# Merger Screens: Market Share-Based Approaches Versus "Upward Pricing Pressure"

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The U.S. Department of Justice and Federal Trade Commission (collectively, the Agencies) receive notification regarding thousands of mergers per year. Given their limited resources, the Agencies must identify, from the entire set of mergers, those that require further investigation. Traditionally, the Agencies have used, among other things, market shares and concentration measures to perform this screening function. Counsel for potential merging parties often calculate market shares and the Herfindahl-Hirschman Index (HHI) when providing advice to their clients regarding the likelihood of receiving a Second Request. However, market share-based screens have significant limitations, particularly for mergers of firms in differentiated products industries. Calculating and relying on market shares or a market concentration statistic like the HHI requires first defining a relevant market, an exercise well known to be difficult with differentiated products.[1] Moreover, the connection between unilateral effects (the primary concern with differentiated products mergers) and market shares and concentration measures is tenuous at best.[2]

Joseph Farrell and Carl Shapiro (referred to as FS in our discussion here) have proposed an alternative approach to assessing the likelihood of unilateral effects for differentiated products based on the concept of "upward pricing pressure," or UPP. UPP is a measure of the strength of the merged firm's incentive to increase price above pre-merger levels. Because UPP is seemingly easy to calculate, the question arises as to whether it would provide a useful screening device that the Agencies could use during the initial HSR waiting period to decide whether a Second Request should be issued.[3] In this article, we address this question.

We start our analysis by providing an alternative derivation of UPP and show that UPP flows from the familiar logic of unilateral effects. From our perspective as economists, this is part of UPP's appeal. We then discuss why reliable estimates of the three key inputs to UPP—diversion ratios, gross profit margins, and efficiencies—are unlikely to be available during the initial HSR waiting period. Because UPP, like any method, is only as reliable as its inputs, a lack of reliable estimates of the three key inputs would limit the extent to which UPP can be a useful screen in the first thirty days.[4] Finally, we demonstrate how a UPP screen based on unreliable "short-cut" esti-

[1] See, e.g., Joseph Farrell & Carl Shapiro, *Antitrust Evaluation of Horizontal Mergers: An Economic Alternative to Market Definition* (Working Paper 2008), *available at* http://www3.ftc.gov/be/workshops/microeconomics/2008/docs/shapiro2.pdf. (A revised version of the Farrell-Shapiro paper is now available at http://faculty.haas.berkeley.edu/shapiro/alternative.pdf.) *See also* Jerry A. Hausman & Gregory K. Leonard, *Economic Analysis of Differentiated Products Mergers Using Real World Data*, 5 Geo. Mason L. Rev. 321 (1997).

[2] Farrell & Shapiro, *supra* note 1, at 5.

[3] Based on a conversation with Carl Shapiro, we understand that Farrell and Shapiro are not advocating that UPP be used as a Second Request screen; instead, they focus on its use after a Second Request has been issued to assess the likelihood of unilateral effects. However, if UPP were included in a revision of the Merger Guidelines, we believe that there will be a tendency for both the Agencies and counsel for the merging parties to calculate UPP early in (or even prior to) the merger review process.

[4] At a later stage in the investigation, when more information is available, one may want to consider using UPP, given its connection to the logic of unilateral effects, or, alternatively, consider using merger simulation. The advantage of merger simulation is that it provides a quantitative prediction of the unilateral effect while UPP does not. The advantage of UPP is that it requires less information (e.g., about the curvature of demand functions) to implement than merger simulation.

mates of the three key inputs could lead to different outcomes from the traditional market share-based approaches of the Merger Guidelines.

### UPP Follows Directly from the Basic Logic of Unilateral Effects

Suppose there is a proposed transaction that would combine under single ownership two single-product firms, Firms A and B, which make products A and B, respectively. Inequality (1) in FS's article lays out the UPP test for this situation.[5] There will be positive net UPP (and thus a presumption of anticompetitive effects) for Product A if

$$(1) \quad UPP_A = (p_B - c_B)D_{A \to B} - \theta c_A > 0$$

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where $p_B$ is the pre-merger price charged by Firm B for its product, $c_A$ and $c_B$ are the pre-merger marginal costs of Firm A and Firm B respectively, $D_{A \to B}$ is the pre-merger diversion ratio from Firm A to Firm B, and $\theta$ is the percentage marginal cost-savings for Product A that is expected to result from the merger.[6] There could be upward pricing pressure for product B as well, and the applicable calculation is similar to that shown in inequality (1) above.

The first term on the left-hand-side of inequality (1) represents the upward pressure on the price of Product A that results from bringing the two products under the same ownership and the subsequent elimination of competition between them. The second term on the left-hand-side of inequality (1) represents the downward pressure on the price of Product A that derives from a merger-specific reduction in the marginal cost of producing Product A. If the former exceeds the latter, the left-hand side of inequality (1) is greater than zero, resulting in positive UPP.

As we demonstrate below, the UPP inequality is a direct implication of the basic logic of unilateral effects that has long been familiar to antitrust practitioners.[7] This is somewhat obscured by the particular approach that FS took to deriving inequality (1). In the tradition of public finance, a branch of economics that focuses on how taxes change incentives, FS characterize the elimination of competition due to the merger as the internalization of an externality and then determine the size of the tax on Firm A that would be necessary to have the same effect. Their UPP measure is equivalent to this tax.

Because non-economists may find the tax-based approach that FS used to be unfamiliar, we now show that inequality (1) can be derived in a fashion that is more intuitive and familiar to antitrust practitioners and that underscores the relationship between UPP and the logic of unilateral effects.

Suppose that, prior to the merger, there are N single-product firms. Each firm chooses its price so as to maximize its own profit given the prices chosen by the other firms.[8] For example, Firm A chooses its price to maximize its profit function

$$\pi_A(p_A) = (p_A - c_A)Q_A(p_A, p_B, p_C, \ldots)$$

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[5] Farrell & Shapiro, *supra* note 1, at 12.

[6] The diversion ratio is defined as follows. The denominator is the decrease in quantity of Product A that would result from an increase in the price of Product A. This is related to the own-price elasticity of demand for Product A. The numerator of the diversion ratio is the increase in quantity of Product B that would result from the increase in the price of Product A. This is related to the cross-price elasticity of demand for Product B with respect to the price of Product A. If there is zero cross elasticity between the products, the diversion ratio will also be zero.

[7] *See, e.g.*, Raymond Deneckere & Carl Davidson, *Incentives to Form Coalitions with Bertrand Competition*, 16 RAND J. ECON. 473 (1985); Jerry A. Hausman, Gregory K. Leonard & J. Douglas Zona, *Competitive Analysis with Differentiated Products*, 34 ANNALES D'ECONOMIE ET DE STATISTIQUE 159 (1994).

[8] For the purposes of this derivation, we assume, as do FS, a "one-shot" (static) game with firms choosing prices.

Firm A's profit is maximized at the price that sets the derivative of its profit function equal to zero, or

(2)    $\dfrac{\partial \pi_A(p^*_A)}{\partial p_A} = (p^*_A - c_A)\dfrac{\partial Q_A(p^*_A, p^*_B, p^*_C,...)}{\partial p_A} + Q_A(p^*_A, p^*_B, p^*_C,...) = 0$

All other firms in the industry also choose price to maximize their respective profits, and, in a Nash equilibrium, each firm's equilibrium price maximizes its own profits, given the equilibrium prices of the other firms.[9] Let $(p^*_A, p^*_B, p^*_C,...)$ be the vector of pre-merger equilibrium prices.

Now suppose that Firms A and B propose to merge. After the merger, the merged firm will jointly set the prices of Products A and B so as to maximize its *overall* profit, which is the sum of the profit from Product A and the profit from Product B:

(3)    $\pi_M(p_A, p_B) = (p_A - c_A)Q_A(p_A, p_B, p_C,...) + (p_B - c_B)Q_B(p_A, p_B, p_C,...)$

The merged firm will have the incentive to increase the price of Product A above pre-merger levels if doing so will increase profit. In mathematical terms, profit will increase if the derivative of the profit function with respect to $p_A$, when evaluated at pre-merger equilibrium prices, is positive, or

$$\dfrac{\partial \pi_M(p^*_A, p^*_B)}{\partial p_A} > 0.$$

We start by taking the derivative of (3) and evaluating it at pre-merger equilibrium prices:

$$\dfrac{\partial \pi_M(p^*_A, p^*_B)}{\partial p_A} = (p^*_A - c_A)\dfrac{\partial Q_A(p^*_A, p^*_B, p^*_C,...)}{\partial p_A} + Q_A(p^*_A, p^*_B, p^*_C,...) + (p^*_B - c_B)\dfrac{\partial Q_B(p^*_A, p^*_B, p^*_C,...)}{\partial p_A}$$

Equation (2) tells us that the first two terms (combined) of the above equation are zero, allowing us to rewrite the derivative as

(4)    $\dfrac{\partial \pi_M(p^*_A, p^*_B)}{\partial p_A} = (p^*_B - c_B)\dfrac{\partial Q_B(p^*_A, p^*_B, p^*_C,...)}{\partial p_A}$

The merged firm has an incentive to increase the price of Product A above the pre-merger level to the extent that this derivative is positive. This will be the case if at pre-merger prices the "per unit" gross profit margin for Product B, $p_B - c_B$, is positive and the "cross" price effect $\dfrac{\partial Q_B}{\partial p_A}$ is positive (i.e., Products A and B are substitutes so that an increase in the price of Product A increases the quantity demanded of Product B). Thus, equation (4) reflects the basic logic of unilateral effects. If Products A and B are substitutes, and Product B has a positive gross margin, the merged firm has an incentive to increase the price of Product A whereas the independent Firm A did not. This is because some of the loss in sales of Product A that would result after an increase in the price of A would be recaptured by the merged firm in the form of an increase in the sales of Product B. From the perspective of the merged firm, this is a diversion of sales "out of one pocket and into the other," whereas for Firm A before the merger, it was just a loss of sales "out of its pocket." This loss constrained Firm A from increasing its price pre-merger.

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[9] A Nash equilibrium is defined to be a set of prices for the firms such that each firm maximizes its profit, taking as given the prices of the other firms. Thus, a Nash equilibrium is a "stable point" where no firm wants to change the price that it is charging.

The closer that Products A and B are as substitutes, i.e., the larger is $\dfrac{\partial Q_B}{\partial p_A}$, the stronger is the incentive for the merged firm to increase the price of Product A. This is familiar territory for antitrust practitioners because the term $\dfrac{\partial Q_B}{\partial p_A}$ is the key determinant of the cross price elasticity of demand.

To the extent that the merger produces efficiencies that result in a lower marginal cost of producing Product A, this will provide an incentive that works in the opposite direction, i.e., the merged firm will have the incentive to lower the price of Product A. To see this, again consider the derivative of the merged firm's profit function with respect to $p_A$. We will evaluate the derivative at pre-merger prices and also assume that the marginal cost of Product A has been reduced by a percentage $\theta$. To focus on the incentives created by the efficiencies, we assume for the moment that $\dfrac{\partial Q_B}{\partial p_A} = 0$, i.e., Products A and B are not substitutes so there are no unilateral effects associated with the merger. Under these conditions, the derivative is

$$\frac{\partial \pi_M(p^*_A, p^*_B)}{\partial p_A} = (p^*_A - (1 - \theta)c_A)\frac{\partial Q_A(p^*_A, p^*_B, p^*_C,...)}{\partial p_A} + Q_A(p^*_A, p^*_B, p^*_C,...)$$

$$= (p^*_A - c_A)\frac{\partial Q_A(p^*_A, p^*_B, p^*_C,...)}{\partial p_A} + Q_A(p^*_A, p^*_B, p^*_C,...) + \theta c_A \frac{\partial Q_A(p^*_A, p^*_B, p^*_C,...)}{\partial p_A}$$

The first two terms (combined) are again equal to zero by equation (2), so we obtain

$$\frac{\partial \pi_M(p^*_A, p^*_B)}{\partial p_A} = \theta c_A \frac{\partial Q_A(p^*_A, p^*_B, p^*_C,...)}{\partial p_A}$$

This expression is less than or equal to zero because $\theta$ is greater than or equal to zero, $c_A$ is positive, and $\dfrac{\partial Q_B}{\partial p_A}$, which is the "own" price effect, is negative (demand curves slope downward). Since the derivative is negative, the merged firm's profit could be increased by decreasing the price of Product A. Given the merged firm's lower marginal cost, it would gain from lowering the price of Product A (through the additional gross profit margin earned on the increased sales), whereas the independent Firm A would not (because it had higher marginal cost). Accordingly, the merged firm has the incentive to lower price whereas Firm A did not have such an incentive. Thus, a merger-induced reduction in marginal cost would be a source of downward pricing pressure resulting from the merger. The strength of the downward pressure depends on the size of the marginal cost reduction and the slope of the demand curve at pre-merger prices. Note, for example, that if there are no efficiencies, i.e., $\theta = 0$, there is no downward pricing pressure.

Under the scenario where there are unilateral effects and efficiencies, the "net" pricing pressure is the sum of the upward pricing pressure resulting from combining the two formerly competing products and the downward pricing pressure resulting from the efficiencies, or

$$NPP_A = (p^*_B - c_B)\frac{\partial Q_B}{\partial p_A} + \theta c_A \frac{\partial Q_A}{\partial p_A}$$

If this is positive, the merged firm has the incentive to increase price after the merger. FS's inequality (1) can therefore be obtained by noting that

$$(p^*_B - c_B)\,\frac{\partial Q_B}{\partial p_A} + \theta\, c_A\, \frac{\partial Q_A}{\partial p_A} > 0 \Longleftrightarrow$$

$$\frac{(p^*_B - c_B)\,\dfrac{\partial Q_B}{\partial p_A}}{\left|\dfrac{\partial Q_A}{\partial p_A}\right|} + \frac{\theta\, c_A\,\dfrac{\partial Q_A}{\partial p_A}}{\left|\dfrac{\partial Q_A}{\partial p_A}\right|} > 0 \Longleftrightarrow$$

$$(p^*_B - c_B)D_{A\to B} - \theta\, c_A > 0$$

where the last step follows from the definition of the diversion ratio and the fact that the own price effect is negative. The last inequality above is FS's inequality (1).

### Would UPP Be Suitable as a Second Request Screen?

UPP has the potential to provide a useful and informative assessment of the potential for a lessening of competition associated with a transaction involving differentiated products. The UPP approach focuses the analysis on the variables that matter the most according to the basic logic of unilateral effects—diversion ratios, gross profit margins, and the potential for efficiencies. By doing so, UPP obviates the need to define a market and thus avoids the problems that arise when trying to define markets in differentiated products industries.[10] In contrast, a market share-based approach does not take into account diversion ratios, gross profit margins, or efficiencies. Instead, it assumes that market shares are reliable indicia of the extent of competition between products in the industry. Like a market share-based approach, UPP also avoids the analytical complexity of quantifying price effects (as merger simulation would require) because it seeks only to assess the strength of the merged firm's incentive to increase price above pre-merger levels. While this simplicity is a benefit, it comes at the cost of not being able to predict the actual magnitude of the competitive effect.

One question related to the overall utility of the UPP test is the stage(s) of the investigation at which UPP may be useful. One stage at which UPP potentially could be used is as a screen to determine whether a Second Request should be issued. If the UPP framework is to be used as a screen early in the merger review process, it must be based on data and information easily available at that point in the process. In practice, gross profit margins, diversion ratios, and estimates of the merger-induced efficiencies may not be readily available to the Agencies during the initial HSR waiting period, which would frustrate the effective implementation of a UPP screen in that time frame.[11] For example, the relevant financial data may not be readily available from publicly available sources, such as annual reports or Securities Exchange Commission filings. Even if the Agencies are able to obtain such data from the merging parties through an Access Letter, calculating the economically correct profit margins using accounting data can be difficult and time-consuming.[12]

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[10] When dealing with a differentiated products industry, it is often difficult to identify the contours of the relevant market for a given product, particularly when attempting to implement the Merger Guidelines' "smallest market" principle. For example, does the relevant market for Kellogg's Raisin Bran include (1) only Post Raisin Bran, (2) all raisin bran cold cereals (including private label), (3) all cold cereals containing bran, (4) all "adult" cold cereals, (5) all cold cereals, (6) all cold and hot cereals, or something even larger?

[11] This point is also made by John Woodbury, *Paper Trail*, ANTITRUST SOURCE, Dec. 2008, http://www.abanet.org/antitrust/at-source/08/12/Dec08-pTrail12-22f.pdf.

[12] On the differences between economic costs and profits and accounting costs and profits, see, for example, Franklin M. Fisher & John J. McGowan, *On the Misuse of Accounting Rates of Return to Infer Monopoly Profits*, 73 AM. ECON. REV. 82 (1983).

Similarly, the most reliable ways of estimating diversion ratios—based on empirical analysis of consumer demand—are data and time-intensive. It can easily take more than thirty days for the merging parties to gather the required data and for the Agencies to perform the econometric analysis. The Agencies may not even have the data until a Second Request is fulfilled.

As an alternative to these methods, diversion ratios can be estimated from survey data or win/loss reports that are kept by firms in the ordinary course of business. However, these data are not typically publicly available. The Agency would not have access to them without requesting them through an Access Letter issued early in the initial HSR waiting period. Moreover, such data are often messy and require extensive discussions with the business people such that even if the Agency were to obtain them, it may take a substantial amount of effort and time, potentially beyond the initial HSR waiting period time frame, in order to coax a diversion ratio out of the data. In addition, survey data and win/loss reports that exist as part of the ordinary course of business often do not directly address the question of how consumers would switch in response to a price increase.

One relatively simple way that has been used to estimate diversion ratios is to compute them using information on market shares.[13] Indeed, Farrell suggested exactly such an approach in a recent interview.[14] However, this approach has two clear problems. First, to obtain market shares, one first needs to define a market over which those shares are calculated. Of course, the necessity of having to define a market eliminates a large benefit of using UPP as a screen as it returns to the market definition problem in differentiated industries that UPP was designed to avoid. Moreover, in many instances, market shares are a poor indicator of the true level of diversion.[15]

In addition to requiring data that are readily available during the initial HSR waiting period, for UPP to be an effective screen, it must be able to distinguish those mergers that have the potential for an anticompetitive effect from those that do not. It is well known that under the model of competition for differentiated products that underlies the FS analysis, a merger involving two sellers of differentiated products will create some incentive, however small, for the merged firm to raise prices post-transaction, as long as there is any positive diversion between the merging parties' products. FS recognize that there will always be positive gross UPP if the diversion ratio is greater than zero (and the gross profit margin is positive). Since a merger screen cannot be useful if it presumes that every merger with a positive diversion ratio is anticompetitive, FS suggest using the net UPP (rather than the gross UPP), which incorporates a standard marginal cost efficiency credit.

FS suggest, for discussion purposes, that a 10 percent efficiencies credit could be applied for the purpose of distinguishing transactions with the potential for an anticompetitive effect from those that do not.[16] However, if UPP were to be used by the Agencies as a screen, we suggest that the size of any "standard" efficiencies credit should be chosen only after substantial analysis. For example, the appropriate standard efficiencies credit would seem reasonably to be based on factors such as (1) the levels of net UPP that historically have been associated with actual post-

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[13] S*ee* Carl Shapiro, *Mergers with Differentiated Products*, Antitrust, Spring 1996, at 23.

[14] Joseph Farrell, *Interview*, The Threshold, Fall 2009, http://www.abanet.org/abanet/common/login/securedarea.cfm?areaType= premium&role=at&url=/antitrust/mo/premium-at/at-mergers/threshold/2009/vol10no01-fall2009-scribner-roberts.pdf; http:// bhost41.crai.com/uploadedfiles/publications/interview-with-joseph-farrell.pdf.

[15] *See* Hausman & Leonard, *supra* note 1.

[16] Farrell & Shapiro, *supra* note 1, at 17.

merger unilateral effects, (2) the threshold level of net UPP that would lead to a manageable number of investigations for the Agencies, and (3) the magnitude of marginal cost efficiencies typically generated in transactions involving differentiated products.

The effectiveness of the UPP framework as a merger screen also depends on the applicability of the underlying theoretical model of competition embodied in the UPP analysis to the specific industry at issue. The net UPP formulation rests on several key assumptions. First, it is based on the assumption that the merging parties are engaged in Bertrand competition, which means the firms compete on price (as opposed to quantity). Second, it is based on a static model of competition, which means that it does not account for dynamic strategic behavior, entry, expansion, or repositioning. To the extent that dynamic considerations are competitively important, a UPP screen may fail to identify correctly the mergers that deserve further review.

Finally, because a UPP screen only assesses the strength of the merged firm's incentive to increase price above pre-merger levels rather than the actual amount by which prices are likely to increase above pre-merger levels, it is possible for a merger to have a large UPP value (and therefore one which exceeds a screening threshold), but only a small actual price increase. This can occur, for example, if the UPP indicates a strong incentive to increase price starting at pre-merger prices with the incentive dissipating rapidly after only a small price increase.[17] For this reason, a UPP screen only suggests the direction of the likely post-merger price change, not its magnitude.[18]

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### Practical Implications of Using UPP as a Second Request Screen Using "Short-Cut" Estimates of the Key Inputs

Given the considerations discussed above, think about how a UPP screen might be implemented in practice by the Agencies.[19] (Again, we distinguish between using UPP as a screening device during the first thirty days and using it later in the investigation after a Second Request has been issued.) Consider, for example, a proposed merger between two firms (Firms A and B) that sell differentiated products (Products A and B). Applying a UPP screen in practice requires the Agencies to have the three inputs necessary to calculate the UPP for Product A: the diversion ratio from Product A to Product B, the gross profit margin for Product B, and the efficiencies the merger is expected to generate. As discussed above, it would be unlikely for the Agencies to have access to the information needed to derive estimates of these quantities during the initial HSR waiting period. Even if the information were available, substantial effort and time would be required to estimate these inputs reliably.

In practice, for the Agency to use UPP as a screen during the initial HSR waiting period, it is likely to have to take short-cuts to obtain values for the three inputs. For example, to estimate a diversion ratio from Product A to Product B, the Agency may use market shares. Suppose the Agency identifies Product A and Product B competing in a market in which there are 10 sellers,

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[17] In general, the more concave with respect to the origin is the demand curve for Product A, the smaller will be the actual price change for a given level of UPP. This is because, with greater concavity, the own elasticity of demand for Product A increases more sharply as price increases, providing a greater constraint on the merged firm's ability to increase price post-merger.

[18] Quantifying price effects typically requires implementing a merger simulation, which is analytically complex and requires various assumptions including the shape of the demand curve (e.g., linear demand, logit demand, or AIDS demand).

[19] For a different approach to this question, see Gopal Das Varma, *Will the Use of the Upward Pricing Pressure Test Lead to an Increase in the Level of Merger Enforcement?*, Antitrust, Fall 2009, at 27, *available at* http://www.abanet.org/antitrust/at-source/10/02/Fall09-DasVarmaC.pdf.

each with a 10 percent market share. In other words, the hypothetical transaction would give the merged parties a combined post-merger market share of 20 percent. The Agency might assume in this situation that the diversion ratio from Product A to Product B was 10%/90% = 11%.[20] Similarly, to estimate a margin for Product B, the Agency may rely on a rule of thumb or previous industry experience, and thus, for example, assume a gross profit margin of 50 percent.

Notice that in this hypothetical market, the pre-merger HHI would be 1000, the change in HHI due to the merger would be 200, and the market would be classified as "moderately concentrated" (according to the 1992 Horizontal Merger Guidelines), in which case the transaction could be viewed as potentially raising competitive concerns.[21] While "moderately concentrated," in practice—absent additional information about the industry, number of competitors in the market, entry conditions, customer complaints, and potential efficiencies—the transaction described above would be unlikely to receive much scrutiny from the Agencies. First, the transaction would fall below the 35 percent market share threshold that is discussed in the unilateral effects section of the 1992 Horizontal Merger Guidelines.[22] Second, only a relatively small proportion of the FTC's merger investigations have been in markets in which the post-merger HHI was less than 1800.[23]

This hypothetical merger, however, is an example of a transaction that would be flagged by a formulaic application of the UPP screen. Application of a UPP screen with a 10 percent efficiencies credit and the short-cuts to estimating diversion ratios and margins described above would result in a positive UPP, indicating that the merger may require further investigation.[24]

Figure 1 shows that this result is more general—a strictly applied UPP screen using short-cut approaches to estimate the key inputs is likely to identify a different set of transactions for further review as compared to current Agency practice. The UPP screen threshold (i.e., the combinations of market share and gross profit margin that yield the threshold value of zero UPP) is shown visually by the downward sloping blue line.[25] Transactions in regions A and B, which are character-

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[20] The assumption would be that the diversion ratio is equal to Product B's sales divided by the sales of all products except Product A. This is equal to Product B's market share divided by (1 – Product A's market share). This calculation implicitly assumes that the market elasticity of demand is zero. In the event that this is incorrect—i.e., that the actual market elasticity is greater than zero in absolute value—the diversion ratio would be smaller. This is yet another way in which the short-cut method of using shares to calculate diversion ratios can be unreliable.

[21] See U.S. Dep't of Justice & Fed. Trade Comm'n, Horizontal Merger Guidelines § 1.51 (1992, rev. 1997), *available at* http://www.ftc.gov/bc/docs/horizmer.shtm (transactions that produce "an increase in the HHI of more than 100 points in moderately concentrated markets post-merger potentially raise significant competitive concerns . . . .").

[22] *See id.* § 2.211 ("Where market concentration data fall outside the safe harbor regions of Section 1.5, the merging firms have a combined market share of at least thirty five percent, and where data on product attributes and relative product appeal show that a significant share of purchasers of one merging firm's product regard the other as their second choice, then market share data may be relied upon to demonstrate that there is a significant share of sales in the market accounted for by consumers who would be adversely affected by the merger.").

[23] In fiscal years 1996 through 2003, the FTC conducted merger investigations in 784 markets. Of the 780 markets for which market structure data were available, only 104 were markets in which the post-merger HHI was less than 1800. *See* Malcolm B. Coate & Shawn W. Ulrick, *Transparency at the Federal Trade Commission: The Horizontal Merger Review Process*, 1996–2003, 73 ANTITRUST L.J. 531 (2006).

[24] If the diversion ratio $D_{A \to B}$ is estimated using market share data and the approximation that $D_{A \to B} = \frac{s}{1-s}$, then a transaction will have a positive UPP if $\frac{s}{1-s} > \theta \frac{1-m}{m}$, where $\theta$ is the efficiency credit, $m$ is the gross profit margin (i.e., price less marginal cost as a percentage of price), and $s$ is the pre-merger share held by each pre-merger party (which is the same for each merging party under the assumption of symmetry). This is similar to the formula that appears as inequality (2) in Farrell & Shapiro, *supra* note 1, where the efficiency credit, $\theta$, appears as the parameter *E*.

[25] As discussed *supra* note 20, for the purposes of Figure 1, the market elasticity is assumed to be zero. If the market elasticity were instead assumed to be greater than zero in absolute value, the blue line would be shifted to the right, increasing the size of regions C and D and decreasing the size of regions A and B.

ized by combinations of gross profit margin and market share that yield a positive UPP, would be identified by a UPP screen. Conversely, transactions in regions C and D, which are characterized by combinations of gross profit margin and market share that yield a negative UPP, would not be identified as requiring a Second Request. In general, these results make economic sense under the logic of unilateral effects—transactions involving firms that have higher cross-price elasticities of demand or higher pre-merger gross profit margins are those that are more likely to generate unilateral competitive effects.
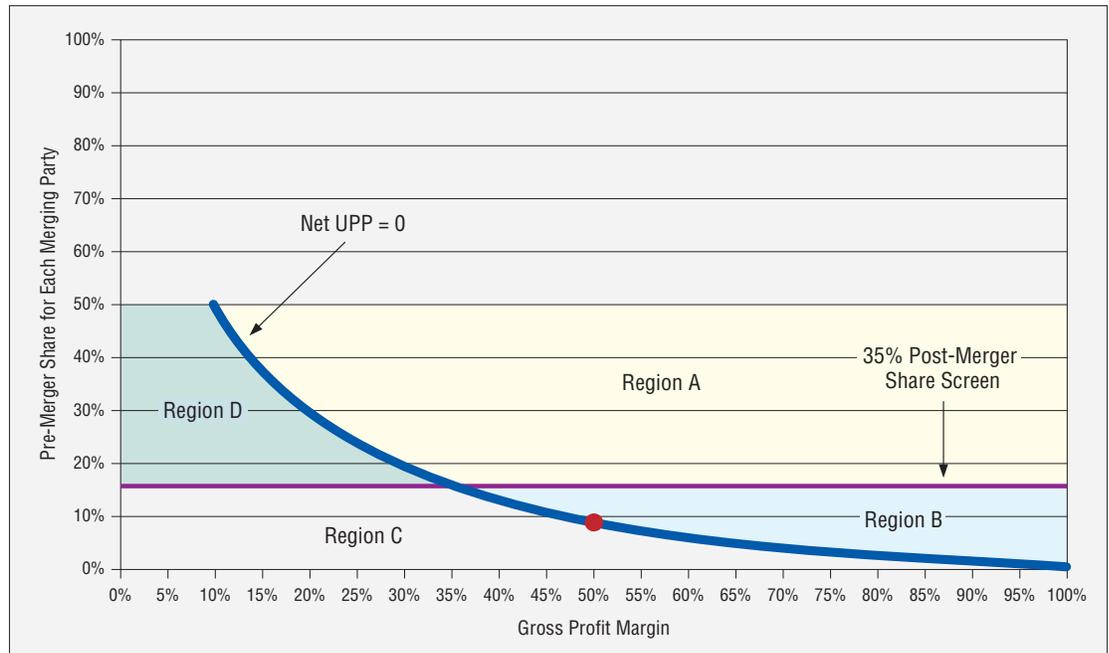


**Figure 1. Comparing the Implications of a UPP Screen and a 35% Post-Merger Share Screen**

Note: The comparison assumes (a) the transaction would reduce costs by 10%, (b) Bertrand competition among competitors, (c) the merging parties are symmetric, and (d) the use of market shares to approximate the diversion ratio.

To put these results into context, Figure 1 also shows the transactions that would be identified by a merger screen that focuses on transactions in which the merging parties would have a combined share of 35 percent or more post-merger, which is the market share threshold that appears in the Merger Guidelines. This screen is shown visually by the flat purple line. Transactions for which the pre-merger share of each merging party (assuming symmetry) is 17.5 percent or more would be identified by such a screen as requiring further review (i.e., transactions in regions A and D), while transactions involving firms with less than a 17.5 percent pre-merger share would not be identified (i.e., transactions in regions B and C).

As shown in Figure 1, both the UPP screen and a 35 percent market share screen would identify the transactions in region A as those that warrant additional investigation and a Second Request. These are, as expected, transactions with higher pre-merger gross profit margins and higher pre-merger shares. Strict application of a UPP screen and a 35 percent market share screen also would imply that a Second Request may not be necessary for transactions in region C. These are transactions with lower pre-merger gross profit margins and lower pre-merger shares.

The transactions that fall in regions B and D are more interesting because they reveal the differences in the results produced by the two types of screens. As noted above, one advantage of the UPP screen is to shift the competitive effects analysis away from market share and toward the economic factors that matter, such as pre-merger gross profit margins, which in turn may reflect

entry conditions, demand conditions, and the presence of substitute products or competitors. Thus, a 35 percent market share screen would flag transactions in region D, while a UPP screen would not, even though the pre-merger shares of the merging parties (and therefore the post-merger market share) would be relatively high for these mergers. For example, in region D, the merging parties may have low gross profit margins because consumers are quite willing to switch to competing products and competitors face no barriers to expansion, in which case the transaction may not raise competitive concerns.

On the other hand, it is likely that a UPP screen could flag many transactions that would give the merged entity a post-merger market share of less than 35 percent. Indeed, the hypothetical transaction discussed above—a merger of two firms with 10 percent pre-merger market shares and 50 percent gross profit margins—would fall in region B and would be an example of a transaction that would be caught by a UPP screen but not by a 35 percent market share screen. More generally, the UPP screen would identify for further scrutiny transactions between firms with low market shares if the firms have sufficiently high gross profit margins. To the extent that the gross profit margins are high as a result of entry barriers or the lack of substitutes, then the UPP screen is a useful tool that goes deeper economically than the market-share based screens.

As discussed above, we are distinguishing between using UPP as a screen during the first thirty days versus using UPP after a Second Request has been issued, when more information is available. Despite being easy to calculate, the likely absence of good information about the three key inputs during the first thirty days limits the usefulness of UPP as a screen. If the Agencies nevertheless start relying on UPP as a screen based on short-cut approaches to estimating the inputs, parties to the proposed transaction may be the ones who are forced to implement a more substantive version of UPP as a defensive measure. Shifting the burden to the merging parties comes with its own set of practical problems. Estimating diversion ratios and gross profit margins in a reliable manner often requires substantial lead time and access to internal data, something not always available to parties hammering out a deal, particularly when only a limited number of the parties' business people are allowed to be privy to the negotiations. Moreover, the inputs to UPP require highly confidential business information from both parties to the potential transaction. While estimating a diversion ratio from Product A to Product B requires data from Firm A, estimating a gross profit margin for Product B requires data from Firm B. In our experience, firms are often reluctant to exchange this type of sensitive business information, even with outside counsel or outside experts, when negotiations over a deal are still underway.

### Conclusion

Merger screens are critical to efficient and effective merger enforcement policy. Using market share-based screens can be misleading when applied to differentiated products industries because (1) defining the relevant market can be difficult; (2) market shares may not provide an accurate measure of competition between products; and (3) such screens do not consider other economic factors that are important determinants of unilateral effects. This provides a motivation for the Agencies to consider UPP as a Second Request screen. When good estimates of the three key inputs are available, UPP may represent an improvement over market share-based approaches because it does not require market definition and it focuses the analysis on those economic factors that matter according to the logic of unilateral effects. However, using UPP as a screen during the initial thirty days may be problematic. In many cases, good estimates of the three key inputs will not be available during the initial HSR waiting period. In such cases, the Agencies should resist the temptation to base a screen on UPP with unreliable short-cut estimates of the inputs. ●