[Slide 1]

[Slide 2]

[Slide 3]

JOHN DAVIES: Now, price concentration analysis: Price concentration analysis looks at how prices vary according to the level of concentration in different markets, usually measured as the numbers of competitors. There are two reasons for doing that. Firstly, it's a good way of testing market definition. If the price falls according to how many of the particular type of supplier is present that sounds like good evidence that type of supplier is in the same market as the product you're looking at. If there is no such effect, so more of those suppliers have no effect on the price, that might be evidence that those suppliers are not in the same market, although, I think that conclusion is rather weak evidence by itself. Secondly, if there is a clear relationship between price and concentration that could be very useful for assessing the effect of a merger. After all, a merger is increase in concentration. Suppose you found that in areas with three stores prices were 10 percent higher than in areas with four stores. Then it's very appealing to conclude that the effect of a merger between two of the stores in an area with four stores would be to make that area look like an area with three stores with prices 10 percent higher. But, as ever, you have to be careful how you do the analysis and how you interpret it. We'll take as our example the classic case of price concentration analysis, the US Federal Trade Commission's analysis of the proposed Staples/Office Depot merger that it took to court in 1997. This was a proposed merger between to retail suppliers of office supplies. Like many retail businesses, there are good reasons to think the markets will be local, and there are many different stores that sell office supplies, from big supermarkets to little corner shops. But the FTC was concerned in this case that large specialists stationery suppliers, so called "office supply superstores,"

constituted a separate product market. If they did, then there were few providers in the market,

just three big chains: the two merging parties, Staples and Office Depot, and a rival, called

OfficeMax.

[Slide 4]

JOHN DAVIES: Here's a very simple, nontechnical illustration of the FTC's case. It

shows advertising flyers put out by Office Depot in two different locations. They're identical

except that most of the prices are higher on one than the other. The FTC suggested that these

two geographic areas were very similar, except that in Orlando, on the left there, there were three

competing superstores, while in Leesburg, on the right, Office Depot faced no office supply

superstores.

You can see that the prices quoted at the bottom of the advertisements are a lot higher in

Leesburg. So FTC was claiming that this price difference reflects the absence of competing

office supply superstores.

[Slide 5]

JOHN DAVIES: Similarly, the FTC presented internal documents from Staples showing

how its prices differed according to the presence or absence of the two competing office supply

superstores, OSSs, as I show here. Staples' pricing policy differed according to which of the

chains it faced. If we take this table at face value, you could conclude that the merger of Staples

and Office Depot would result in prices rising by 11.3 percent in areas where currently they are

the only OSSs, so that would be a two-to-one merger, and by 4.9 percent in areas where both

brands currently compete, but also face OfficeMax, in a three-to-two merger.

So, this all seems very simple. However, one reason I have picked this case is because it

became much more complicated than that and because it is a famous case that has been written

up in such detail by the various economists involved, both for the FTC and for the merging

parties, as well as by interested commentators. So, there's a lot you can read about it.

As I'm afraid often seems to be the case in quantitative analysis, price concentration

analysis can give false negatives and false positives. False negatives can arise for all sorts of

reasons. They can be as simple as poor data. For example, if you're measuring headline prices

but competition actually takes place through hidden discounts, then you might not see how

concentration is affecting the prices that really matter. Maybe in more competitive areas the

companies are giving higher discounts, but you won't see that if you're only looking at the

headline prices.

Similarly, if there are factors jointly causing high prices to be associated with more firms,

that could counterbalance the effect of more competition, leading to no relationship between

concentration and price. So, there can be false negatives. But more often in this sort of analysis,

there are concerns about false positives. The analysis can show a false positive because it

assumes that market concentration, for example, the number of firms present in a location,

determines price. But that is not the only way in which concentration and price could be related.

There might be a common factor determining both.

For example, if one firm's products are higher quality than those of its rivals, then it

might have a high market share and a higher price, giving rise to a positive relationship between

concentration and price that does not actually reflect weaker competition in the more

concentrated markets.

Another even more common reason has to do with cost of supply. Suppose the cost of

supply are high in an area, for example, a remote, rural area in which firms cannot easily achieve

an efficient scale. Then that region might have very few firms, simply because it's not an

attractive place to do business and costs will be high. But high costs also result in high prices, so we would see high concentration associated with high prices, but not because competition is weak, simply because high common costs determine both of those results.

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JOHN DAVIES: There are econometric techniques that seek to deal with this problem -- in particular, so-called "fixed effects" models using panel data try to control for the differences between areas that might arise from cost differences while having enough variation over time to pick up changes in concentration. We're not going to go into the details here.

The FTC carried out just such an analysis, and it found a similar effect with this more sophisticated analysis as it did with the simple price comparison. However, as a cautionary tale, I would point out that economists working for the parties vigorously disputed this result and argued that the right figure for the difference was more like 1 percent. I illustrate some of the different estimates on the slide here, reproduced from a very readable account of the case by Jonathan Baker, who was working for the FTC at the time.

This sort of argument over econometric analysis has sometimes been called a battle of the models, and as far as the judge was concerned, these models do seem to have canceled one another out in that the judge did not cite the more sophisticated analysis in his decision. That does not have to happen when quantitative techniques are being used by different parties in a case, but it does happen quite frequently. I recommend reading Baker's account of what went on. He gives an excellent blow-by-blow account of the different techniques and how they related to one another while making his case, to my mind convincingly, that the FTC's analysis was fundamentally sound.

For a more technically detailed treatment, also from the FTC's side, you can also read a

paper on the case by Ashenfelter, Baker and others. The link is in the transcript[1]. And for an

alternative view by economists working for the merging parties, you can read Hausman and

Leonard, also linked in the transcript[2].

If you don't have the capability to undertake that more sophisticated econometric

analysis, and frankly, even if you do, my personal view is that simple price concentration

analysis can still be useful, but, as ever, you need a good understanding of the industry and the

markets to interpret the results properly.

Yes, there is a problem that prices and concentration could be jointly caused by

something else, such as local costs or demand conditions or quality differences, but you could

use more qualitative evidence to understand whether it is competition or these other things that's

driving your findings. For example, you might look at internal documents on how companies

price or analysts' reports on the same thing, or try to get an understanding of what the costs of

setting up in a new area actually are to see whether it is plausible that the higher priced areas do

indeed necessarily entail higher supply costs to a degree that explains the higher prices.

Or, if the parties are claiming that this is why their prices are higher in high-concentration

areas, you could ask them to prove it, as the FTC did in the Staples case.

And as we've said throughout this module, don't just do the technical quantitative

analysis in isolation. It is part of the evidence, and it needs to be interpreted and understood

together with all of the other evidence in the case.

[Slide 7]

[Slide 8]

JOHN DAVIES: Now we'll cover the use of diversion ratios in so called "upward pricing

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[1] https://papers.ssrn.com/sol3/papers.cfm?abstract_id=529144
[2] https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1305691

analysis" in horizontal mergers. One of the most common reasons for challenging the merger is that it might give rise to unilateral effects. If firms sale products that are close substitutes they each individually set their prices such that if one raises its prices unilaterally it will lose so many sales to the others that its profit would fall. However, if a merger brings a firm together with a close competitor, it could then raise prices because some of those lost sales would stay within the merged firm, so the loss of profits would be less.

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JOHN DAVIES: Here's an illustrative example. Suppose we have local retailers -- supermarkets, perhaps-- in an area that we'll say is a geographic market. If Supermarket A, in the center there, raises its prices, then its most price-sensitive customers will go to other stores, and that's what the arrows show. They'll go to some stores more than others. And this will not necessarily be proportional to market shares.

Some of them might go to stores that are very close to A, if that was already the most convenient location for them. Or maybe if A specialized in organic groceries, then they would favor, similarly, wholesome, high-end stores and so on. Note that some will even go to stores outside the geographic market. And A will have set its prices so that the sum total of all those departing customers would be just enough to render a price rise at A unprofitable, a loss greater than the critical loss.

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JOHN DAVIES: But if two of these firms merge, then the critical loss analysis changes. Suppose that A buys C. Then post-merger, if A raises its price, the owner will still keep some of those customers who would depart as a result of the higher price within the new merged firm, those customers who would have gone to C. So, the actual loss of profits will be rather less than

it would have been pre-merger as a result of raising price.

Now, since before the merger A was just at the point where it did not want to raise prices, post-merger it will have an incentive to raise prices. And the question we're interested in is whether it has an incentive to raise prices a lot or only a little. And it's fairly obvious that the answer to that question basically depends upon two things. Firstly, what is the proportion of those customers leaving A who will go to C. That's called the diversion ratio. The higher the diversion ratio from A to C, the more customers who leave A because of high prices will continue to buy from the merged firm, so the greater the incentive to raise prices at A.

And, secondly, how profitable will those customers be for the merged firm when they start buying from C? And that is measured by the profit margin at C. The higher the margin at C, the more the merged firm gains from a customer leaving A to go and buy from C, so the more willing the merged firm will be to raise prices at A.

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JOHN DAVIES: So, if we can measure the diversion ratio, and the margin, we can combine them into a single measure that captures the firm's incentive to raise prices at A after it has merged with C -- the gross upward pricing pressure index, or GUPPI. The GUPPI provides a preliminary indication of the merger's unilateral effects. It's very simple. It's just the margin at C, multiplied by the diversion ratio from A to C, or multiplied through by relative prices so that it's a percentage and not an absolute value.

It is a very simple formula. So, for example, if the prices of the two stores are the same, and we have a margin at C of 20 percent, and we find that 30 percent of customers leaving A because of price rises go to C, as opposed to going to other stores, we get a GUPPI of 6 percent. A higher GUPPI indicates stronger unilateral effects because Firm A would stand to gain more

from a unilateral post-merger price increase.

Note that the diversion ratio measures only the proportion of those customers leaving A that go to C. It does not have to take any account of how many of those customers stay at A, even if the prices rise. It is a proportion of those customers leaving.

[Slide 12]

JOHN DAVIES: The GUPPI is only ever going to be positive for prices producing substitutes, but of course we expect mergers to result in cost-saving efficiencies, as well. So, the overall effect of the merger will be the net upward pricing pressure instead of the gross upward pricing pressure. UPPI is the gross upward pricing pressure, minus some estimate of efficiency savings. If the UPPI is positive, then, in this very simple modeling framework, the firm has an incentive to raise prices post-merger. And, of course, you can calculate upward pricing pressure in the other direction, too, to work out whether the merged firm has the incentive to raise prices at C once it's merged with A.

[Slide 13]

JOHN DAVIES: Now, it's a bit strange to think of the incentives for the merged firm to raise prices at A while holding the price at C constant and then to calculate its incentives to raise prices at C holding A constant. So, if we can assume that margins and diversion ratios in both directions are the same, we can simplify to an overall upward pricing pressure, which I show here without deriving the algebra.

To illustrate, using the same number as before, the GUPPI is 8.6 percent. If marginal cost savings were less than 8.6 percent, we would expect the merger to raise prices. If the marginal cost savings are less than 8.6 percent, we would expect the merger not to raise prices.

But the assumptions to be able to do this -- the assumptions that margins and diversion

ratios are the same in both directions are very strong indeed. Imagine having one big store and one little store. It's really rather unlikely that the diversion ratios will be the same in both directions. But this calculation does have the advantage of simplicity, and all you need are margins and diversion ratios.

I'll talk about how to interpret these results in a moment, but first, where do we get these numbers? Internal documents can sometimes give you a sense of what the diversion ratios might be. Some companies have win/loss statistics. For example, mobile phone companies often track where any lost customers have gone. These statistics will tend to show which competing providers of products are considered as particularly close competitors by customers on average.

Now, that's not quite what we want. Ideally, of course, we want to know which products are considered close competitors by the most price-sensitive customers, ones who would leave if prices rose. Remember, a diversion ratio is not the proportion of A's customers who would leave following a price rise; it is the proportion of those customers who would leave that would go to C.

Ideally, we are only interested in those customers who are leaving because prices are high. Those are the marginal customers. They're the ones who are constraining prices pre-merger. And the way that those marginal customers split between different alternatives might be different from the way that customers leaving for other reasons split. So, looking at average diversion ratios can be useful, but it's not measuring exactly what we want.

You can also get diversion ratios by conducting surveys. And if you have a large enough survey, you can explore price sensitivity as well as measuring the diversion ratio so that you can deal with this issue, because you could first ask customers about their price sensitivity, and then you could only use the answers that speak to the diversion ratio from those customers who seem

to be price-sensitive. But that obviously adds significantly to the amount of time and effort you're going to need to put into getting your survey because you need to survey a lot of customers. We're going to see an example of a survey used for this sort of work later on.

A natural question is what sort of level to take as a benchmark to decide that a merger is a problem. How much upward pricing pressure is enough? Well, the gross upward pricing pressure, the GUPPI, will always give you a positive price rise. The UPPI will depend upon the level of efficiencies. And if you don't have good estimates for efficiencies, and let's face it, you usually won't, one approach is to assume a fairly small efficiencies level, say 5 percent, and see if the UPP is positive.

Another approach is to calculate what level of efficiencies you would need in order for the upward pricing pressure to be zero and then decide whether that level of efficiencies is plausible. So, in our example before, for example, we needed 8.6 percent reduction in marginal costs in order to conclude that the merger would not result in upward pricing pressure.

Can we interpret these things as price rises? Well, no. You can convert them into price rises, but you have to make even more assumptions, which is perhaps not a good thing to do. The difficulty we face, if we're going to convert them into price rises, is that we then have to make some assumptions about the overall market demand curve. How much will consumption of the product fall as a result of price rises?

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JOHN DAVIES: I'm showing you here the simple formulae you can use to convert diversion ratios and margins into illustrative price rises, assuming first of all a straight line linear demand curve and secondly, assuming constant elasticity or isoelastic demand, which gives you a curvy demand curve. You will get lower illustrative price rises with a linear demand curve

than with a constant elasticity demand curve.

I've plugged the same numbers we used before into the illustrative price rise formulae. And as you can see, the difference between the two price rises resulting from two different demand curve assumptions is quite big. And here's the problem; you will not know what the demand curve actually looks like at this level of detail. You will not be able to decide in a particular case which of these demand curves is more likely to be right. Frankly, in most cases, we're lucky if we can even get a sense of the slope of the demand curve. It is completely unrealistic to expect that we will also be able to measure how fast that slope is changing, which is the difference between these two demand curves I've shown here.

So, what to do about this? Well, if you're trying to calculate illustrative price rises, you could think about quoting both numbers, taking one as a minimum and the other as a maximum, but it's a little unsatisfactory.

I think a much more comfortable use of upward pricing pressure is as a relative measure. Quite often, this measure is used in mergers where there are a lot of local markets. I think it's very difficult to look at any UPP measure and decide whether that means a given merger is anticompetitive or not, but it is much more reasonable to say that those locations in which the UPP is higher are more of a problem than those locations in which the UPP is lower. So, you can use this measure to rank different markets. And then perhaps you could do more qualitative and quantitative analysis to decide finally where you draw the line and which mergers you prohibit or take action against and which you let through.

These measures are certainly useful as a screen, for example, in phase one merger analysis. Opinion is a bit more divided on whether any reliance can be placed upon them for a final decision.

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JOHN DAVIES: I provide links here to some good things to read about diversion ratios and the UPP. There are some economists who believe that these measures are so simple that the assumptions behind them are so strong and unrealistic that they should not be used at all. I include here a link to an article by Simon Bishop arguing exactly that. I strongly encourage you to read it because I think he makes his case very well, and it's an extremely useful paper on the limitations of this technique, and you need to understand that.

I personally do not agree with his conclusion. I think that upward pricing pressure is a useful technique, as long as it's used with care and in full understanding of its weaknesses. In particular, it is essential to understand what it leaves out. It takes no account of coordinated effects. It's only suitable for mergers with unilateral effects. It assumes no change in product positioning or new entry, for example. And in its simple form, it only represents what happens when one firm but no others adjust prices, which is obviously unrealistic.

But all of the criticisms of UPP methods could also be applied to the traditional approach of looking at market shares. To my mind, what UPP is doing is taking the basic idea of market definition and market shares and refining it a bit by adjusting for diversion ratios that do not correspond to market shares, thus capturing the concept of firms being particularly close competitors of one another, which is very important in unilateral effects analysis, and also refining the analysis by bringing margins into the picture, which seem sensible.

Just like all the other techniques we've discussed here, it would be dangerous simply to calculate the numbers and then take decisions on that basis. You have to consider how well the assumptions match the realities of the case that you're looking at and how this evidence matches the other evidence you have. But if you can measure diversion ratios and margins in a unilateral

effects merger case, I think you should make use of that information as it's surely relevant to the question of whether the merger makes it more likely that prices will rise.

The Swedish competition agency, the Konkurrensverket, or KKV, has published an excellent account of using these methods that sets out the theory and some practical tips for using them very well. It then illustrates this account with some real case examples, one of which Arvid Fredenberg, Chief Economist at the KKV, will now present.

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ARVID FREDENBERG: My name is Arvid Fredenberg, and I am the Chief Economist of the Swedish Competition Authority. I will talk about our service and UPP calculations in a merger case. The views I present here do not necessarily reflect the official position of the Swedish Competition Authority.

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ARVID FREDENBERG: In August 2012, we received a notification of a planned merger between Akademibokhandeln and Bokia, the two largest brick-and-mortar bookstore chains in Sweden. The main question in the case was whether online bookstores exerted enough competitive pressure on the merging parties.

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ARVID FREDENBERG: We were interested in investigating whether competition from online bookstores and grocery stores would be sufficient to discipline the merged entity. Given the geographic distribution of brick-and-mortar bookstores, the merged entity would only face few constraints from other traditional bookstores, so germane to determine whether diversion ratios from Akademibokhandeln and Bokia to online bookstores and supermarkets was such that the merger would not lead to higher prices.

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ARVID FREDENBERG: In the face of one investigation, we held a second competition under our framework agreement on surveys and commissioned the winner to perform exit interviews in three cities where the outlets of Akademibokhandeln and Bokia were located closest to each other. The idea was that if the survey of those worst-case outlets showed a significant diversion to online bookstores, the merger ought to be non-problematic.

However, that was not the case, which led to a Phase 2 investigation and a similar survey was expanded to four more cities. The choice among the different formats for service was subject to discussion, both within the authority and with the parties. We chose face-to-face exit interviews because they allow something from people who have just purchased a book at the store of interest.

The whole process of conducting the surveys took 15 days from our announcement of the second competition to the delivery of the results to us. We gave the parties the possibility to review the draft questions.

One negative aspect of exit interviews is that factors such as the weather can affect the result. In our case, there was a southern snowstorm in one of the cities when the survey was carried out, and few customers were out shopping for books, which resulted in too few respondents in that city.

Our exit interviews had two screening questions. The first question was did you buy at least one book at the store you just visited, with the followup, did you pay for your purchase with a gift voucher. People redeeming gift card vouchers had no choice than visiting the store and could not be considered as typical customers of the outlet.

In order to assess whether books are bought spontaneously or if the purchase is planned,

we asked what the respondent would have done if the book they had bought had not been available in store. Around a quarter of the respondents would have bought another book in the same store. Less than 10 percent would have ordered the book from an online bookstore.

The aggregate diversion ratios were calculated by aggregating the answer from both chains to the questions if the store you just had visited and purchased a book in did not exist, what would you have done. Ideally, only price-sensitive customers should be asked their opinions, but this requires the survey to be significantly larger. For example, if only 10 percent of customers would be price-sensitive, we would have needed a sample size 10 times larger. Due to our experience of very few price-sensitive customers in the previous survey on bookstore customers, we decided to ask the second- choice question so that we would get enough respondents to estimate diversion ratios.

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ARVID FREDENBERG: Over 60 percent of the customers stated that they would choose another brick-and-mortar bookstore as their second choice. Seventeen percent of Akademibokhandeln customers answered that they would have chosen an online bookstore if the particular Akademibokhandeln outlet did not exist. For Bokia, the equivalent figure was somewhat lower. The diversion to all supermarkets, grocery stores, was roughly 6 percent, thus much lower than the ones to other physical bookstores or online bookstores.

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ARVID FREDENBERG: The diversion ratio needed for calculating the UPP index of interest is the one between Akademibokhandeln and Bokia. The table presents estimated diversion ratios between these two chains from Akademibokhandeln to Bokia and vice versa. These have been calculated as the ratio of respondents outside the respective store that named the

other chain as their second choice.

Approximately 22 percent of all Akademibokhandeln customers chose Bokia as their second choice, while 29 percent of Bokia customers chose Akademibokhandeln as their second choice.

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ARVID FREDENBERG: Since the focus of our analysis was to assess the effects of the merger in the local markets separately, the margins specific for each outlet were collected. The relevant margins for the calculation of the UPP were the total turnover minus the cost of goods sold; that is, the costs involved in selling an extra copy of a book.

The GUPPI for A is calculated by multiplying the diversion ratio from A to B with the margin for B and the relative price between B and A. For the purpose of this presentation, we assume equal prices and an equal margin of 40 percent.

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ARVID FREDENBERG: The table presents the calculations of the UPP indices based on the diversion ratios between the merging parties from the previous table and the margin of 40 percent for all outlets. The efficiencies to merging parties claimed were not up to the standard to be taken into account. So, the values of the UPP measure here are the same as the GUPPI.

The analysis showed that the merging parties would have the incentive to increase prices in a couple of cities. The GUPPI is over 10 percent for both parties in some cities, which could be seen as problematic. If post-merger Bokia raised prices in these cities, so many of the customers moving from Bokia would go to Akademibokhandeln that the price rise would be profitable. However, in Sweden, a merger can only be blocked if it were to significantly impede competition in the country as a whole or a substantial part thereof.

A merger that would cause a price increase in just a couple of cities would probably not be forbidden. The parties argued that the cities represented only a small part of Sweden and of their own total turnover. They also claimed that they would maintain national pricing and it would be unprofitable to raise the national price as it would lead to losses in the non-overlapping areas.

We examined whether the parties would have an incentive to switch from national pricing to local pricing after the merger by examining what the pricing structure would look like with local pricing after the merger and compared it with a case from national pricing. The increase in profits from switching to local pricing was small.

Given the aspects mentioned above and a lot of other aspects in the case, we decided to allow the merger between Akademibokhandeln and Bokia to take place without any remedies.

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ARVID FREDENBERG: You can read more on this case and four other cases where the Swedish competition authority has used UPP in a working paper available on our website.

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JOHN DAVIES: Thank you Arvid.

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[Slide 27]

JOHN DAVIES: Now we have another detailed case study. This is bidding analysis, using data from an auction or a tender. Bidding analysis can be similar to price concentration analysis in looking at how the number of bidders in different auctions affects the outcome, for example. It can also be similar to diversion ratio analysis in looking at which bidders seem to exert a particularly strong competitive constraint upon one another. I'm going to hand over to

Csaba Kovács of the Hungarian Competition Authority, the GVH, for an example based on an actual case.

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CSABA KOVÁCS: I am Csaba Kovács from the Hungarian Competition Authority, that is, the GVH. I will talk about a bidding study which has been performed in a merger case. I was not involved in the case, and I am grateful for the support of those who were. Any errors are mine, and the views presented here do not necessarily reflect the official position of the GVH.

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CSABA KOVÁCS: The case dealt with a merger between two telecom firms: Tele and Phone. These are not the real names, and I have changed the data for reasons of confidentiality, but otherwise, the analysis is the same as in the actual case.

The merger involved many relevant markets but competitive concerns emerged regarding only one of them: information and communications technologies for big businesses in Hungary. That is ICT.

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CSABA KOVÁCS: ICT here is the provision of a range of telecommunication services in one package for large enterprises. ICT was highly concentrated, and Tele and Phone had a large combined market share. There were only two major alternative suppliers: Dial, the former monopolist incumbent, and Cell, a newer firm.

In addition, there were several smaller competitors. HHI was high pre-merger and would increase significantly post-merger. Entry was regarded as difficult. An analysis based on market shares could have suggested that the merger was likely to lessen competition substantially.

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CSABA KOVÁCS: ICT projects were big and complex and were purchased through tenders. In tenders, the winner takes the whole contract, and to some degree, competition in the market may be replaced by competition for the market. Market shares may not reflect the strength of the underlying competitive pressure that different suppliers impose on each other. Therefore, they analyzed bidding data.

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CSABA KOVÁCS: We collected data from ICT customers. The objective was to cover the biggest customers rather than to have a full representative sample. For each tender, we asked, among other things, three win/loss questions. First, who won the tender? Second, who submitted the second-best bid? And, third, who else submitted a bid?

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CSABA KOVÁCS: First, we looked at how often a particular competitor such as Tele submitted a bid when another particular supplier, such as Phone, submitted a bid, too. The number of such tenders divided by the total number of tenders where Phone participated produces a ratio which tells us something about the competitive pressure that Tele imposes on Phone.

The idea is that the presence of competitors in a given tender is a competitive threat to other bidders. For example, the presence of Tele is a competitive threat to Phone. The higher the frequency of this presence, the stronger the competitive pressure. From our data set, we calculated this ratio for each supplier concerning each competitor.

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CSABA KOVÁCS: The first row of this table represents tenders where Dial participated. That is 60 tenders, or half of the total. In 40 percent of those 60 tenders, Tele also participated,

and in 50 percent of those 60 tenders, Phone also participated, and so on.

So, each row represents tenders where a particular supplier participated, and each column indicates the competitive pressure a particular competitor imposes on others.

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CSABA KOVÁCS: In each row, the numbers in the column of Dial are by far the biggest. This suggests that Dial imposes the strongest competitive pressure on other competitors. Within that, Dial seems to impose stronger competitive pressure, both on Tele and on Phone, than they impose on each other.

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CSABA KOVÁCS: The numbers of Phone and Cell in the row of Tele are equal. The same is true for the numbers of Tele and Cell in the row of Phone. This suggests that Cell imposes as much competitive pressure on Tele and on Phone as they impose on each other. It doesn't matter that Cell has only 10 percent market share while Tele and Phone each has 15 percent.

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CSABA KOVÁCS: Smaller competitors also seem to impose relatively strong competitive pressure. All these findings suggested that the merger between Tele and Phone would eliminate relatively little competition.

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CSABA KOVÁCS: Next, we look at how often a particular competitor, such as Tele, submitted the second-best bid when another particular supplier, such as Phone, won the contract. This gives a better picture of closeness of competition. The idea is that the most dangerous competitor of the winner is the one who submits the second-best bid. The more often a

competitor is the second one behind a particular supplier, the stronger competitive pressure it imposes on that particular supplier. This logic is the same as that of diversion ratios discussed elsewhere in this training module.

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CSABA KOVÁCS: The first row of this table represents tenders where Dial won and there was at least one other bidder. That is 40 tenders. Tele was second in 20 percent of them; Phone was second also in 20 percent of them, and so on. So, each row represents tenders which were won by a particular supplier; and each column indicates the competitive pressure that the particular competitor imposes on others.

[Slide 40]

CSABA KOVÁCS: These results tell the same story. Dial seems to impose much stronger competitive pressure, both on Tele and on Phone, than they impose on each other. There are relatively small numbers in the Tele/Phone and in the Phone/Tele relations. This indicates relatively weak competitive pressure between the merging parties. Cell and smaller competitors, in spite of their smaller market shares, seem to impose much stronger competitive pressure on the merging parties than they impose on each other.

All these findings bring forth the impression that a merger between Tele and Phone would eliminate relatively little competition. These findings are stronger than the previous ones. First, here, some of the numbers are more extreme. Secondly, here, we are closer to the core concept of competitive pressure.

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CSABA KOVÁCS: In this simple analysis, the numbers of tenders can be weighted by contract values or shipment volumes as appropriate when data are available. There are further

analytical options that bring you even closer to the core concept of competitive pressure.

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CSABA KOVÁCS: For example, you can check if the probability that Phone wins is different in those tenders where Tele also submitted a bid from those where Tele did not and how big the difference is. The more Tele's participation decreases Phone's chance of winning, the stronger competitive pressure it seems to impose on Phone. You can check the same for each supplier concerning each competitor. This helps to map out competitive pressure even better.

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CSABA KOVÁCS: In addition, you can check if the price of Phone is different in those tenders that it won and Tele submitted a bid from those where Tele did not and how big the difference is. The more Tele's participation decreases the winning price of Phone, the stronger competitive pressure it seems to impose on Phone. This logic is the same as that of price concentration analysis discussed elsewhere in this training module.

Checking the same for each supplier concerning each competitor helps to map out competitive pressure in arguably the best way.

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CSABA KOVÁCS: These further options require more sophisticated tools such as regression analysis, as well as more data. Otherwise, results can be misleading.

In the Tele/Phone merger case, it performed a multiple regression analysis to find out the effect of participations of competitors on suppliers' chances of winning. For various reasons, the results were not conclusive, but they did not contradict the findings of the previous analysis.

We were not able to carry out an analysis on bidding prices. ICT projects were substantially different from each other. To some extent, they were apples and oranges.

Therefore, we could not define a price variable allowing meaningful comparisons of price between different tenders.

Also, customers said that in one out of three tenders price was not the most important factor. So, we relied greatly on the first two straightforward methods of win/loss analysis, which provided a rough but still useful picture.

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CSABA KOVÁCS: Our bidding study helped us learn more about closeness of competition between suppliers. This did not replace market definition, but drew a different picture than market shares only. The merging parties seemed to be less direct competitors of each other than other suppliers. Their merger eliminated much less competition than suggested by their market shares or the increase of HHI.

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CSABA KOVÁCS: Other information pointed in the same direction. For example, Tele and Phone seemed to target different kinds of customers. Various evidence reinforced each other. Ultimately, the GVH did not find that the merger was likely to lessen competition substantially, so it was cleared. Please note that these type of bidding studies contribute to the assessment of horizontal noncoordinated effect. They do not capture either coordinated effects or dynamic responses such as new entry. These have to be checked in other ways. For example, in the Tele/Phone case, they investigated entry barriers. Also, other types of bidding analysis exist. For example, other procurement data can be used in cartel screening. Cartel screening is discussed elsewhere in this training module.

[Slide 47]

CSABA KOVÁCS: Finally, it is useful to read about GE/Instrumentarium, a classic in

bidding studies.

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JOHN DAVIES: Thank you, Csaba.

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JOHN DAVIES: In this module, we've looked mainly at techniques for measuring substitution between competing firms, measuring price correlation and elasticities to put some simple measure on how strongly firms compete with one another. Those techniques will be useful for market definition in all sorts of cases, but they're likely to be used most in merger analysis, both for market definition and for the assessment of competitive effects.

We've not said much so far about cartels, and that's no coincidence. Qualitative economic analysis is not used so much in cartel cases. Those cases typically turn on more traditional legal evidence: Can the authority show that two employees of two competing companies exchanged information, for example.

Economic analysis is used for the assessment of fines and damages in many jurisdictions, and that's a big topic, and we're not going to deal with it here. However, there is also increasing interest these days in using quantitative techniques to try to identify possible cartels at the start or even before the start of a cartel investigation.

How far this sort of analysis actually gets you and whether it's going to be enough to bring a case or whether it just tells you where to focus your forensic techniques to look for the more traditional evidence, that will depend upon your jurisdiction, and we're not going to go into those jurisdiction-specific matters, but we will provide some examples of the analysis itself.

Simon will lead this final part of the module.

Simon.

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SIMON ROBERTS: So, let's come on to how data can be used for looking at cartels. There is excellent materials about how you can screen for cartels, which is a subject of separate materials that the ICN has produced and there's also very good papers by people such as Professor Joe Harrington and Rosa Abrentes-Metz on this, which people can look at.

Often cartels are really understood in terms of -- or identifying cartels is understood in terms of finding a smoking gun, which leads to the conviction, which is quite correct. But I'm going to highlight what data on market behavior can play an important part in that screening process.

And I'm just going to provide some examples, where even relatively basic data that you may not think is going to be helpful actually might provide important pointers. This is not data that's necessarily going to, therefore, secure a conviction, but it's going to raise questions, and it also may be an important part of motivating for more invasive means of investigation, such as a dawn raid being used.

It's also something that may be used in terms of establishing how harmful a cartel was in terms of cartel markups once a cartel has been uncovered. So, even with basic data, some screening can be done, and there can be important insights.

And what we're really looking for in terms of data is whether that data is in line or consistent with how you'd expect markets to behave under competition and how the conduct you observe may differ from that. And it's important to highlight at the outset that this is not about firms charging the same prices. Sometimes people say, look, firms charge the same prices and their prices move together – price parallelism. But, of course, this is what you'd expect in a

competitive market as well.

In actual fact, the examples that I'm going to highlight show that in terms of the pricing, patterns that are followed over time, that these pricing patterns are not consistent with vigorous rivalry where people are responding or firms are responding to demand patterns, demand shifts, where they're discounting, they're pricing different brands or promoting different brands, in other words, where the messiness of markets that you'd expect competitive markets is not what you see, but you see a kind of indication of rules that are being followed by firms.

And this is because firms that are running cartels are trying to behave like monopolists. They're trying to maintain -- reach, maintain, and monitor agreements. And that might mean that they use simple benchmarks to track behavior and use market information to monitor where the people are agreeing or staying with the cartel arrangement and that this is something that you might be able to pick up.

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SIMON ROBERTS: So, I'm going to look at data on prices and data on market shares, and I'm going to explain why the prices in market shares may be things that you need to look at together in understanding a cartel because firms discount prices in order to attract customers, in order to change their market share at the expense of a competitive rival. On the other hand, maintaining stable market shares might mean that there's little price competition because the rationale for that price competition or discounting has been removed.

So, let's look at some simple examples which illuminate these types of issues. And they really are very, very simple -- surprisingly simple -- which is why I want to highlight that the data can play this role. And these come from South African cases, and these cases have been written about in different papers.

The first one is looking at reinforcing steel bar, and these are all producer prices that have been obtained from the statistics authority. Producer prices are meant to be net prices, ex-factory prices. They're meant to be prices net of discounts and rebates. So, it's important to check that that is the case, and even if it's not, that the stats authority has been given prices which are ex-factory prices but not necessarily net of all the rebates and discounts. It may be a useful starting point to use to then go out.

In the reinforcing steel bar case, you can see the price series has got steps in it. The prices have been changed essentially every six months. Sometimes the price may be maintained without a price increase, but prices never fall. This doesn't look like a competitive market. There's demand patterns which are changing; there's cost conditions which are changing. And, also, you'd expect some variations in the prices. You wouldn't expect these very stable prices between the steps because month by month you'd expect producers which are competing to be varying their prices.

There was also no apparent discounting happening, no standard discounts. And when the firms were asked, they were, in actual fact, charging prices which were uniform on a delivered basis, which as you'll know if you looked at this literature, is a very, very strong signal of collusion. So, this data was immediately cause for concern in terms of a cartel in this industry.

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SIMON ROBERTS: In the next slide, looking at the pricing trends, as we can see here, there are three products which are on the charts, and all producer price indices, so these are indexes produced by the statistics authority, and you can see that there is a line for concrete pipes, a line for fiber cement roof sheets and a line for ordinary and extended cement.

And just very quickly, you can see that the concrete pipes price, it increased in steps, but

little variation up until around 2008, and this is when the cartel ended. And you can see, after

that point, you can see there's more movement of the prices. So, that's the kind of thing you'd

expect for a change from a cartel to a more competitive market.

In cement, you can see the steps are not as clear. You can see there's a bit of variation.

This is a lot -- this is because the product is sold in large volumes, and there is some discounting

and you've got this price indices as an average price, and so you can see even though there is a

cartel, which was in place until the end of 2009, that there was some variation in the average that

happened. But, nevertheless, you had price steps, and the price never fell in terms of the price

increases that were announced and then after that point, you can see a very -- some substantial

price for -- and you can see that variation. And the third product is roof sheets, cement roof

sheets, and you can see here a step pattern, and so this raises the obvious question as to whether

there is a cartel. It certainly doesn't look like a competitive market. To my knowledge, there

hasn't been a cartel uncovered in cement roof sheets, and in theory, there may not be one, but

there was a cartel uncovered in concrete pipes revealed by a leniency applicant at the end of

2007.

The cartel ended in 2008, and in cement, again, there was a raid in this case and a

leniency applicant, and the cartel ended in 2009. And, so, this is just producer price data and yet

reveals quite interesting patterns that can be used to signal market behavior.

[Slide 54]

SIMON ROBERTS: The next slide looks at market share data, and this data has been --

I've made up this data. It's a hypothetical example, but it's based on the cement cartel in South

Africa. Because if you've got large producers, there's an incentive for them to cheat on the

arrangements and offer secret discounts to customers. And, so, this incentive is there and may be

at work.

So, how do firms then prevent this from operating? Well, one way in which they do that is by agreeing on market shares. And if one gets data on market shares, which in this case was actually collected through the industry association, so it was relatively easy to obtain from the industry association, it was obtained on a monthly basis from the firms and sent back in aggregated form to the company, so each one could calculate their own market share.

Then one can see, as I've illustrated in this hypothetical example of the data that the shares of the firms always revert back to what were -- what was revealed to be – their agreed levels. So, you know, an agreement of a certain percentage of market share meant that in terms of the tracking, if the share had gone up one month, then the next month the firm you would have to lose sales and manage it back down again.

And this is very, very important for the maintenance of cartels because if a firm sees its sales going down, they need to know whether its sales are going down because somebody has competed for sales of a customer or whether the sales are going down because the demand in the market has fallen overall. And market share data enables one to do that. It enables one to see what the shares of the total and not just to look at the sales in terms of tons in this case or in terms of absolute volumes.

And, so, one can obtain this data if you're doing an investigation, and you can see if you've got the stability of market shares. Again, just to finish off, this is not necessarily going to lead you to conviction. It will depend on legal standards, and there are big questions about information exchange, for example, by industry associations such as in the case here where the industry association was collecting the data for the firms to calculate their market shares. But it's, I think, very, very important in understanding whether the market is complying with what

would be expected in a competitive situation.

And, again, relatively simple descriptive data analysis can provide very important pointers to behavior in the markets.

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JOHN DAVIES: Thank you Simon.

[Slide 57]

JOHN DAVIES: Throughout this module, we have provided you with some suggestions for further reading. Although we intend this module to provide you with enough information to start using these techniques, you will want and need more detail and discussion if you want to use them seriously in case work.

So, to finish, we have some suggestions for further reading that go across all of the topics we've covered. And you can look further back up the transcript for the specific things we cited as further reading in the individual topics as we went through them.

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JOHN DAVIES: So, for general further reading, firstly, there are some very good guides available for free on the internet, and we've listed some of them here. The booklet by Charles River Associates is quite old, but it's an excellent overview of how quantitative techniques are used in competition cases.

The guide by Hatzitaskos, et al., goes into more detail. It was published by the Regional Center for Competition in Latin America. And that site has a lot of useful materials on it in both English and in Spanish.

And then I've listed an article by Gergely Csorba, former Chief Economist of GVH, the

Hungarian Competition Authority, because his article does a really good job of relating theory and techniques to real-world cases. I recommend it.

And, finally, with apologies for the advertisement for my own organization, I want to emphasize that OECD's website contains a huge amount of material on using economics in competition cases. Our roundtable discussions bring together work by my own team here in Paris, by academics, and practitioners, and we publish all of the materials on the page that I've listed there on the slide. The roundtable on economic techniques in merger analysis is most relevant to the things we have discussed, but there are many more, so just take a look. Most of the material is in French, as well as in English.

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JOHN DAVIES: Finally, we've listed a few of the books that have been written on this topic, and there are many, many more. It's well worth buying at least one of these books. Bishop and Walker is perhaps the best known of these textbooks, and I can certainly recommend it. Davis and Garces, and I should emphasize that's not me, it is Peter Davis, is to my mind the best book specifically on quantitative techniques. It goes into more technical detail than the others do, but the authors do so in a way that is very readable and very clear.

Elhauge and Buccirossi's books are both collections of articles by other economists covering a vast range of topics, all of them relevant to the practical application of economics to competition cases.

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JOHN DAVIES: And that's it. It just remains me too thank my fellow presenters Simon Roberts, Francis Kariuki, Arvid Fredenberg, and Csaba Kovács, as well as Russ Damtoft and Kristina Mulligan at the FTC who suggested this module and edited it, and my colleague James

Mansini here in Paris who's helped me here. And thank you as well for your attention. I hope you find these suggestions useful and if you meet me or any of my co-presenters at a conference or some other event, do come up and say hello, and tell us what you thought of the module, and do let us know how you get on applying these techniques. Thank you.

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