MERGER ANTITRUST LAW

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Class 17 (October 28): H&R Block/TaxACT (Unit 9)[1]

Mavericks

After finishing up anything on coordinated effects, we will turn to the role of "mavericks" (pp. 118-21, HMG §§ 2.1.5, 7.1, and slides 83-93). The *H&R Block* court, as do many analysts, treats the maverick analysis as part of the coordinated effects theory. While this is analytically proper, it is more convenient in talking to clients to isolate mavericks in their own separate theory.

Unilateral effects

The next topic will be unilateral effects. Unilateral effects is the primary theory of anticompetitive harm employed today by the agencies in their horizontal merger investigations. It is hard to find a modern agency decision to challenge a horizontal merger that did rely on this theory, so it is important that you understand the theory and its application.

Theory. The basic idea of the unilateral effects theory is straightforward and echoes a bit the underlying economics of a one-product SSNIP test in a two-product candidate market. Assume firms A and B produce differentiated products that are substitutes, that is, the products exhibit some cross-elasticity/diversion between each other. This means that if firm A was to increase its price and firm B was to hold its price constant, firm A would lose some sales (its marginal sales) and some of these lost sales would be diverted to firm B at firm B's original price.[2] Say that we have the following pre-price increase situation:

Pre-Price Increase

	p	c	margin	q	Profits
Firm A	300	100	200	100	20000
Firm B	350	90	260	120	31200

BTW, firm A should be at its profit-maximizing output level in the pre-price increase situation. Now suppose that firm A increases its price by $30 to $330 and, as a result, it loses 15 units, 9 of which go to firm B. Now we have:

[1] A reasonably complete set of the most important filings in the litigation (including the trial transcript) may be found here on AppliedAntitrust.com.

[2] Remember, when firm A increases its price, firm B's product becomes more attractive to some of firm A customers at firm B's original price.

Post-Price Increase

firm A increases prices by:	30
firm A marginal (lost) sales:	-15
Diversion: A to B	60%
Unit sales firm A loses to firm B:	9

	p	c	margin	q	Profits	Profit change
Firm A	330	100	230	85	19550	-450
Firm B	350	90	260	129	33540	2340

Note that firm A loses $450 due to the price increase (as it should since firm A was at its profit-maximizing output and price originally). Firm B's profits increase by $2340 as a result of the diversion, but what happens to firm B is irrelevant to firm A. So firm A should not raise its price.

Suppose that firm A acquires firm B. Now firm A seeks to maximize the joint profits of itself and firm B. When firm A increased its prices, firm B gained 9 units of sales from the diversion, which provided firm B with an additional $2340 in profits. Jointly, the combined firm makes $1890 when firm A increases its price and firm B holds its price constant, so the combined firm can profitably increase firm A's price postmerger.[3]

This is the theory of unilateral effects. The recapture of diverted sales by firm B changes the combined firm's profit-maximizing function and *creates upward pricing pressure*. Now you should read Section 6 of the Horizontal Merger Guidelines and slides 92-101 of the class notes.[4]

We can think about unilateral effects as changing firm A's marginal revenue so that the first order condition (marginal revenue equals marginal cost) is no longer satisfied postmerger. To illustrate this, however, we need to change our example a bit. In our original example, firm A increased its price and decreased its sales. To see this in standard marginal revenue terms, we need to have firm A production increase and its price drop.

To do this, we can just run the tape backward. Assume that firm A was producing 90 units and selling them at $320. Firm A is wondering whether it is at its profit maximum and is considering increasing its production by 10 units. Given firm A's residual demand curve, its price must drop to $300 to sell out its increased production. Firm A will make $200 by increasing its production. Suppose firm B, on the other hand, will lose 4 units to firm A because of firm A's lower, more attractive price. Firm B *loses* $1040 on these diverted sales. In other words, firm A's output increase/price decrease imposes a *negative externality* on firm B. But firm A does not care about that premerger—B's profit loss is B's problem. Premerger, firm A maximizes its profit by choosing its production level to equate its marginal revenue to its marginal cost independently of its effect on the profits of firm B and any other firms. Thus, firm A should increase its production.

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[3] This analysis does not explain by how much the combined firm should increase firm A's price postmerger. Moreover, usually with unilateral effects, if the combined firm should increase firm A's price, then it should also increase firm B's price. As the hypothetical monopolist increases firm B's price. the profit-maximizing increase in frim A's price decreases.

[4] All references to the class notes are to the revised October 16 version.

Now assume that firm A acquires firm B as a subsidiary and tells firm B it will compensate firm B for its profit losses to the extent firm B's customers switch to firm A in response to firm A increasing its production.[5] That is, firm A has now *internalized* the negative externality it would inflict on firm B. This adds an additional (negative) term to firm A's marginal revenue: the payment it makes to firm B when firm B's customers switch to firm A. In this scenario, firm A is no longer equating its marginal revenue to its marginal cost at the premerger level of output and price: firm A's marginal revenue from a price increase is *less* than its marginal cost because of the payment to firm B.[6] Since firm A's postmerger marginal revenues are less than its marginal cost at premerger prices, firm A should increase its price (reduce its production) to restore the equality and maximize its profits. Hence, the merger results in a price increase in firm A's products, even assuming that no other firm changes its price (that is, without the need for any competitor accommodation). Indeed, we can show that the merged firm will have a profit-maximizing incentive to increase the prices of both A's and B's products, although a joint price increase would be less than if the merged firm only increased the price of one of the two products.[7]

Pre-Output Increase

	p	c	margin	q	Profits
Firm A	320	100	220	90	19800
Firm B	350	90	260	120	31200

Post-Output Increase

Firm A increases output by:	10
Diversion: A to B	40%
Unit sales firm B loses to firm A:	4

	p	c	margin	q	Profits	Profit change
Firm A	300	100	200	100	20000	200
Firm B	350	90	260	116	30160	-1040
						-840

Postmerger, then, firm A should not increase its production. Indeed, given the large negative profit change in firm B compared to the profit gain by firm A, the combined firm should *decrease* firm A's production below the original 90 units in this second example.

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5 In other words, all profits gains and losses to the combined firm will be accounted for in firm A's books.

6 Remember, marginal revenue at q is the revenue the firm would earn *if* it increased its output by one unit.

7 Analytically, this is similar to the situation of pollution. When a firm emits pollution that harms as a third party, it will ignore this harm—known in economics as a *negative externality*—in making its production decisions. If, however, the firm has to pay the third party for the damages the pollution inflicts, the firm is now forced to take into account the negative externality its actions impose on the third party. As a result, the firm will reduce its production level precisely because the payment for the negative externality reduces the firm's marginal revenue and the firm must cut back on its production to reequilibrate its marginal revenue and its marginal cost. This is called *internalizing the externality*.

Here is a schematic way to think about unilateral effects when A is considering increasing output (when marginal cost is constant):

Premerger: $mr_A^{\text{premerger}} = mc_A$ since A is profit maximizing

Postmerger: $mr_A^{\text{postmerger}} = mr_A^{\text{premerger}} - \text{Payment by A to B for B's losses} < mc_A$

Since $mr_A^{\text{postmerger}} < mc_A$, firm A should decrease output below its premerger level to maximize postmerger profits, which will result in a price increase for firm A's products (given the downward sloping demand curve facing firm A).

The story is most straightforward when the firm is considering increasing its production because marginal revenue and marginal cost are commonly interpreted to mean the gain in revenue (positive or negative) minus the additional cost the firm confronts when it increases its production by one unit. But the antitrust story deals with price increases from quantity reductions. To tell this story, we need to reinterpret marginal revenue and marginal cost. When the firm is considering increasing its price by reducing its production level, marginal cost is the production cost *savings* the firm makes when reducing its output by one unit and its marginal revenue is the *loss* the firm confronts from reducing its sales by one unit. The profit-maximizing first order condition for the firm can then be written:

$$-MR = -MC,$$

that is, the loss of marginal revenue (positive or negative) from a reduction in the firm's production by one unit is just equal to the savings the firm makes from the reduction in production costs from producing one less unit.[8] Now when firm A increases its price by lowering its production, firm B receives a *positive externality* of the additional profits it earns when some of firm A's customers switch their purchases to firm B. Premerger, firm A does not take firm B's positive externality into account in making its production decisions. But if firm A acquires firm B and requires firm B to pay firm A the additional profits firm B earns from firm A's former customers, then firm A's marginal revenue loss from the price increase will be less than its marginal cost at the premerger level of output and prices. To reequilibrate marginal revenue loss and marginal cost savings, firm A needs to decrease its output and raise its price to maximize its profits. Schematically:

Premerger: $-mr_A^{\text{premerger}} = -mc_A$ since A is profit maximizing

Postmerger: $-mr_A^{\text{postmerger}} = -mr_A^{\text{premerger}} + \text{Payment by B to A for B's profit gains} < -mc_A$

Since $-mr_A^{\text{postmerger}} < -mc_A$, firm A should decrease output below its premerger level to maximize postmerger profits, which will result in a price increase for firm A's products (given the downward sloping demand curve facing firm A).

[8] The conditions $MR = MC$ and $-MR = -MC$ are mathematically identical, since the second condition is simply the first condition when both sides are multiplied by –1.

Slides 102-105 approaches unilateral effects more formally and gives another example to make the idea explained in the previous paragraphs more precise. Try to wade through the math and the diagram so that you can see the difference between the profit-maximizing first order condition for a single firm premerger and the profit-maximizing first order conditions for the combined firm postmerger and how to interpret the terms in the first order condition. This is the heart of the unilateral effects theory.

Study the numerical example and the charts on slides 106-08 and the application of unilateral effects theory to the Nestlé-Dreyer's merger (slides 109-11). Slides 112-13 give the Merger Guidelines' requirements for the application of the theory and examine two types of evidence especially probative on the theory. Unilateral effects also has implications for market definition (slide 114) and offsetting marginal cost efficiencies (slide 115).

The most important thing to remember about unilateral effects is not the underlying economic theory (although that is important), Rather, it is that an actionable anticompetitive price increase due to a reduction in local competition between uniquely close substitutes can occur in relevant markets that do not trigger the PNB presumption. Indeed, market definition is not a requirement of the theory of unilateral effects.

Diversion ratios. Diversion ratios, as already apparent, are fundamental to unilateral effects (slide 116). In our example above, when firm A increased its production level, some, but presumably not all, of its increased unit sales came from firm B. Now suppose that firm A *increases* its price (decreases its production level). Say Δq_A is the total decrease in A's sales and $\Delta q_{A\to B}$ is B's gain of unit sales from A, and let Δp_A be the price decrease in A necessary to clear the market after the production increase. Then we can define the diversion ratio from A to B as:

$$D_{A\to B} \equiv D_{AB} = \frac{\frac{\Delta q_{A\to B}}{\Delta p_A}}{\frac{\Delta q_A}{\Delta p_A}} = \frac{\Delta q_{A\to B}}{\Delta q_A}.$$

For example, if in response to a SSNIP in A's product, firm B loses 100 unit sales and firm B gains 25 units of those sales, then the diversion ratio from A to B is 0.25.

Merger simulation. Why do diversion ratios matter? Remember, the unilateral effects theory is based on internalizing the externality firm A imposes on firm B when firm A changes its output (price) levels. In the case where A decreases its output to increase price, the magnitude of this (positive) externality on B is the number of units B gains as a result of A's price increase (Δq_B) times the gross margin ($p_B - c_B$) B earns on each diverted unit. As we can see from the schematic equations earlier, the magnitude of A's postmerger adjustment to its production levels depends on the magnitude of the externality the merger internalizes: the more B earns from the diverted sales, for example, the larger the payment from B to A and the greater A's reduction in its production level to reequilibrate its marginal revenue and its marginal cost postmerger. If we know the magnitude of the externality the merger internalizes, the shape of A's residual demand curve, and A's marginal costs, we can estimate the magnitude of the A's production reduction and the resulting price increase for A's products as a result of the merger (under whatever assumption we make about how other firms respond to this price increase with their own output and price changes).

Estimates of the magnitude of the changes in price and output that would result from a merger is known as *merger simulation* (slides 118-20). Antitrust economists define a measure called the *gross upward pricing pressure index* (*GUPPI*) to measure the magnitude of the pricing externality, which they can then use to assess the merged firm's incentive to raise prices under a unilateral effects theory in the absence of entry, repositioning, and efficiencies:

$$GUPPI_A \equiv \frac{\text{Value of profits from sales diverted to product B}}{\text{Value of all sales lost by product A}} = \frac{\Delta q_B \left(p_B - c_B \right)}{\Delta q_A p_A},$$

where the merging firms produce products A and B, respectively, and $GUPPI_A$ is the measure for product A. Section 6.1 of the 2010 DOJ/FTC Horizontal Merger Guidelines implicitly creates of measure of this type.

Let $m_B = \frac{p_B - c_B}{p_B}$ be the percentage gross margin of product B and D_{AB} be the unit

diversion ratio between product A and product B. Then multiplying by p_B/p_B yields:

$$GUPPI_A = \frac{\Delta q_B}{\Delta q_A} \frac{\left(p_B - c_B \right)}{p_B} \frac{p_B}{p_A} = D_{AB} m_B \frac{p_B}{p_A},$$

which is the usual form of a GUPPI in antitrust analysis. The larger the GUPPI, the more firm A has an incentive to increase its prices when it acquires firm B.[9] Read slides 121-22.

Before continuing, we should make three important points about GUPPIs:

1. GUPPIs, like elasticities, are dimensionless, that is, they do not change in magnitude with different units of measurement. As the above equation shows, GUPPIs are the product of three ratios (each of which is dimensionless). So changing the dollar measure from dollars to pounds sterling, for example, will not change the magnitude of the GUPPI.
2. GUPPIs give you more information about the likely price effects of a merger than cross-elasticities. As you know, diversion ratios (D_{AB}) are mathematically related to cross-elasticities (ε_{AB}), but GUPPIs weight the diversion ratios by the percentage margin of product B. So if we hold the cross-elasticity between product A and B constant (which, in turn, holds the diversion ratio constant), the greater the percentage gross margin of product B, the more incentive firm A has to raise its prices postmerger. So among antitrust economists, diversion ratios and GUPPIs are "crowding out" cross-elasticities as the variables of interest.
3. Without more structure on the demand system, the cost functions, and the nature of equilibrium in the market (i.e., how firms react to changes in one another's output and price choices), GUPPIs give at best only a qualitative indication of the magnitude of the likely price increases that might result from a horizontal merger. In other words, as the GUPPI increases, the magnitude of the likely postmerger price increase is likely to increase, but we cannot tell by looking at the GUPPI what the price increase is likely to be.

[9] We may call this a *unit sales GUPPI* because the measure of diversion is unit sales. We could also create a dollar sales or revenue GUPPI by measuring diversion in dollar sales (see slide 122).

By adding structure, however, we can use GUPPIs to simulate price increases resulting from mergers. In the very special case of linear residual demand curves and equal diversion ratios ($D_{AB} = D_{BA} = D$), equal marginal costs, equal prices, and equal market shares, Bertrand competition, no changes in the prices of any nonmerging firm, and no entry, expansion, repositioning, or efficiencies, the GUPPI gives the profit-maximizing price increase postmerger under the unilateral effects theory. The profit-maximizing price increase for product A leaving the price of product B at its premerger level:

$$\frac{\Delta p_A^*}{p_A} = \frac{GUPPI}{(1-D)} = \frac{Dm}{(1-D)}.$$

The profit-maximizing price increase for both product 1 and product 2 when raising the price of both products:

$$\frac{\Delta p_1^*}{p_1} = \frac{\Delta p_2^*}{p_2} = \frac{GUPPI}{2(1-D)} = \frac{Dm}{2(1-D)}.$$

In other words, the profit-maximizing price increase when the merged firm raises the price of both products is half of the profit-maximizing price increase when the merged firm raises the price of only one of the two products. This makes sense given the linearity of demand and the symmetry assumptions in the model. Slide 123 reports these results and slides 124-31 provide some applications. Slide 132 illustrates how the formula for simulated postmerger price increases becomes much more complicated as the assumptions are relaxed.[10] GUPPIs are beginning to appear in some court opinions, but they are often plagued with data problems and, to date, have only provided additional support for more reliable means of proving the requisite anticompetitive effect (slide 133).

Note that if we impose enough structure on the model to allow GUPPIs to predict the magnitude of postmerger price increases, we can use merger simulations using GUUPIs to apply the hypothetical monopolist test for market definition. Warren-Boulton did this in H&R Block/ TaxACT to support his conclusion that DDIY was the relevant product market (see pp. 92-93). Warren-Boulton also used his merger simulation using GUPPIs more directly to support his conclusion that the merged firm would raise prices under the unilateral effects theory (see pp. 128-30). This part of the opinion deserves some careful attention. Given the background provided by the class notes, you should be able to understand what Warren-Boulton was doing here.

For completeness, I have included a few slides on a dominant firm with a competitive fringe, which can be part of a theory of unilateral effects (slides 134-37). You can skip those for now, but we will return to this theory in a later unit.

Efficiencies

The defendants' next rebuttal argument addressed in the opinion is that of efficiencies (pp. 134-39). Read this section of the opinion and Section 10 of the Horizontal Merger Guidelines. We examined this defense in the *Sanford Health* case study, so we will not spend much, if any, time on this defense in class. The class notes in the Downward Pricing Pressure

[10] You will not be required to apply the formula on slide 122. I include it only to show you how complicated the formulas become for more general situations.

Defenses deck (slides 12-40) provide a bit more detail than the class notes in *Sanford Health*, so skim the notes to refresh your recollection and find the additional details.

On Tuesday, we will finish with anything that did not did cover on H&R Block/TaxACT opinion. We will then turn to Sysco/U.S. Foods, our next case study.

Enjoy the reading! Email me if you have any questions.