be for me to walk you through table 8, which is in my reply report. That is {E/35/45}. That is page 43 in my own pagination.

MR RIDYARD: Table 8, did you say?

PROFESSOR NEVEN: That is table 8, yes.

MR RIDYARD: Yes, that is page 45.

PROFESSOR NEVEN: Page 43 in my own pagination.

MR RIDYARD: 45 on the court ...

PROFESSOR NEVEN: Before I go through the details of this table, let me explain here the spirit of the test that I am carrying out here, which I sort of alluded to just before the break.

We have two important features with respect to the emission standards and the effect of the coordination on the premia of the emission standard. The first observation is that the coordination, the infringement with respect to emission standards, should lead to a higher price -- higher margin, higher price, exactly in the same way as what I would refer to as the normal infringement, I think the infringement which is unrelated to the emission standard, the infringement that may be related to the information exchange. So they both lead to higher prices so they are, in that perspective, equivalent in terms of observation. We have two channels, one channel which is the coordination through the information exchange, the other channel which is the coordination at the time of the introduction of the information exchange.

THE CHAIRMAN: The emission standards?

PROFESSOR NEVEN: The emission standard.

Now, the other important feature is that they

should, both of these effects, be determined by the timing of the infringement; that is to say that these emission standard premia that may be associated with the infringement, they should take place during the infringement and not outside the infringement, which means that we potentially have a strategy in order to identify whether these emission standards are due to the infringement, which, as I mentioned earlier, is to use differences outside the infringement period and during the infringement period.

That is essentially what I am doing in this table 8. So essentially, before I go through the table, let me explain the spirit. The spirit is that when I have the emission standard, I potentially -- emission standard, that is fixed effects -- I potentially have two channels for the infringement: one channel which is the information exchange, the other channel which is the coordination around the passing-on of costs. If I switch off one of the channels, the other one should pick up the effect. Why? Because, as I mentioned earlier, these two channels have the same effect in terms of prices and they should also both be higher during the infringement period relative to outside the infringement period.

So the spirit of the test that I am doing in this

table, in table 8, is to say, "Okay, if I have emission standard fixed effect, I have the two channels. Let me now switch off the channel through the emission standard. Is it that I see that the infringement effect that I estimate, the difference in prices during the infringement period and outside the infringement period, is going up?", because if indeed the emission standards are associated with the infringement, when I switch off that channel, the other channel should pick up because, as I said, both channels lead to higher prices.

So what I observed, just to anticipate the results that I have in table 8, is that it is not the case. It is that when I switch off the emission standard channel, my estimate of the infringement is unaffected.

So let me walk through the table. So what you have in there, in the first column, is an estimate of my before/during/after model; okay? This is an estimation that sort of is using all the data from 1995 to 2017 and in which, of course, the infringement is from 1997 to 2011. So the first column includes all the emission standards from Euro 2 to Euro 6. That is an estimate in which I allow for the second channel.

Now, what you see in the second column is an estimate in which I remove all of these emission standards fixed effects. What I exploit of course there

is the fact that some emission standards are introduced before the infringement, Euro 6 is introduced after the infringement and the others, 3, 4, 5, are introduced during the infringement. So by removing the emission standard fixed effect, if indeed the emission standard 3, 4, 5 are affected by the coordination, I should observe that my infringement dummy, which measures the difference in price between the prices during the infringement and outside the infringement, that is to say including after and before this infringement, dummy should be higher, and I see that is not the case. I see that if you are comparing my infringement dummy, it is actually going from 0.07 to 0.05. It is essentially unaffected.

Now, I do an additional two further tests in this table --

THE CHAIRMAN: Sorry, you say 0.07?

PROFESSOR NEVEN: Yes, so it is basically 0.7 minus --

MR RIDYARD: You might have missed a zero out there.

THE CHAIRMAN: I think you added a zero.

PROFESSOR NEVEN: It is 0.007. This is the coefficient. I was reading the coefficient, but if you look at the estimated overcharge, which is at the last line, it is 0.7%, minus 0.7%.

THE CHAIRMAN: Yes. Okay. Thank you.

PROFESSOR NEVEN: Sorry, I was reading the coefficient and --

THE CHAIRMAN: Yes, okay.

PROFESSOR NEVEN: -- not the estimated overcharge.

These are actually not significantly different from zero, but it is another dimension that we have not discussed so far.

Now, let me briefly comment on the third and the fourth estimation. In the third estimation I said, "Okay, there is some concern about Euro 6 and the concern may be that Euro 6 may also be tainted because there were discussions about Euro 6 and the pass-on of course associated with Euro 6". So what I do in column 3 is that I introduce a dummy for Euro 6 which effectively means that I am not using Euro 6 trucks in order to estimate the effect of the infringement.

So I have an estimate of the effect of the infringement which compares the Euro 1 and Euro 2 trucks as well as the Euro 5 trucks after 2011 with all of the trucks during the infringement. So I basically, you know, try to see whether this is a year that Euro 6 trucks would have been tainted, would have been polluted by the infringement effects, the estimation. As you can see, the estimate is now 0.7%, so it is still very close to zero. There is a change but it is a small change.

The final estimation that I do in the fourth column is to say, "Okay, I also have heard about this concern", and we have discussed it yesterday, "that maybe there is a follow-on effect of the infringement. Maybe the infringement does not really stop in 2011". So what I assume there is that all Euro 5 trucks are affected by the infringement independently of the date at which they are actually sold. So that I identify the infringement effect by comparing all of the trucks during the infringement, including all of the Euro 5 trucks that were sold after the infringement relative to a group of untainted trucks that would be Euro 1, Euro 2 for the beginning of the infringement as well as Euro 6 trucks. I see that there again there is no significant change in the estimation of the infringement.

So this analysis, to me, suggests that the hypothesis that the emission standard fixed effects are due to coordination is inconsistent with this evidence. It is inconsistent because, if they were associated with coordination, they would take place during -- on average, during the infringement period, and then, given that they are equivalent in terms of higher prices to the normal infringement effect, I should estimate it, I should capture it, through a higher infringement effect.

MR RIDYARD: Mr Harvey.

MR HARVEY: The validity of this test rests on other variables in this model, not picking up the exclusion of the fixed effects. So put another way, I think that the hypothesis is that, by excluding these variables, if they are related to the infringement, then the infringement effect will pick it up because there is something missing from the model that needs to be accounted for by the infringement effect. But there are other variables in this model, including the series fixed effects, that could otherwise pick up the exclusion. So I do not think that this test itself shows that, if you like, the channel is switched off.

PROFESSOR NEVEN: I think it does, and the reason is that if I remove these emission fixed effects, the model will attribute the change in prices that were due to these emission fixed effects to the variable that is most closely correlated. It could be the infringement, it could be something else. What is revealing is that the model is choosing cost and series fixed effect in order to pick up the slack. You know, if indeed the emission standard were associated with coordination, what would pick up the slack is the infringement, and this is not what is happening.

MR RIDYARD: Mr Harvey.

MR HARVEY: I think the issue is the infringement dummy is stable obviously over the infringement period and so what these dummies are -- essentially they appear at different points in time. So what matters is whether there are other variables, including the series fixed effects, that appear at different points in time and they would pick up the slack. So I do not think the logic of just because it is in the infringement period means that the infringement variable will pick it up. It depends on the other variables.

PROFESSOR NEVEN: But what is relevant is that the other variables pick it up. That is the thing. What is relevant is that by removing them, we see that MLO and we see that the series fixed effect pick up the slack.

THE CHAIRMAN: So what is the series fixed effect?

PROFESSOR NEVEN: Series fixed effects are, I mean, dummies again that we both introduce at the level of series because DAF, as you know, is producing three families of truck and then within the families you have sort of different series. We are both introducing series dummies, that is to say that we are trying to see whether the model will estimate a specific premium or a specific discount, as the case may be, at the level of series. What I see is -- sorry.

MR RIDYARD: So one series of truck has a different price

level to another series of truck. There is a systematic difference in price between one series and another and that has been accounted for within the model by this effect.

Sorry, Professor Neven, I cut you off halfway through. Were you going to add --

PROFESSOR NEVEN: No, I think that I explained what I wanted to explain, is that what I find revealing -- and this is why this test is useful -- is that indeed the slack that is left by these emission standard dummies is picked up by other variable than the infringement. You know, if the infringement was behind, on average -- was behind these emission standard premia during the period of the infringement, they would be picked up by the infringement dummy.

MR RIDYARD: What I understood Mr Harvey to be saying is that it was a question of which is the closest substitute, if you like.

PROFESSOR NEVEN: Yes.

MR RIDYARD: He is suggesting that the infringement would not be the closest substitute because it is a blanket dummy across the whole period, whereas some of these other things are more granular and therefore maybe that is why they are appearing to be the closest substitute for the emissions effect. Was that what you were

saying?

MR HARVEY: Yes.

MR RIDYARD: I am not saying whether I think he is right or wrong, but I am just -- but it seems ...

PROFESSOR NEVEN: So the argument of Mr Harvey is that, simply because the emission standard is a dummy, this dummy is not going to pick up the slack --

MR RIDYARD: I think because it is a dummy that applies right across the infringement period, whereas -- sorry, I do not mean to make Mr Harvey's case for him.

MR HARVEY: So in a sense what we are picking up with these Euro emission premia, I suppose you could view it as an overcharge that is varying over time. That is kind of what is going on here, yes.

PROFESSOR NEVEN: That is right, that is correct.

MR HARVEY: So that is one way of thinking about it. The overcharge, the standard, let us call it, overcharge dummy, by its nature is fixed over time, it is not varying, and then there are other -- but there are other variables in the model that may well vary over time, and what I am saying is they are more likely to pick up the effect of the exclusion than the infringement variable, not because they were not caused by the infringement, just because of the structure of the data.

PROFESSOR NEVEN: I mean, what you are pointing to is that

this test, of course, is a test with respect to the average of the emission standard effect during the infringement period. It cannot say very much about the significance of the individual or the significance of the coordination potentially with respect to individual emission standards. On average, I mean, this is what this is capturing.

MR RIDYARD: Just going back, Mr Harvey, to your answer to the previous question, before we got into the discussion of Professor Neven's results, I mean, you said that in your approach all of the margin premium associated with the introduction of new emissions is attributable to the cartel. So does that worry you in the sense that you are therefore saying -- you are denying any possibility of a margin increase which happens to happen when an emission standard comes in, which might be due to an otherwise unmeasured quality difference which an equilibrium would justify a margin premium?

MR HARVEY: It is something that I did think about. It is a question of interpretation. The reason I interpreted all of the uplift as an infringement effect was that I had accounted for a lot of the characteristic differences between the trucks within the modelling plus some additional factors -- sorry, the series effects plus some additional characteristics. Then I looked to

the list of improvements that was provided. Some of those appear to be already captured within the model, things like cabin enhancements and so forth; others appear to be sort of day-to-day updates, so software improvements, that type of thing. But there did not seem to be necessarily step change improvements that perhaps would be expected as new trucks came out. But it is an interpretation. It is a judgment on the data.

MR RIDYARD: You could say it was quite an extreme judgment because you are giving no credence to the possibility of a margin improvement, naturally occurring margin improvements, on something which is admittedly not measured?

MR HARVEY: Yes, and you could reach a different view on the data. But, as I said, I looked at the combination of the view that, generally speaking, people did not want to pay for the new Euro standard, then the fact that you need to be able to reconcile that with the idea that new features come along and you are willing to pay for those plus some at the time of the new introduction of the standard, the combination of controlling for a large section of the characteristics that matter for pricing plus review of the information that was provided where some of the improvements did not in the least strike me on the face of it as being significant. But I of course

accept that you could reach a different view on that.

MR RIDYARD: Okay, thanks.

Just scanning through the questions, again I think quite a bit of what we intended to ask has been covered by the discussions we have had so far. But one thing I wanted to pick up -- it might just be for confirmation purposes more than anything else -- was when we look at the Euro 2 trucks and the Euro 6 trucks, the sort of before and after trucks, are you saying that although on the face of it they look to be quite useful observations because they would be -- enable us to differentiate between cartel period effects and non-cartel period effects, are you saying that in both cases, maybe for different reasons, they are not useful for those purposes? Perhaps, Professor Neven, you could go first on that.

PROFESSOR NEVEN: Yes, I think they are useful because, I mean, these are premia that occur outside the period of the infringement. Of course there are limitations to the extent to which we can, I guess, use them as estimate of the premia that could be associated with willingness to pay with respect to other standards because other standards are different. Of course there is a particular concern with respect to Euro 2 which is that we are not controlling for cost as well as we

could. It is also the case for Euro 3 because Euro 3 is introduced in 2001 onwards, so it is more difficult for those.

With respect to Euro 6, I mean, there is this concern that Euro 6 may also be tainted, but, I mean, the fact that I do not get different results in this regression here, whether I control for Euro 6 or not, suggests that Euro 6 is not affecting the identification. By the way I have run this exercise here also on the before/during model, I mean, with similar -- and that is in table 23, I think, in my second report -- with similar results.

MR RIDYARD: Mr Harvey.

MR HARVEY: I think I commented on what is in Euro 2 and Euro 6 earlier, so nothing more to add.

MR RIDYARD: Okay. I think that is probably all we had on the emissions questions.

THE CHAIRMAN: Any clarification?

MR BEARD: No, I do not think so. Thank you.

THE CHAIRMAN: Nor from you, Mr Ward?

MR WARD: No, thank you.

MR RIDYARD: Right. Our last topic: value of commerce.

The first question is a broad one. I should say, on the question we gave you, I think we have written "DAF" instead of "Royal Mail and BT", but -- so that may be

a slightly confusing question. But the question should have been: can you shed light on whether the prices paid by the claimants for bodies and tail-lifts -- whether they were affected by the infringement? Is that something that you can shed light on?

THE CHAIRMAN: I think it is only Royal Mail.

MR RIDYARD: Only Royal Mail, of course, yes. Sorry -- whether the prices paid by Royal Mail for bodies and tail-lifts were affected by the infringement.

Mr Harvey, would you like to go first on that?

MR HARVEY: The way I think about this is the answer to the question turns on how competition worked in the supply of the bundle, as it were. So I think it depends on basically whether -- almost whether there is a market for the supply of the all-in body and truck that is sort of different to the market for the supply of separate components.

My understanding is that Royal Mail went to market to buy the bundle, and if the sort of competitor set for the supply of those services was only those involved in the infringement, then I think it is possible that the prices of the bundle could be elevated. It is a difficult question to answer directly empirically with the data. Further principles -- in terms of the data itself, because the data set is principally a -- I think

the phrase is "naked truck, truck data set", it is hard to investigate sort of bundle pricing on its own. So that is some observations.

MR RIDYARD: So the vast majority of the observations in the econometrics are for trucks without bodies?

MR HARVEY: Yes.

MR RIDYARD: Can you just expand a bit on how that affects -- I mean, the Royal Mail purchases were quirky in that respect. They were out of the ordinary.

MR HARVEY: Yes. So in terms of the way it affects the implication for the overcharge, the overcharge estimate?

MR RIDYARD: Yes.

MR HARVEY: The overcharge estimate would mostly reflect overcharge on the naked trucks, but, of course, there is some proportion of the observations for which a bundle is purchased. So intuitively the overcharge estimate will be a sort of weighted average, if you will, of the two but strongly weighted in favour of the naked truck.

MR RIDYARD: How does that affect the -- because what we are talking about here is what sales -- what body of sales -- if we have a percentage uplift that we think exists because of the infringement, what do we apply that to?

MR HARVEY: Yes, well, by applying it to the combined purchases of the body and the truck itself, the implicit

assumption is that the overcharge that emerges for the sort of weighted but predominantly naked truck estimate would also apply to the bundle. That is not something that is directly testable using the data, but that is the implicit assumption and that assumption will be consistent with a market in which there is a sort of supply for the bundle rather than supply for the separate components.

SIR IAIN MCMILLAN: Yes. I just wanted to clarify, if I may. It was the purchase price of the bundle that was the input to your model?

MR HARVEY: Yes. Yes, because it is sort of negotiated as one.

SIR IAIN MCMILLAN: Yes.

MR HARVEY: You cannot tease them out.

SIR IAIN MCMILLAN: Yes. So I understand, thank you.

THE CHAIRMAN: But I thought you said before that the overcharge was estimated by reference to the naked truck, not the bundle.

MR HARVEY: Sorry. So the overcharge data, around 90% or so of the observations are for the supply of naked trucks. There is a proportion, around 10%, that include Royal Mail, I think also Morrisons, if I am correct, where the prices include the supply of the bundle. So the data set is a combination of them both but

predominantly naked trucks, yes.

MR RIDYARD: But when you are trying to explain prices in the model -- obviously you have got a lot of explanatory variables in there -- is the existence of a body one of the explanatory factors?

MR HARVEY: No, it is not, but we do have the MLO cost of the --

MR RIDYARD: Of course, yes.

MR HARVEY: So it is not a separate ...

MR RIDYARD: The MLO cost of the body, how does that get fed into the data? Is that the price that DAF paid the subcontractor for the body or is it the actual manufacturing cost of the body?

MR HARVEY: No, I think it is the price -- I think this varies over time, actually, but I think I am right in saying that it is the price that DAF pays to those that manufacture it. I think I took -- yes, that is correct, it is the price that DAF pays to others and that is included.

MR RIDYARD: In some cases did DAF actually make the bodies themselves?

MR HARVEY: I do not think so.

THE CHAIRMAN: Yes, I think there was. I think Mr Ashworth said that.

PROFESSOR NEVEN: After the end of the infringement, but, as

far as I understand, not to Royal Mail. I think that -- indeed, I mean, DAF produced some of the bodies itself and, in the case of some customers like Royal Mail, procured bodies from third parties, and of course in the data, when DAF is producing the body, it will be reflected in the cost that is incurred in producing the body. In the case of bodies that were procured from third parties, it is reflected and I understand that the amount that is inputted in the MLO is the amount that was paid to the third party.

MR RIDYARD: That would make sense, would it not? Yes. So, Professor Neven, what is your overview on this topic?

PROFESSOR NEVEN: I agree with Mr Harvey that we have predominantly, quote unquote, "naked trucks" in the sample. The overcharge that we are estimating is an overcharge -- if at all, an overcharge that would apply to naked trucks and not to the combination between trucks and bodies. Of course, I mean, given that this overcharge is a truck -- is an overcharge that is likely to apply to naked trucks, if we apply to -- this overcharge in the case of Royal Mail not only to the naked truck but also to the body, this is likely to lead to a substantial overestimation of the damages if indeed the bodies were not affected.

So under the assumptions that the bodies were not

affected, to extrapolate that overcharge estimated on naked trucks to the bodies leads to a substantial overestimation. I mean, in many instances, in the case of Royal Mail, the body, say, is roughly £7,000 or something of that order of magnitude and some of the LF trucks, you know, were priced at 20. So, you know, we have something here which is one-third of the cost of the naked truck. So, you know, it would be a substantial overestimation if you were to extrapolate what has been estimated as the overcharge on naked trucks on the bodies.

Just one comment, if I may, on the question of whether there was an overcharge on bodies. I mean, there is clearly a market for bodies -- okay? -- because most customers are actually not buying naked trucks and bodies from the manufacturers. They are actually procuring the bodies from third parties.

THE CHAIRMAN: Like BT?

PROFESSOR NEVEN: Yes, exactly, like BT. Actually, as Mr Harvey has indicated, there are very few instances in which DAF is actually procuring bodies on behalf of others or even DAF or even producing these bodies. So the predominant organisation is one in which the customers, the final customers, are procuring bodies in the open market and then are asking either DAF or

a third party to put the body on the chassis, which means that, you know, you can expect that there will be a competitive constraint that is exercised there. So it is a --

THE CHAIRMAN: Is this your argument on complements?

PROFESSOR NEVEN: We will get there eventually.

THE CHAIRMAN: We will! It is not going to be tomorrow, but ...

No, but I mean in terms of the argument on this has an impact on that, does it not?

PROFESSOR NEVEN: Indeed. What I am saying is that there was an open market for bodies and that, as a result of the infringement, if there was one, it was an effect on the naked trucks, I would also expect the pricing of complements to go down.

MR RIDYARD: This may not be even that relevant, but just to try and complete my understanding. Most of the sales go through dealers. The truck sales go through dealers. Do we know -- maybe we do not know or even do not care, but I will ask anyway -- do we know whether -- when customers buy from a dealer, does the dealer put the body together for them or does the customer buy a naked truck from a dealer and then buy a body from someone else?

PROFESSOR NEVEN: I think that typically -- you have

alternative models -- is that the customer might arrange for the dealers to actually put the body that they have purchased from someone else onto the chassis, and I understand this is something that the dealers can do. I also understand that there are circumstances in which the dealer will -- I mean, together with the final customer, will procure the body so that the dealer will actually play a role in the negotiation for the bodies. But I am not sure it matters all that much.

MR RIDYARD: No, I am not sure it does either. I was just trying to fill in the gap.

If you go back to your scenario, Professor Neven -- let us take a simplified purely hypothetical example. Let us say we found a 10% overcharge on the naked trucks and let us say -- to make it easy, let us say the truck was the same value as the body, you are then saying, if we then applied that 10% overcharge to the truck and body, we would be doubling the effect of the infringement?

PROFESSOR NEVEN: That is correct, yes.

MR RIDYARD: So what is the answer to that, then, Mr Harvey?

MR HARVEY: I think if the body is unaffected by the infringement, then that would overestimate the effect of the infringement by taking that calculation step, so I do not think there is a disagreement on that.

MR RIDYARD: Yes. So the proposition -- so it all rests on whether the infringement impacted the body price -- the prices that DAF charged to Royal Mail for the bodies?

MR HARVEY: I think so, yes.

MR RIDYARD: How do we --

THE CHAIRMAN: How do we test that?

PROFESSOR NEVEN: The thing is that we do not have the data to test that case. We have performed a sensitivity analysis in which, instead of using the invoice prices -- and, you know, the invoice prices, as you pointed out, are invoices for the naked truck together with bodies when the body was attached and was sold by DAF to the customer -- we have also performed an exercise in which we remove the body value, when we can, and we estimate the overcharge then on what is the naked truck. I mean, it does not really change very much the estimation of the overcharge. Of course this is something that we can do for the later period because in the later period, I mean, we have an MLO which is truck-specific and so we can identify the body. We cannot do that for the earlier period. Unfortunately, this is a limitation of the data. But for the later period, if we do that exercise of stripping out the value of the body or estimates of the overcharge, then it will change.

THE CHAIRMAN: The invoice presumably specifies a separate amount for the body, does it?

PROFESSOR NEVEN: I am not sure you want to know the details, but there are sort of two sources of information for that. One source of information is -- as a straight answer to your question, it does not; okay?

THE CHAIRMAN: It does not?

PROFESSOR NEVEN: No. So you have to infer the value of the body either from the MLO data or from the options data. I mean, there are two sources from which we can identify the value of the body. Of course, in the case of Royal Mail, we can extend the analysis for the earlier period, the AS/400 period, something we cannot do for the other customers who bought trucks together with bodies. We can do it in the case of Royal Mail because we have the contracts, and so even though, I mean, the invoice would not specify exactly, you know, which body was purchased in the context of a particular contract, we assume -- actually, if you look at these contracts, they are menus; okay? They will tell you, "Here is an LF 55 with that sort of characteristic and in the context of the contract we have two types of bodies, a body at £7,000, a body at £8,000", whatever.

We have assumed, in order to have an imputed value

for the body, that we always take the least value, so we are conservative. So we always take out what could have been, in the context of the implementation of these contracts, the lowest value for the body. I am not clear, is it?

THE CHAIRMAN: No, I think I understand.

MR RIDYARD: Mr Harvey, you had some concerns with Professor Neven's approach to swapping out the body price.

MR HARVEY: Yes, I think Professor Neven has touched on some of them. There is the practical difficulty of identifying which body was purchased on the contract-matching approach. The more fundamental issue is: what is, if you like, the true value of the body bit? So, as I understand it, these contracts were -- they were being negotiated for the supply of the bundle and so, even though a contract might list, you know, £20,000/£30,000 for the truck, £5,000 for the body, some high amount for a radio, it is not clear that relates necessarily to the economic value of the body bit. So they are the sorts of concerns I had with the contract-matching approach. The --

THE CHAIRMAN: Do you mean that DAF might be making a sort of turn on the bodies if they are --

MR HARVEY: It is more just -- although an invoice or

something like that might just list out, you know, "Here is the price of the truck, here is the price of the body", in the end what was negotiated over was the total package.

MR RIDYARD: This is where we are trying to work out the body value from the contract itself as opposed to going through the MLO --

MR HARVEY: Correct, yes. So I understand the pragmatism, but that is a limitation of the work.

MR RIDYARD: Yes.

MR HARVEY: Then the other approach was just to identify the cost of the body in the MLO. The concern there is I think that the cost is not just for the body --

PROFESSOR NEVEN: There is a tail-lift.

MR HARVEY: -- it is for other things.

PROFESSOR NEVEN: There is a tail-lift. Yes, it is true that -- I mean, Royal Mail --

THE CHAIRMAN: There is what?

PROFESSOR NEVEN: A tail-lift.

THE CHAIRMAN: Other bits and pieces added on.

PROFESSOR NEVEN: In order to lift the letters into the truck.

So Royal Mail was always buying the body and the tail-lift, so essentially what we regard as the body is actually the combination between the body and the

tail-lift, which is --

THE CHAIRMAN: They are not separated out?

PROFESSOR NEVEN: No, they are not separated out. It is essentially a redefinition of the body. Instead of being a simple body, it is a body with a tail-lift.

THE CHAIRMAN: But in both cases they are not manufactured by DAF?

PROFESSOR NEVEN: Exactly. So they are -- economically they are identical.

MR RIDYARD: Okay. I am not sure there is -- unless you think we have missed something important, I am not sure there is much more we have to ask on that topic. Okay.

THE CHAIRMAN: All right. Any clarification?

MR BEARD: No.

THE CHAIRMAN: Same for you, Mr Ward?

MR WARD: I do actually, if I may.

THE CHAIRMAN: Right.

MR WARD: Firstly, there is a -- pure information for the tribunal. There was a discussion a few minutes ago about when DAF started to manufacture its own bodies, and it is actually Mr Ashworth's evidence, if I can just give you the reference. We do not need to turn it up unless you wish to. It is {D/22/55}, paragraph 218, where he says -- sorry, I will just turn it up:

"From late 2007, DAF UK customers were able to

request that Leyland Trucks build 'box bodies' ..."

So that is just Mr Ashworth's evidence.

THE CHAIRMAN: Thank you.

MR WARD: The second was a clarification question for Mr Harvey, where we have just been talking about the two different methodologies Professor Neven uses to calculate the body value. On page [116] of the transcript, the chairman said, "Do you mean that DAF might be making a sort of turn on the bodies ...", and you said, Mr Harvey:

It is more just -- although an invoice or something like that might just list out, you know, 'Here is the price of the truck, here is the price of the body' ..."

Is it right that the body is listed on the invoice? I see Professor Neven shaking his head.

MR HARVEY: No, sorry. That was misleading. It is the contract that has the price of the body. The invoice obviously is the invoice for the bundle. Apologies.

MR WARD: Thank you. Those were my only questions.

THE CHAIRMAN: I think what I was trying to get at was that if you are using the MLO cost for the body and the tail-lift or whatever, does that match up in any way to the invoice or the contract price for the bodies?

PROFESSOR NEVEN: Yes. I mean, you can do the exercise both ways actually. You can use the contracts in the case of

Royal Mail and you can also use the MLO or the bob-lob data, and they lead to very similar results.

THE CHAIRMAN: But that assumes that there was no margin on --

PROFESSOR NEVEN: Yes, but this margin argument, I am not sure that I am so concerned about it because there is a competitive market. You know, if DAF is trying to have double marginalisation, as we say in economics, if DAF is trying to charge a margin on a margin, well, Royal Mail are going to run away. They are going to say, "Okay, fine. We are going to procure our own bodies".

MR BEARD: I do have a clarification just on that. It is because it was for the transcript.

I think Professor Neven referred to "bob-lob"; is that right?

PROFESSOR NEVEN: Yes.

MR BEARD: Is it worth just explaining what "bob-lob" is?

PROFESSOR NEVEN: I mean, bob-lob is a file that has been shared by DAF with Royal Mail which essentially has all the options and it is a file in which you can identify the value of the body in those circumstances in which it was not purchased by -- it was not manufactured by Royal Mail. So it is actually from this bob-lob file which is --

THE CHAIRMAN: You mean not manufactured by DAF?

PROFESSOR NEVEN: By DAF, sorry. I am getting tired. It is not manufactured by DAF.

So you do not actually get it straight in the MLO; you get it from this bob-lob file, which is a more specific list of items.

THE CHAIRMAN: All right. Thank you.

MR BEARD: It is just underlying data, but otherwise the transcript would be unintelligible.

THE CHAIRMAN: No, that is a perfectly legitimate clarification.

Right. Thank you. I think that is the end of the hot tub session, so we will break now. You are released from any restrictions. We will resume with cross-examination tomorrow. I assume it will be Mr Harvey who is cross-examined first?

MR BEARD: Yes, I assumed we would go in the same order. I have not discussed with Mr Ward how long he would intend to be with Professor Neven so I might do that overnight. I do not know whether or not it would be sensible, on a precautionary basis, to think about starting at 10 o'clock tomorrow.

THE CHAIRMAN: How long do you think you are going to be?

MR BEARD: I think I am going to be a good two and a half hours so I will be the morning, I think, even at

reasonable pace, with Mr Harvey. Obviously I will look overnight to see if I can curtail things, but I do not have a sense -- Mr Ward and I have not spoken about this so I do not know Mr Ward's position.

THE CHAIRMAN: Well, we certainly have to finish by close of play tomorrow.

MR BEARD: That is exactly it. I am concerned -- that is why I am quite aware of it, but I do not know if Mr Ward is in a position to comment now.

MR WARD: Yes, I also think I need that sort of amount of time, so starting early --

THE CHAIRMAN: We will start at 10.00.

MR WARD: -- seems like a good idea.

MR BEARD: I am most grateful. Thank you.

THE CHAIRMAN: All right. Thank you very much, everyone. We will see you tomorrow at 10.00.

(3.01 pm)

(The hearing adjourned until.

Friday, 27 May 2022 at 10.00 am)

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