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Assessing Umbrella Pricing Incentives

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WHEN COLLUSIVE AGREEMENTS involve a subset of firms in an industry, they may create the incentive and ability for firms that are not participants in the cartel to raise their prices—so-called umbrella pricing.[1] In the European Union, Canada, and in some cases in the United States, consumers who purchase a product from firms that engage in umbrella pricing (umbrella purchasers) have standing to sue the cartel members for damages resulting from "overcharges" from umbrella pricing. The defendants in these matters are the cartel members, not the non-cartel members from which the consumers purchased the good. In jurisdictions that allow umbrella purchaser claims, plaintiffs must demonstrate that the losses they incurred stem from collusive actions, which predictably undermined competition. This highlights the importance of identifying and characterizing the link between the pricing of cartel members and non-cartel members.

This article provides an overview of the requirements for standing for umbrella purchasers in the U.S., EU, and Canada, and demonstrates how in a marketplace with differentiated products, an analysis of the upward pricing pressure experienced by non-cartel members may contribute to an assessment of whether the requirements for standing are met.

Standing for Umbrella Purchasers Varies by Jurisdiction

The ability of umbrella purchasers to sue the participants in a cartel for damages associated with price increases implemented by non-cartel members varies across countries and jurisdictions. In the EU in 2014, the Court of Justice of the European Union ruled that EU Member States cannot categorically exclude umbrella pricing claims against cartel members, and determined that umbrella purchasers have standing in matters where the cartel's actions created an incentive for umbrella pricing and where that effect was foreseeable.[2]

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In the United States, courts are split on the question of standing for umbrella purchasers.[3] U.S. courts have tended to reject umbrella claims, citing the difficulty of proving injury and calculating damages; for example, in *In re Vitamins Antitrust Litigation* the court noted that "'[t]he causal connection between plaintiffs' injury and the alleged conspiracy is necessarily attenuated by significant intervening factors, such as independent pricing decisions of the non-conspiring [parties]' . . . [and the] intervening factors . . . make it impossible to apportion damages between the overcharges and the other factors with any reasonable degree of certainty."[4]

But in some cases, U.S. courts have recognized the standing of umbrella purchasers, noting that plaintiffs would have to demonstrate that non-cartel members' prices were elevated as a result of the cartel's actions, and assessing the difficulty of estimating damages for umbrella purchasers to be no more complex than estimating damages for cartel purchasers. For example, in *Costco Wholesale Corp. v. AU Optronics Corp.*, the court found that if "Costco has standing to pursue its version of the umbrella theory . . . Costco would have to present evidence showing that the 'minor players' charged their higher panel prices because of the conspiracy, not for independent reasons . . . ." and "Costco's claims [regarding defendants] will require the court and the jury to tackle . . . evidentiary complexities . . . regardless of Costco's umbrella damages. Eliminating the umbrella theory would not make the economic inquiries less complex."[5]

In Canada, courts were split on standing until September 2019, when the Supreme Court of Canada determined that plaintiffs who purchase from umbrella pricers have standing to sue cartel members for damages. The decision was made in the context of an appeal to *Godfrey v. Toshiba*, a class action filed in British Columbia that alleged that Pioneer, Toshiba, and other manufacturers of optical disk drives (ODDs) and ODD products had conspired to fix prices between 2004 and 2010. The proposed plaintiff class included (among others) umbrella purchasers who had purchased an ODD or ODD products from a non-defendant.[6]

The Supreme Court of Canada was asked to address whether umbrella purchasers have the right to sue the members of a cartel for their economic losses.[7] The majority ruled that umbrella purchasers have standing to sue if they can prove that their losses foreseeably resulted from unlawful behavior by the cartel members—that is, whether plaintiffs can show that non-cartel members increased their prices as a predictable result of the cartel members' price-fixing agreement. [8] The Court determined that these conditions were met in *Godfrey*, but noted that they might not be met in other cases, noting "I am of the view that indeterminate liability would not arise in this case in any event" but "whether indeterminate liability might properly be considered *at all* in the context of a claim under s. 36(1)(a) of the Competition Act—I am content to leave for another day."[9]

In contrast, the dissenting opinion argued that standing for umbrella purchasers exposes defendants to indeterminate liability because cartel members cannot predict or control the actions of firms that are not members of the cartel (indeterminacy), and that standing for umbrella purchasers exposes defendants to potential claims by customers of firms whose prices are only tangentially influenced by the cartel members (remoteness): "[Claimants should not be allowed] to recover from defendants for any losses that in some way flowed from the alleged price-fixing conspiracy as it would expose defendants to liability that is potentially limitless in scope for loss and damage that are too remote from any price-fixing that occurred."[10]

The Court's decision opens the door to expanded class actions with regard to the size of the class and the amount of potential damages in price-fixing matters in Canada. But it also holds that umbrella purchasers must demonstrate that their losses resulted from collusive actions that predictably undermined competition—a set of requirements similar to those in the EU and in some U.S. courts. These standards require assessing the link (or lack thereof) between the pricing of cartel members and non-cartel members. For example, when members of a cartel increase their prices, do non-cartel members have an incentive to increase their prices? Can the magnitude of the umbrella price increase be approximated (and thus be foreseen)?

An Analysis of Upward Pricing Pressure May Assist in Determining Whether the Requirements for Standing for Umbrella Purchasers Are Met

The logic underlying umbrella purchaser claims is that the prices charged by non-cartel participants are set in response to the supracompetitive prices charged by the cartel members: the elevated prices maintained by the cartel reduce the competitive restraints on non-cartel members and, as a result, the non-cartel members set their prices higher than they would have in the absence of the cartel.

Whether such claims characterize a particular matter depend on the facts specific to the matter. A non-cartel member might not increase its price for a number of reasons. For example, a non-cartel member might be unable to change prices for customers who purchase under contractual pricing agreements. A non-cartel member also might not have sufficient bargaining power to negotiate a price increase with customers. Furthermore, if a non-cartel member's product is a somewhat distant substitute for the products produced by the cartel, it may only be able to raise prices by a de minimis amount. And a non-cartel member may increase its price for reasons unrelated to the cartel, such as an increase in marginal cost. The point is that an analysis of umbrella pricing requires a fact-specific assessment of the particular matter.

One approach that likely will contribute to understanding umbrella pricing incentives is to perform an upward pricing pressure analysis for the non-cartel members.[11] When cartel members increase their prices, some of the cartel members' customers may shift their purchases to non-cartel members, which may create an incentive for non-cartel members to increase their prices. Modeling these interactions can likely help to characterize and quantify the link between the pricing of cartel- and non-cartel members.[12]

As an example of one such model, consider a market with three firms which are all at the same level in the chain of production. Each firm sells a single differentiated product, and the products are (imperfect) substitutes. The firms initially compete on price, with each firm determining the price that maximizes its profit, given the prices of the other two firms.[13] In equilibrium, each firm's price will be set such that any increase in price beyond that point would be unprofitable for the firm—the additional revenue it would earn by setting a higher price would be more than offset by the profit it would lose when some of the firm's customers shift their purchases to other firms.

Now assume Firms 1 and 2 form a cartel in which they each agree to increase their price by a certain amount. (Assume Firm 3 does not join the cartel, perhaps to avoid violating antitrust laws.) Collusion between Firms 1 and 2 may change the competitive incentives for Firm 3: the price that Firm 3 set before the formation of the cartel may no longer be the price that will maximize Firm 3's profit. That is because as a result of the price increase of Firms 1 and 2, some consumers may shift their purchases to Firm 3, and if the demand for Firm 3's product increases, the price which maximizes Firm 3's profits also typically increases.[14] Firm 3's incentive to increase price will be counterweighted, as before, by the profit Firm 3 would expect to lose when some of the Firm 3's customers shifted their purchases away from Firm 3. Thus, in the context of this model, whether and how much Firm 3 will increase its price in response to the cartelization of Firms 1 and 2 depends on two things: (1) the extent to which the customers of Firms 1 and 2 will respond to a price increase by Firms 1 and 2 by shifting their purchases to Firm 3, and (2) the extent to which customers of Firm 3 will respond to a price increase by Firm 3 by shifting their purchases away from Firm 3.

The likelihood of these occurrences can be better understood by breaking them down into their component parts. For example, the tendency of customers of Firms 1 and 2 to respond to a price increase by shifting their purchases to Firm 3 depends on the size of Firm 1 and 2's price increase; the sensitivity of Firm 1 and 2's customers to price; and the extent to which Firms 1 and 2's customers consider Firm 3's product to be a good substitute for the products of Firms 1 and 2. Similarly, the tendency of Firm 3's customers to respond to a price increase by shifting their purchases away from Firm 3 depends on the size of Firm 3's price increase and the sensitivity of Firm 3's customers to price.

Firm 3's price increase will depend on the strength of these tendencies, as well as the respective volumes involved. For example, if Firm 3's customer base is small relative to the customer bases of Firms 1 and 2, then all else equal, the number of customers Firm 3 expects to lose due to a price increase may be small relative to the number of customers Firm 3 gains due to the price increases of Firms 1 and 2.

In summary, Firm 3's price increase will be larger:

- the greater is the price increase of Firms 1 and 2
- the more price sensitive are the consumers of Firms 1 and/or 2
- the greater is the substitutability of Firm 3's product for the products of Firms 1 and/or 2;
- the less price sensitive are the original consumers of Firm 3
- the smaller is Firm 3's quantity relative to Firms 1 and/or 2.[15]

Firm 3's pricing incentives can be further characterized and quantified by the following formula, which estimates the amount by which Firm 3 will increase its price in response to an percent price increase by Firms 1 and 2.[16]

$$\frac{p'_3 - p_3}{p_3} = \left[\frac{\varepsilon_1 \delta_{13} q_1 + \varepsilon_2 \delta_{23} q_2}{2\,\varepsilon_3 q_3}\right] s \quad \text{(Equation 1)}$$

Equation (1) shows that Firm 3's percentage price increase will be proportional to the percentage price increase, s, of the colluding firms, where the proportionality factor is given by the fraction in brackets in Equation (1). The first term in the numerator includes the own-price elasticity of demand for Firm 1 (ε_1)—that is, the percent by which Firm 1's demand decreases in response to a 1 percent increase in Firm 1's price; the diversion ratio from Firm 1 to Firm 3 (δ_{13}), which is the fraction of the demand lost by Firm 1 that is diverted to Firm 3; and the pre-cartel quantity (q_1) of Firm 1.[17] The magnitude $\varepsilon_1 \delta_{13} q_1$ in Equation (1) reflects the consumer demand that is shifted from Firm 1 to Firm 3, when Firm 1 increases its price by 1 percent. The second term, $\varepsilon_2 \delta_{23} q_2$, has a similar interpretation with respect to Firm 2's price increase. The term in the denominator includes the own-price elasticity of demand for Firm 3 (ε_3) and the pre-cartel quantity sold by Firm 3 (q_3). This term reflects the consumer demand that Firm 3 will lose for each percentage point increase in its price.[18] Equation (2) describes the same relationship using an alternative formulation; it expresses the determinants of Firm 3's price increase as variables that often can be estimated or approximated using firms' financial information (Q_i, m_i, s) and strategic plans and studies (δ_{ij}), where Q_i is the pre-cartel quantity share of Firm i and m_i denotes Firm i's percentage profit margin.[19]

$$\frac{p'_3 - p_3}{p_3} = \left[\frac{\delta_{13} Q_1 \frac{m_3}{m_1} + \delta_{23} Q_2 \frac{m_3}{m_2}}{2\,Q_3}\right] s \quad \text{(Equation 2)}$$

Table 1 provides a set of illustrative examples which demonstrate how, in the context of this model, Equation 2 can be used to estimate the extent to which Firm 3 will increase its price in response to the cartelization of Firms 1 and 2. The first column of the table serves as the base case. The base case assumes that Firms 1, 2, and 3 are of the same size and profitability, and that 45 percent of consumer demand diverted from Firm 1 or Firm 2 would shift to Firm 3. The base case also assumes that through collusion, Firms 1 and 2 agree to sustain a 10 percent price increase.[20] Under these assumptions, Equation (2) implies that the price increases of Firms 1 and 2 create the incentive for Firm 3 to increase its price by 4.5 percent.

The second column considers an alternative scenario; it is identical to the base case except it assumes that Firm 3's product is a more distant substitute for the products of Firms 1 and 2. Intuitively, that would suggest that Firm 3's price increase would be lower than it was in the base case, and that is what Equation 2 shows: if 35 percent of consumer demand diverted from Firm 1 or Firm 2 would shift to Firm 3 (instead of 45 percent, as assumed in the base case), then a 10 percent price increase by Firms 1 and 2 creates the incentive for Firm 3 to increase its price by 3.5 percent (instead of 4.5 percent , as implied by the base case).

The third column considers a scenario that is identical to the base case except it assumes that Firm 3 is half the size of Firms 1 and 2. Consistent with intuition, under this assumption Equation 2 shows that Firm 3's price increase is higher than it was in the base case: a 10 percent price increase by Firms 1 and 2 creates the incentive for Firm 3 to increase its price by 9 percent (instead of 4.5 percent , as implied by the base case).

The fourth column considers a scenario that is identical to the base case except it assumes that the price sensitivity of Firm 3's customers is doubled relative to the base case (as measured by a halving of its percentage profit margin). As one would expect, Equation 2 shows that under this assumption Firm 3's price increase is lower than it was under the base case: a 10% price increase by Firms 1 and 2 creates the incentive for Firm 3 to increase its price by 2.3 percent (instead of 4.5 percent , as implied by the base case).

Several additional comments are worth noting. First, Firm 3's price increase does not involve collusion with Firms 1 and 2. In fact, as noted by Inderst et al., Firm 3 need not be aware of the collusive agreement between Firms 1 and 2; Firm 3 merely observes Firm 1 and 2's price increases and responds unilaterally, in accordance with its own economic incentives.[21]

Second, as explained by Inderst et al., if the price increases of Firm 1 and 2 are large enough, it is possible that Firm 3 would not be in the same relevant market that Firms 1 and 2 are in when they set their prices competitively.[22] For example, in the context of this model, suppose Firms 1 and 2 are the only two firms in their relevant market when they

Table 1: Illustrative Examples

Variable Name	Notation	**Example 1: Firm 3 is similar to Firms 1 and 2**	**Example 2: Firm 3's product is a more distant substitute**	**Example 3: Firm 3 is small relative to Firms 1 and 2**	**Example 4: Firm 3's consumers are more price sensitive**
		Firms 1 and 2 are established producers of widgets. Firm 3 is:			
		an established producer of widgets	*an established producer of gadgets*	*a new producer of widgets*	*an established producer of economy widgets*
% price increase by Firms 1 and 2	**s**	**10%**	**10%**	**10%**	**10%**
Quantity demanded from each of Firms 1 and 2	q_1, q_2	1,000,000	1,000,000	1,000,000	1,000,000
Quantity demanded from Firm 3	q_3	1,000,000	1,000,000	500,000	1,000,000
% profit margin of Firms 1 and 2	m_1, m_2	30%	30%	30%	30%
% profit margin of Firm 3	m_3	30%	30%	30%	15%
Diversion ratio from Firms 1 and 2 to Firm 3	δ_{13}, δ_{23}	45%	35%	45%	45%
% price increase by Firm 3	$(p_3' - p_3)/(p_3)$	**4.5%**	**3.5%**	**9.0%**	**2.3%**

Note: values of q_i, m_i, δ_{ij}, and p_3 are stated on a pre-cartel basis. The pre-cartel quantity share of Firm *i* is $Q_i \equiv \frac{q_i}{\sum_1^3 q_j}$.

set their prices competitively. If Firms 1 and 2 then collude to increase their prices significantly, some consumers will shift their purchases from Firms 1 and 2 to a firm that provides an imperfect but affordable substitute (which in this example would be Firm 3). In this situation, the elevation of Firm 1 and 2's prices gives Firm 3 the incentive to increase its price, even though Firm 3 is not included in the relevant market of Firms 1 and 2 when they price competitively.

Third, Equation 2 does not provide a complete analysis of umbrella pricing incentives. Consistent with the literature on unilateral incentives created by upward and downward pricing pressure,[23] Equation 2 analyzes the pricing incentives of a given player (Firm 3) holding the actions of other players fixed. It also does not account for the possibility of repositioning of existing firms or entry by new firms in response to Firm 3's price increase.[24] As noted in other studies, upward and downward pricing pressure analyses characterize and quantify potential outcomes based on firms' economic incentives without involving the development of a more complex simulation model.

Fourth, under the assumptions of the model, Equation 2 implies that Firm 3 will increase its price by some amount, since the terms in Equation 2 are all positive. However, the model accounts for the fact that Firm 3's price increase could be inconsequentially small. For example, if Firm 3's product is a more distant substitute for the products of Firms 1 and 2, then the model indicates that the price increases of Firms 1 and 2 may have very little impact on Firm 3's price. More generally, this observation highlights the importance of considering the implications of the model in the context of the broader fact base of a particular matter. As noted above, a non-cartel member might not change its price if, for example, it is unable to change prices for customers who purchase under contractual pricing agreements or if it does not have sufficient bargaining power to negotiate a price increase with customers. Or a non-cartel member may increase its price for reasons wholly or partly related to increases in its marginal cost. And so on. These examples illustrate the importance of considering the results of the model in the context of a more holistic assessment of the economic factors influencing the firm.

In summary, an analysis of the unilateral pricing incentives that a non-cartel member may experience as a result of a cartel's elevated pricing is likely to be a useful tool to understand the link between the pricing of cartel and non-cartel members. In combination with the broader set of facts specific to a given matter, this approach may contribute to an understanding of the factors, such as indeterminacy and remoteness, that courts consider when evaluating whether umbrella purchasers have standing. ■

[1] For example, partial cartels can occur when establishing and maintaining an agreement is costly—such as when firms vary significantly by size or communication is difficult—or when a potential member chooses not to violate antitrust law.

[2] C-557/12, Kone AG et al. v. ÖBB-Infrastruktur AG, EU:C:2014:1317 (C.J. June 2014) ("Consequently, the victim of umbrella pricing may obtain compensation for the loss caused by the members of a cartel, even if it did not have contractual links with them, where it is established that the cartel at issue was, in the circumstances of the case and, in particular, the specific aspects of the relevant market, liable to have the effect of umbrella pricing being applied by third parties acting independently, and that those circumstances and specific aspects could not be ignored by the members of that cartel. It is for the referring court to determine whether those conditions are satisfied. . . . Article 101 TFEU must be interpreted as meaning that it precludes the interpretation and application of domestic legislation

enacted by a Member State which categorically excludes, for legal reasons, any civil liability of undertakings belonging to a cartel for loss resulting from the fact that an undertaking not party to the cartel, having regard to the practices of the cartel, set its prices higher than would otherwise have been expected under competitive conditions.").

[3] *See* Roger D. Blair & Christine Piette Durrance, *Umbrella Damages: Toward a Coherent Antitrust Policy*, 36 CONTEMP. ECON. POL'Y 241 (2018).

[4] *In re* Vitamins Antitrust Litig., No. 99-197 (TFH), 2001 U.S. Dist. LEXIS 12114, at *27–34 (D.D.C. July 2, 2001) ("[T]he overwhelming majority of recent court decisions that have addressed the viability of the 'umbrella' theory . . . have rejected 'umbrella' claims . . . . [In this matter, p]laintiffs' umbrella claims are simply too remote to confer antitrust standing. . . . The causal connection between plaintiffs' injury and the alleged conspiracy is necessarily attenuated by significant intervening factors, such as independent pricing decisions of the non-conspiring suppliers of pre-mix . . . . Plaintiffs in this case are seeking to recover damages that may overlap with the claims of the blenders for overcharges. Moreover, even to the extent that plaintiffs are not seeking compensation for overcharges which were passed on to them from the blenders, there are too many intervening factors which would make it impossible to apportion damages between the overcharges and the other factors with any reasonable degree of certainty. Therefore, because plaintiffs' claims for damages under the "umbrella" theory are too speculative, potentially duplicative of the claims of the blenders who are also litigants in this case, and necessarily involving highly complex and theoretical damage calculations, the Court will grant defendants' Motion for summary judgment of these claims."). *See also In re* Skelaxin (Metaxalone) Antitrust Litig., No. 1-:12-md-2343, 2014 U.S. Dist. LEXIS 66707, at *40 (E.D. Tenn. May 15, 2014) ("This case, however, involves a trickier inquiry: why did two of Defendants' competitors price their generic alternatives as they did? There are any number of possible answers to this question, which is why courts routinely preclude plaintiffs from seeking compensation in these circumstances."); *In re Vitamins Antitrust Litig.*, No. 99-197 (TFH), 2002 U.S. Dist. LEXIS 25793, at *1 (D.D.C. Apr. 30, 2002).

[5] Costco Wholesale Corp. v. AU Optronics Corp., No. 13-1207RAJ, 2014 U.S. Dist. LEXIS 133798, at *9–12 (W.D. Wash. Sept. 23, 2014) ("[T]he court rules that except as to panels sold by non-conspiring 'minor players' to entities who were neither conspirators nor in a control relationship with conspirators, Costco has standing to pursue its version of the umbrella theory . . . . The court today rules only that in this context, faced with an eve-of-trial motion to knock out a significant portion of a plaintiff's case, Costco has articulated a version of the umbrella theory that can at least proceed to trial." The court also noted "Costco would have to present evidence showing that the 'minor players' charged their higher panel prices because of the conspiracy, not for independent reasons . . . ." and that "Costco's claims [regarding defendants] will require the court and the jury to tackle the evidentiary complexities that the *Petroleum Products* court feared regardless of Costco's umbrella damages. Eliminating the umbrella theory would not make the economic inquiries less complex."). *See also* U.S. Gypsum Co. v. Ind. Gas Co., 350 F.3d 623, 627 (7th Cir. 2003) ("A cartel cuts output, which elevates price throughout the market; customers of fringe firms (sellers that have not joined the cartel) pay this higher price, and thus suffer antitrust injury, just like customers of the cartel's members . . . buyers from fringe firms suffer antitrust injury . . . their complaints cannot be dismissed at the outset under the *Illinois Brick* doctrine, and . . . the potential to establish injury through elevation of price in the affected market satisfies any distinct 'antitrust standing' requirement."); Cty. of San Mateo v. CSL Ltd., No. 10-cv-05686-JSC, 2014 U.S. Dist. LEXIS 116342, at *9, 11 (N.D. Cal. Aug. 20, 2014) (finding that umbrella purchasers had standing to sue because, among other things, it was not "impossible for Plaintiff to establish with a 'reasonable probability,' that Defendants' supply restriction caused a price umbrella; that is, caused Plaintiff to incur an overcharge when purchasing IVIG and albumin from non-conspirators" and "[i]f it would be too speculative as a matter of law to make this computation with respect to non-conspiring rivals, it would also be too speculative to make the same calculation in regards to cartel members." (citation omitted)).

[6] Pioneer Corp. v. Godfrey (2019), 437 D.L.R. 4th 383 (S.C.C.).

[7] *Id.* This is the question the Supreme Court of Canada was asked to address with respect to umbrella purchasers. The Court was also asked to resolve questions regarding the requirements for certifying loss as a common issue, as well as questions related to certain procedural issues. *Id.*

[8] *Id.* Among the reasons cited by the Supreme Court of Canada were that the success of the defendants' alleged price fixing required price increases throughout the ODD marketplace and thus umbrella pricing by rival manufacturers of ODD and ODD products was foreseeable; and that recovery was limited to purchasers who could demonstrate that their loss was caused by the intentional actions of the cartel to lessen competition.

[9] *Id.*

[10] *Id.* ("Indeterminacy is a policy consideration that negates the imposition of a duty of care in negligence where it would expose the defendant to liability in an indeterminate amount for an indeterminate time to an indeterminate class and remoteness limits the scope of liability in negligence where the harm is too unrelated to the wrongful conduct to hold the defendant fairly liable . . . . [Claimants should not be allowed] to recover from defendants for any losses that in some way flowed from the alleged price-fixing conspiracy as it would expose defendants to liability that is potentially limitless in scope for loss and damage that are too remote from any price-fixing that occurred.")

[11] Unilateral effects analyses based on upward and downward pricing pressure have been applied in a wide variety of contexts. *See, e.g.,* Joseph Farrell & Carl Shapiro, *Antitrust Evaluation of Horizontal Mergers: An Economic Alternative to Market Definition*, 10 B.E. J. THEORETICAL ECON. 1 (2010); Serge Moresi, *The Use of Upward Price Pressure Indices in Merger Analysis*, ANTITRUST SOURCE 1 (2010); Serge Moresi & Steven C. Salop, *vGUPPI: Scoring Unilateral Pricing Incentives in Vertical Mergers* (Georgetown Law Faculty Working Papers, Paper 163, Feb. 2013), http://scholarship.law.georgetown.edu/fwps_papers/163; Serge Moresi & Steven C. Salop, *Incentive Scoring in Merger Review*, https://www.semanticscholar.org/paper/Incentive-Scoring-in-Merger-Review-Moresi-Salop/16345dae9145698ec6785e82bac3690eeff07a1e; Serge Moresi et al., *cGUPPI: Scoring Incentives to Engage in Parallel Accommodating Conduct* (Geo. Law Faculty Publications and Other Works, 2015), https://scholarship.law.georgetown.edu/facpub/1501/. As noted in more detail below, the results of the model presented here must be considered in the context of a more holistic assessment of the economic factors influencing a non-cartel member.

[12] Roman Inderst, Frank P. Maier-Rigaud & Ulrich Schwalbe, *Umbrella Effects*, 10 J. COMPETITION L. & ECON. 739 (2014). *See also* Emanuel Holler & Maarten Pieter Schinkel, *Umbrella Effects: Correction and Extension*, 13 J. COMPETITION L. & ECON. 185 (2017) (providing a comprehensive analysis of umbrella effects, including the effects that occur with homogeneous and differentiated goods, with Bertrand and Cournot competition, and with non-cartel members that are price takers and non-cartel members that have some degree of market power. Also characterizing factors that determine the extent of umbrella pricing, including among other things the magnitude of the cartel's price increase, the relative size of the cartel and non-cartel members, the degree of substitutability among the products of cartel and non-cartel members, and the elasticity of demand and supply. The contribution of the present article is to demonstrate that in a model with linear demand and price competition among producers of differentiated products, the percentage price increase for an umbrella pricer will be proportional to the percentage price increase of the colluding firms, where the proportionality factor is a function of the pre-collusion quantity shares and percentage profit margins of cartel- and non-cartel members and the diversion ratios of the cartel members. This formulation expresses the umbrella pricer's percentage price increase as variables that often can be estimated or approximated using firms' financial information and strategic plans and studies.).

[13] The equilibrium concept is Bertrand-Nash equilibrium. Firms are assumed to have no binding capacity constraints and constant marginal costs over the relevant range of output. The demand function is assumed to be linear.

[14] The collusive price increase by the cartel may lead to an increase in the demand faced by non-cartel members. For many commonly used functional forms, such as, for example, the linear demand model used in the present model, an outward shift in demand causes demand to become less elastic

so that non-cartel members that experience increased demand have a unilateral incentive to raise price in response to the collusive price increase by the cartel.

[15] These factors are consistent with factors described in Inderst et al., *supra* note 12.

[16] *See* the online appendix for the technical details, https://www.americanbar.org/content/dam/aba/publishing/antitrust_magazine/atmag-fall2020/savio-appendix-assessing-umbrella-pricing-incentives.pdf.

[17] Since only relative quantities matter in Equation 1, one can use either quantities or quantity shares.

[18] When Firm *i* increases its price, some of the customers diverted away from Firm *i* might choose not to purchase a substitutable product from Firms *j* or *k*. This option (the so-called outside good) is a constraint on Firm *i*'s incentive to increase price. The diversion ratio from Firm *i* to Firm *j*—that is, the fraction of the demand lost by Firm *i* that is diverted to Firm *j*—is also impacted by the degree to which consumers prefer the outside good. *See, e.g.,* Serge Moresi & Hans Zenger, *Recapture Ratios in Merger Analysis*, 170 Econ. Letters 136 (2018).

[19] Before the cartel was formed, the profit-maximizing prices set by the firms satisfied the Lerner condition $\frac{1}{-\varepsilon_i} = m_i$, where m_i denotes Firm *i*'s percentage profit margin; this is the first-order condition characterizing the pre-cartel equilibrium. The pre-cartel quantity share of Firm *i* is $\frac{q_i}{\sum_j^3 q_j} \equiv Q_i$.

As noted above, the diversion ratios from Firm 1 and 2 to Firm 3 (δ_{13} and δ_{23}, respectively) are impacted by the degree to which consumers prefer the outside good. Moresi and Zenger, *supra* note 18, show how the proportion of a product's lost sales that does not remain in the market can be approximated using information such as the market elasticity of demand, market shares, and profit margins.

[20] The 10% price increase for Firms 1 and 2 is an exogenous assumption; the incentives (and disincentives) for Firms 1 and 2 to increase their prices through collusion are not modeled here.

[21] Inderst et al., *supra* note 12, at 750.

[22] *Id.* at 755–57.

[23] *See* sources cited *supra* note 11.

[24] In this context, repositioning refers to a supply-side response in which firms adjust production so as to offer closer substitutes to the products whose prices have increased.