JOHN KWOKA'S *MERGERS, MERGER CONTROL, AND REMEDIES*: A CRITICAL REVIEW

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John Kwoka's 2015 *Mergers, Merger Control, and Remedies*[1] has received considerable attention from both antitrust practitioners and academics.[2] The book's centerpiece is a meta-analysis of retrospective studies of consummated mergers, joint ventures, and other horizontal arrangements.[3] Professor Kwoka creates a database of the estimated price effects reported in these academic studies, and uses it to address important questions about federal antitrust enforcement, such as: Do the agencies successfully identify anticompetitive mergers? Do merger remedies effectively prevent the creation and exercise of market power? Have the agencies applied consistent standards over time for identifying and challenging anticompetitive mergers?

Based on summary statistics generated from his database, Kwoka concludes that domestic antitrust agencies are excessively tolerant in their merger enforcement; that merger remedies are ineffective at mitigating market power; and that merger enforcement has become increasingly lax over time.

As Federal Trade Commission economists, we appreciate Kwoka's effort to distill for a broader audience the wide range of published analyses of antitrust

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[1] *See* JOHN KWOKA, MERGERS, MERGER CONTROL, AND REMEDIES: A RETROSPECTIVE ANALYSIS OF U.S. POLICY (2015).

[2] *See, e.g.*, Robert A. Skitol, *A Harsh Report Card on the Merger Enforcement Process*, ANTITRUST SOURCE (Feb. 2015), www.americanbar.org/content/dam/aba/publishing/antitrust_source/feb15_skitol_review_2_11f.pdf.

[3] Meta-analysis is a method for systematically combining quantitative findings from multiple studies to develop a finding that has greater statistical power than any of the individual studies alone.

enforcement actions. The FTC has a longstanding culture of reflection and self-assessment; indeed, current or former FTC Bureau of Economics (BE) staff authored many of the studies in Kwoka's survey.[4] The FTC recently released its second major assessment of its merger remedies;[5] the first was released in 1999.[6] Retrospective studies of consummated mergers have increased the FTC's antitrust knowledge base, and have helped it improve enforcement accuracy by providing valuable insights into when merger policy has worked, and when it has not.

For example, after a series of unsuccessful hospital merger challenges, FTC Chairman Timothy Muris launched the Hospital Merger Retrospective Project in 2002, which contributed to the FTC's recent successes in challenging harmful hospital mergers.[7] More generally, as Orley Ashenfelter et al. have noted, prior to the publication of merger retrospectives in the academic literature, there was virtually *no* empirical evidence on the actual competitive effects of horizontal mergers.[8] Retrospective analyses also help the agencies assess and improve the empirical tools used for prospective merger enforcement.[9] We

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[4] In addition to studying mergers retrospectively, FTC staff also have studied the effects of nonmerger activity retrospectively. *See* BUREAU OF COMPETITION & BUREAU OF ECON., FED. TRADE COMM'N, IMPACT EVALUATIONS OF FEDERAL TRADE COMMISSION VERTICAL RESTRAINTS CASES (Ronald N. Lafferty et al. eds., 1984).

[5] BUREAU OF COMPETITION & BUREAU OF ECON., FED. TRADE COMM'N, THE FTC'S MERGER REMEDIES 2006–2012 (2017) [hereinafter FTC'S MERGER REMEDIES 2006–2012].

[6] BUREAU OF COMPETITION, FED. TRADE COMM'N, A STUDY OF THE COMMISSION'S DIVESTITURE PROCESS (1999).

[7] *See* Deborah Haas-Wilson & Michael Vita, *Mergers Between Competing Hospitals: Lessons from Retrospective Analyses*, 18 INT'L J. ECON. BUS. 1 (2011); *see also* Orley Ashenfelter et al., *Retrospective Analysis of Hospital Mergers*, 18 INT'L J. ECON. BUS. 5 (2011). Since the completion of this project, the FTC has enjoyed a string of successes, either successful litigation or transactions abandoned after the issuance of an FTC complaint. *See, e.g.*, FTC v. Penn St. Med. Ctr., 838 F.3d 327 (3d Cir. 2016); FTC v. Advocate Health Care Network, 841 F.3d 460 (7th Cir. 2016); Promedica Health Sys., Inc. v. FTC, 749 F.3d 559 (6th Cir. 2014); FTC v. OSF Healthcare Sys., 852 F. Supp. 2d 1069 (N.D. Ill. 2012); Order Dismissing Complaint, Reading Health Sys., FTC Docket No. 9353 (Dec. 7, 2012); Decision and Order, Carilion Clinic, FTC Docket No. 9338 (Nov. 23, 2009); Order Dismissing Complaint, Inova Health Sys. Found., FTC Docket No. 9326 (June 17, 2008). In *Advocate* the appellate court cited published FTC hospital merger retrospectives. *Advocate*, 841 F.3d. at 470, 472 (citing Steven Tenn, *The Price Effects of Hospital Mergers: A Case Study of the Sutter-Summit Transaction*, 18 INT'L J. ECON. BUS. 65 (2011); Aileen Thompson, *The Effect of Hospital Mergers on Inpatient Prices: A Case Study of the New Hanover-Cape Fear Transaction*, 18 INT'L J. ECON. BUS. 91 (2011); Michael G. Vita & Seth Sacher, *The Competitive Effects of Not-for-Profit Hospital Mergers: A Case Study*, 49 J. INDUS. ECON. 63 (2001)).

[8] Orley Ashenfelter et al., *Generating Evidence to Guide Merger Enforcement*, 5 COMPETITION POL'Y INT'L 57, 58 (2009).

[9] *See* Craig Peters, *Evaluating the Performance of Merger Simulation: Evidence from the U.S. Airline Industry*, 49 J.L. & ECON. 627 (2006); Matthew C. Weinberg & Daniel Hosken, *Evidence on the Accuracy of Merger Simulations* 95 REV. ECON. & STAT. 1584 (2013); Christopher Garmon, *The Accuracy of Hospital Merger Screening Methods* (Fed. Trade Comm'n, Working Paper No. 326, 2016).

therefore regard retrospective analyses of policy decisions as a vital input into the refinement and improvement of antitrust merger policy.

While acknowledging many of these valuable contributions of retrospective analysis to merger policy, Kwoka's principal focus is to use this literature to draw conclusions about contemporary federal merger policy. These include:

- "[W]e can conclude that recent merger control has not been sufficiently aggressive in challenging mergers."[10]

- "[T]he evidence also indicates that many challenged mergers are subject to remedies that fail to prevent post-merger price increases. Neither conduct nor structural remedies on average succeed in that objective, but of the two types of remedies, the conduct approach has shown itself to be particularly ineffective."[11]

- "It can therefore reasonably be concluded that . . . the numerical shift toward more accommodating policy across these decades reflects a bona fide policy change."[12]

Are these conclusions justified? In what follows, we provide a detailed examination of Kwoka's conclusions, and the studies and methods on which they rely. For a variety of reasons, we find that his evidence cannot support such broad conclusions. For example, as we will show, several of the studies that form the basis for his criticisms of negotiated remedies actually provide no information about the effectiveness of those remedies. When those studies are removed from his analysis, the remaining evidence is weak and equivocal.

In addition, there are substantial methodological issues with his analysis. Kwoka does not employ well established meta-analytic techniques for computing average price effects and their associated standard errors. For example, he does not weight his observations by their estimated variances. The absence of weighting means that imprecise estimates of price effects receive the same weight as precisely estimated effects in the computation of his averages, which is a substantial departure from standard meta-analytic methodology. More importantly, he reports no standard errors for his estimated average price effects, which means that neither he nor his readers can conduct the hypothesis tests (e.g., is the average merger price effect statistically different from zero?) that normally are the focus of this type of inquiry. The absence of standard errors not only is a substantial departure from basic meta-analytic methods, but also is a substantial departure from normal econometric practice.

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[10] Kwoka, *supra* note 1, at 158.

[11] *Id.* at 159–60.

[12] *Id.* at 117.

Last, we show that Kwoka's analysis provides little support for the conclusion that enforcement standards have become weaker over time.

In what follows, we explore and discuss these issues in greater detail.

I. KWOKA'S ANALYSIS OF FEDERAL MERGER POLICY AND MERGER REMEDIES

The core of the Kwoka study, at least as it concerns FTC and DOJ enforcement policy, is contained in chapter 7 of *Merger Policy and Remedies*. Kwoka canvases the economic literature for relevant research, identifying 49 transactions for which a retrospective study exists. Of these 49 transactions, 42 are mergers; the others are either joint ventures or airline "code shares." Kwoka provides a brief synopsis of each transaction and the relevant study (or studies) in Appendix I of his book. The Appendix to this article reproduces Kwoka's Table 6.2,[13] which lists all 49 transactions in his database.

After compiling a database of these estimated price effects from the studies in his sample, Kwoka computes average price changes based on various mutually exclusive categories of agency actions. Table 1 lists Kwoka's results, where the first column contains average price effects reported in Kwoka's Table 7.9,[14] while the second column reports the number of mergers in each category from Kwoka's Table 7.4.[15] Kwoka interprets these average price effects as follows:

- Kwoka interprets the 1.86 percent increase for "opposed mergers"—that is mergers where either the FTC or DOJ recommended blocking the transaction in its entirety—as evidence that the "agencies' actions were effective."[16]

- He interprets the 7.05 percent and 16.03 percent increases for mergers with divestiture and conduct remedies, respectively, as follows: "Thus, while neither type of remedy for competitively problematic transactions seems to have been especially effective in restraining postmerger price increases, conduct remedies were by far the weaker of the two."[17] He also states that "it is clear that agency actions did not preserve or restore the price competition otherwise lost as a result of these mergers."[18]

- Regarding the 6.08 percent and 7.15 percent price increases for cleared mergers, Kwoka states, "These studied mergers appear to be cleared too

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[13] *Id.* at 90–91.
[14] *Id.* at 120.
[15] *Id.* at 115.
[16] *Id.* at 120.
[17] *Id.*
[18] *Id.* at 119.

often."[19] Elsewhere, he states that the agencies "fail to challenge a considerable fraction of [mergers] that result in price increases."[20]

TABLE 1:
KWOKA AVERAGE PRICE EFFECTS BY AGENCY
ENFORCEMENT ACTION[21]

Agency Action	Average Price Effect (Kwoka Table 7.9)	Number of Mergers (Kwoka Table 7.4)
All mergers in the sample	7.22%	42
All mergers opposed by agencies	1.86%	5
Mergers when a divestiture remedy was obtained	7.05%	6
Mergers when a conduct remedy or conditions imposed	16.03%	4
Mergers explicitly cleared by agencies	6.08%	5
Mergers presumably cleared due to lack of explicit information agency the an	7.15%	22

Kwoka finds that FTC/DOJ merger policy has failed systematically to achieve its stated objective of preserving competition:

> The mean price change for all the mergers where the antitrust agency took any enforcement action—that is, opposition or any challenge and remedy— was an increase of 7.71 percent.[22] This result is inconsistent with the proposition that agency actions served to restore or preserve competition. *Rather, it implies that policy decisions and actions have been too accommodating, failing in their mission of preventing postmerger price increases.*[23]

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[19] *Id.* at 120.

[20] *Id.* at 126.

[21] There is a slight discrepancy between the count of mergers with divestitures listed in Kwoka's Table 7.4 (i.e., 6) and the count that one obtains from Appendix I (i.e., 7). Apparently Kwoka assigned a "half-frequency" score to the Kalvar/Xidex and Thomson/West mergers because the remedies in those cases involved both divestitures and licensing. *See* KWOKA, *supra* note 1, at 162, 183, 245 n.6.

[22] The average price change is 7.71% for the 15 transactions listed in rows 2 through 4 of Table 1 (i.e., those underlying the 1.86%, 7.05%, and 16.03%), taking account of the different number of transactions in each row. *Id.* at 119.

[23] *See id.* (emphasis added).

Kwoka concludes:

> [T]hese results suggest that merger policy at the margin has been exces-
> sively permissive . . . remedies do not appear adequate to the task of
> preventing postmerger price increases . . . . All in all, both investigations and
> policy actions appear to err on the side of permissiveness, with the result that
> too few mergers are challenged, and too few of those that are challenged are
> subject to either adequate remedies or opposition by the antitrust agencies.[24]

He also finds:

> [T]here is strong evidence that these mergers on average have resulted in
> higher prices, and strikingly, that is the case regardless of whether the agen-
> cies acted or not, and if they did, what type of action they took. This perva-
> sive anticompetitive outcome from these well-studied mergers is indicative
> of the need for closer policy scrutiny of mergers at the enforcement margin
> and for stronger actions and remedies in the case of challenged mergers.[25]

II. EVALUATION OF KWOKA'S EVIDENCE

Kwoka's central finding is that federal—that is, FTC and DOJ—merger enforcement is excessively lenient and ineffective. He also concludes that too many anticompetitive transactions proceed unchallenged. And when mergers are challenged and addressed via remedies negotiated with the merging par-ties, these remedies—either divestiture or conduct remedies—are inadequate to prevent the creation and exercise of market power. Finally, he concludes that federal merger enforcement has grown increasingly lenient over time.

Do the underlying publications support these conclusions? In what follows, we examine more closely the relevant merger studies from his data sample.

A. COMPOSITION OF KWOKA'S SAMPLE: INITIAL OBSERVATIONS

Given that a principal objective of Kwoka's analysis is to assess the effec-tiveness of *recent* antitrust enforcement policies, one is struck by the age of some transactions in his sample. Three mergers (Scott Graphics/Xidex, Kal-var/Xidex, and Weyerhaeuser/Menasha) pre-date the issuance of the modern 1982 Merger Guidelines. One of them (Kalvar/Xidex) pre-dates enactment of the Hart-Scott-Rodino (HSR) Act in 1976. Transactions of this vintage do not inform the evaluation of contemporary federal enforcement policy. In fact, only seven of the mergers in his sample occurred in 2000 or later, with the most recent in 2006. While the set of transactions available for inclusion in his meta-analysis is beyond Kwoka's control, the paucity of recent transactions nevertheless constrains inference about *current* FTC and DOJ policy.[26]

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[24] *Id.* at 120–21.

[25] *Id.* at 126.

[26] In contrast, in comments to the FTC about its current merger remedies study, Kwoka ex-pressed concern that the findings of the previous (1999) FTC Remedies Study had grown stale,

The data sample also is unrepresentative of the population of industries where mergers now occur. The studies in Kwoka's sample are concentrated in a handful of industries. Thirty of the 49 transactions (and 23 of the 42 mergers) occur in three industries: petroleum (11), airlines (9),[27] and academic/professional journal publications (10).[28] Also, because some of the studies included in Kwoka's sample examine numerous transactions, there is a lack of diversification in primary research sources. One publication analyzes eight petroleum mergers,[29] and one author (in two publications) addresses ten mergers involving journal publications.[30] More than 40 percent of the mergers in Kwoka's data sample come from these two sources.

This lack of diversification in sources and industries increases the likelihood that idiosyncratic issues will affect the results of his meta-analysis. For example, consider the transportation sector. In the early stages of airline deregulation, prior to 1989, the Department of Transportation retained authority over airline mergers.[31] The DOJ's role was merely advisory. All five of the airline mergers in Kwoka's sample occurred prior to this transfer of jurisdiction to the DOJ. In addition, Kwoka's analysis includes two railroad mergers, which to this day fall under the Surface Transportation Board's jurisdiction.

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notwithstanding that the transactions in that study were more recent than many of those in his data sample. Specifically, Kwoka wrote, "[T]he nature of mergers has arguably changed in recent years, so that a study reliant on twenty-year-old experiences may not capture the policy choices that are most relevant in the matters before the FTC today" and that "over the past decade remedies themselves have shifted in their emphasis." *See* John Kwoka, Comment on the Merger Remedies Study Proposed by the Federal Trade Commission (Mar. 2015).

[27] Kwoka's count of cases by industry in his Table 6.3 is incorrect; there are 11 petroleum transactions, 9 (not 10) airline transactions, and 5 (not 4) hospital mergers.

[28] Orley Ashenfelter et al. make this same observation in their survey of the retrospective literature: "Unfortunately, the mergers studied do not constitute a representative sample of all potentially anticompetitive mergers . . . . Most merger studies examine mergers in one of four industries that have experienced a large number of mergers and where data are available: airlines, banking, hospitals, and petroleum." *See* Orley Ashenfelter et al., *Did Robert Bork Understate the Competitive Impact of Mergers? Evidence from Consummated Mergers*, 57 J.L. & Econ. S67, S77 (2014).

[29] *See* John A. Karikari et al., *The Impact of Mergers in U.S. Petroleum Industry on Wholesale Gasoline Prices*, 25 Contemp. Econ. Pol'y 46 (2007) (analyzing BP/Amoco, Exxon/Mobil, MAP/UDS, Marathon/Ashland, Shell/Texaco, Shell/Star, Tosco/Unocal, and UDS/Total). We will have more to say about the Karikari et al. study below.

[30] Mark J. McCabe analyzes Wolters Kluwer/Lippincott, Reed Elsevier/Pergamon, Wolters Kluwer/Thomson, Harcourt/Churchill, Thomson/Shepards, Wolters Kluwer/CCH, Reed Elsevier/West, Thomson/West, Wolters Kluwer/Little, Brown, and Reed Elsevier/Matthew Bender. *See* Mark J. McCabe, *Journal Pricing and Mergers: A Portfolio Approach*, 92 Am. Econ. Rev. 259 (2002); Mark J. McCabe, *Law Serials Pricing and Mergers: A Portfolio Approach*, 3 Contributions to Econ. Analysis & Pol'y 1 (2004) [hereinafter McCabe, *Law Serials Pricing and Mergers*].

[31] When Congress eliminated the Civil Aeronautics Board in 1985, it temporarily transferred merger review authority to the Department of Transportation. The DOT's jurisdiction over mergers terminated effective December 31, 1988, after which time the DOJ assumed sole responsibility for airline merger review.

These seven transactions, representing 14 percent of Kwoka's sample, cannot inform an analysis of the effectiveness of current FTC and DOJ merger policy.

The concentration of Kwoka's sample in a small number of industries renders it remarkably unrepresentative of recent merger activity. The three industry groups discussed above (transportation, energy, and journal publishing) represent 32 of his 49 transactions, i.e., two-thirds of his sample. In contrast, transportation and energy represent only 8.4 percent of FY2015 HSR filings, with journals not even listed separately (presumably they are contained within the "other" category).[32] Similarly, consumer goods and manufacturing represent 43 percent of FY2015 HSR filings, versus 16 percent in the Kwoka sample.

Kwoka's sample includes six mergers that were not reviewed by the agencies until after they had been consummated.[33] Under the 1976 HSR Act, only mergers exceeding certain size thresholds require pre-merger filing with the antitrust agencies. One merger in Kwoka's sample pre-dated HSR, while the remainder fell below the HSR filing threshold and thus were consummated prior to agency review.

Whether a merger was HSR-reportable is a vitally important factor to take into account in any assessment of enforcement effectiveness. The remedies available to the agencies once a transaction has been consummated are very different from those available pre-consummation. Indeed, the HSR Act was enacted precisely because of the extreme difficulty in obtaining effective relief once a transaction has been consummated and the "eggs scrambled."[34] As we discuss in detail below, it is misleading to compare the effects of remedies obtained for HSR-reportable transactions to the effects of those remedies obtained for transactions that were not reported under HSR.

As the discussion above highlights, Kwoka's data sample does not represent the population of agency-reviewed mergers. This limits one's ability to draw general conclusions about the effectiveness of overall merger policy. The remainder of Part II examines more closely the particular elements of the data sample used to support some of Kwoka's most targeted conclusions, focusing on his conclusions about the effectiveness of structural and conduct merger remedies.

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[32] *See* FED. TRADE COMM'N & DEP'T OF JUSTICE, HART-SCOTT-RODINO ANNUAL REPORT FISCAL YEAR 2015 (2016).

[33] These are: Scott Graphics/Xidex; Kalvar/Xidex; Dominican/AMI; New Hanover/Cape Fear; Evanston/Highland Park; Provena St. Therese/Victory.

[34] *See* Kenneth G. Elzinga, *The Antimerger Law: Pyrrhic Victories?* 12 J.L. & ECON. 43, 54 (1969).

B. Structural Divestiture Remedies in Merger Cases

Kwoka concludes that even when the agencies obtained asset divestitures, prices on average nonetheless increased by 7.05 percent. From this, he infers that asset divestitures in general were inadequate to constrain the exercise of market power.[35]

As Kwoka reports in his Table 7.4 (reproduced in Table 1 above), this average price effect is derived from seven transactions. These are:

- Kalvar/ Xidex (1979): This consummated merger was challenged by the FTC in 1981. The FTC order, requiring the licensing of technology[36] and the divestiture of productive assets, became final in July 1983. However, the David Barton and Roger Sherman article on which Kwoka relies analyzes the effects of two Xidex mergers using data spanning the period 1973–1982—a sample period that ends one year *before* the remedy was imposed.[37] Barton and Sherman had no data from the post-remedy period.

  Accordingly, this study cannot—and does not—say anything about the effectiveness of the FTC's relief in those two cases because its analysis is post-merger, but pre-remedy. Accordingly, we conclude that this study provides no evidence on the effectiveness of FTC divestiture remedies, and therefore cannot support Kwoka's conclusion that merger remedies have been ineffective. Note that omitting the Barton and Sherman study substantially reduces Kwoka's estimated average price effect in mergers with divestitures—reducing it from 7.05 percent to 4.43 percent—because the estimated price increase for the Xidex/Kalvar merger was large (22.8 percent).[38]

- Thomson/West (1995): Mark McCabe analyzes the price effects of several journal publishing mergers within a single framework.[39] The DOJ required divestiture of Thompson's legal publication unit to Reed Elsevier in January 1997. The author finds that prices rose significantly, ranging from 11 percent to 40 percent, following the divestiture.[40] We agree this study raises questions about whether this particular remedy was effective.

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[35] Kwoka's Table 7.9 data are reproduced in Table 1, *supra. See* Kwoka, *supra* note 1, at 120.

[36] The non-divestiture portion of this remedy will be discussed further in Part II.C of this article.

[37] *See* David M. Barton & Roger Sherman, *The Price and Profit Effects of Horizontal Merger: A Case Study*, 33 J. Indus. Econ. 165 (1984).

[38] *Id.* at 170.

[39] McCabe, *Law Serials Pricing and Mergers*, *supra* note 30.

[40] *Id.* at 16.

- Guinness/Grand Met (1997): This merger combined two producers of distilled spirits. The FTC required the divestiture of Bombay and Bombay Sapphire gin, and Dewar's scotch, to Bacardi. Orley Ashenfelter and Daniel Hosken estimate the price effects of the transaction for scotch, gin, and vodka, finding positive price effects in scotch, but ambiguous results for gin and vodka—some empirical specifications yield a positive merger price effect, others a negative effect.[41] In the case of gin and vodka, this ambiguity arises from the choice of a control group; positive price effects are obtained when a control group of private label producers is used, while negative price effects are obtained with a branded producer control group.[42] For the merger viewed in its entirety, Ashenfelter and Hosken find a net positive price effect of 2.7 percent when private label control groups are used, but a negative 1 percent price effect when branded control groups are used.[43] In short, Ashenfelter and Hosken's study provides mixed evidence on the effectiveness of the FTC's remedy, in contrast to Kwoka's definitive conclusions. Depending upon how one averages together the numerous heterogeneous price effects reported in this study—a topic we shall further address below—the degree to which it supports Kwoka's conclusion about the ineffectiveness of divestiture relief is unknown.

- BP/Amoco (1998) and Exxon/Mobil (2000): Kwoka relies on John Karikari et al.[44] for the price effects of these two mergers, both of which required divestitures of various petroleum assets. Karikari et al. present the exact coefficient estimates that first were published in the 2004 GAO report, Tables 21–23. Given the importance of petroleum market merger enforcement to the FTC, BE staff expended considerable effort examining this study,[45] ultimately expressing substantial concerns about

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[41] Orley Ashenfelter & Daniel Hosken, *The Effect of Mergers on Consumer Prices: Evidence from Five Mergers on the Enforcement Margin*, 53 J.L. & ECON. 417 (2010).

[42] If the control group consisted of private label producers, the estimated price effect tended to be positive. With branded control groups, the estimated effect tended to be negative. *See id.* at 451. In their Table 3, Ashenfelter and Hosken report overall price effects for this merger by computing revenue-weighted averages of the individual price effects. *See id.* at 441. They report estimated price effects for 28 individual products (a product is a brand/size combination; e.g., Johnny Walker Black 750 ml), using both types of control groups. Of these 56 reported price changes, 25 were negative.

[43] Only the analysis of price effects for scotch and gin would be relevant to assessing the effectiveness of the FTC divestiture remedy (because the FTC did not require a divestiture for vodka). It remains unclear how Kwoka combined gin and scotch into an average post-remedy price effect for the purposes of assessing the FTC's remedy.

[44] Karikari et al., *supra* note 29.

[45] Prior to the study's public release, the FTC provided the GAO with a detailed critique of its methods and conclusions. *See* Letter from Timothy J. Muris, Chairman, Fed. Trade Comm'n, to James E. Wells, Dir., Nat. Res. & Env't, U.S. Gen. Accounting Office (Aug. 25, 2003), www.ftc.gov/sites/default/files/attachments/press-releases/statement-federal-trade-commission-

its empirical methods and the robustness of its results.[46] BE staff re-estimated the mergers' price effects using a "difference-in-differences" specification, obtaining results inconsistent with GAO's original findings.[47] For example, the FTC estimated the price effect of the Exxon/Mobil transaction to be about 0.11¢/gallon for branded gasoline (about one-tenth of GAO's estimate of 1.34¢/gallon); and between -0.34¢ and -0.26¢/gallon for unbranded gasoline (compared to GAO's estimate of 0.77¢/gallon).[48] For BP/Amoco, the FTC's estimates also were smaller

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chairman-timothy-j.muris-gao-study-1990s-oil-mergers-concentration-released-today/040527petrolactionsftcresponse.pdf (discussing shortcomings of the 2003 draft of the GAO analysis); U.S. Gen. Accounting Office, Energy Markets: Effects of Mergers and Market Concentration in the U.S. Petroleum Industry (2004). Post-release, in 2005, the FTC held a public conference on Oil Industry Merger Effects, in which independent experts (Dennis Carlton, Jerry Hausman, Hal White, Ken Hendricks, and Scott Thompson) were invited to discuss the merits of the GAO study and an FTC study. *See* Fed. Trade Comm'n, Preliminary Conference Agenda, Estimating the Price Effects of Mergers and Concentration in the Petroleum Industry: An Evaluation of Recent Learning (Jan. 14, 2005); *see also* Press Release, Fed. Trade Comm'n, FTC to Host Conference on Oil Industry Merger Effects (Jan. 12, 2005). Additionally, the FTC's BE staff prepared a detailed technical report on the GAO study. Fed. Trade Comm'n, Robustness of the Results in GAO's 2004 Report Concerning Price Effects of Mergers and Concentration Changes in the Petroleum Industry (2004) [hereinafter FTC, Robustness of GAO's 2004 Report].

[46] Among a number of statistical/methodological problems, the initial GAO study (GAO I, ultimately published as Karikari et al.) did not estimate the mergers' price effects using the "difference-in-differences" empirical method. *See* Karikari et al., *supra* note 29. As Kwoka emphasizes, use of this method is essential if one is to measure correctly the competitive effect of a merger because it allows one to compare price changes in the market affected by the merger to a suitable "control" group. *See* Kwoka, *supra* note 1, at 84; *see also id.* at 59 (describing this method). This methodological deficiency notwithstanding, Kwoka included this study in his database.

[47] When the FTC staff re-estimated the GAO equation using a difference-in-difference specification, GAO's findings of positive merger price effects were substantially attenuated, and in some cases reversed (i.e., negative price effects were found). The BE Staff Technical Report found that the GAO I results were not robust to a number of perturbations to GAO's specification. In response to another Congressional request (and after receiving the FTC staff's critique of their first study), the GAO conducted a second set of merger studies in 2009 (GAO II) which was published as Michael Kendix & W.D. Walls, *Oil Industry Consolidation and Refined Product Prices: Evidence from U.S. Wholesale Gasoline Terminals*, 38 Energy Pol'y 3498 (2010). In contrast to GAO I, GAO II used a correct difference-in-difference specification (i.e., it addressed the concerns articulated by the FTC about the methodology of GAO I). GAO II studied 7 oil mergers and found 4 instances where there were not significant price effects; mixed results in the other 3 (e.g., price increases in some specifications but not in others); and some significant price decreases. Overall, GAO II found far fewer adverse competitive outcomes than did GAO I. GAO II was carried out as part of a formal audit of the FTC's antitrust enforcement in oil markets. The audit concluded that the FTC should continue to conduct oil merger retrospective analyses to help guide its enforcement actions. Since then, BE has conducted several additional oil merger retrospectives and has found little evidence of anticompetitive effects. *See* Daniel Hosken et al., *Does Concentration Matter? Measurement of Petroleum Merger Price Effects*, 101 Am. Econ. Rev. (Papers & Proc.) 45 (2011); Louis Silvia & Christopher T. Taylor, *Petroleum Mergers and Competition in the Northeast United States*, 20 Int'l J. Econ. Bus. 97 (2013); Nicholas Kreisle, *Merger Policy at the Margin: Western Refining's Acquisition of Giant Industries*, 47 Rev. Indus. Org. 71 (2015).

[48] *See* Robustness of GAO's 2004 Report, *supra* note 45, at 38.

than GAO's by approximately 15–40 percent. Kwoka did not include these very different findings in his meta-analysis.[49] Had they been included, the average price increases reported in his Table 7.9 (Table 1, above) would have been reduced, weakening the basis for his critique of federal merger enforcement policies.

- Fleet/BankBoston (1999): Charles Calomiris & Thanavut Pornrojnangkool[50] analyze this merger in a working paper, one of two unpublished studies in Kwoka's sample.[51] In September 1999, the DOJ and the Federal Reserve cleared the merger subject to divestiture of 306 branches. The authors estimate the effects of this merger on the cost of loans to borrowers of different sizes, both inside and outside of New England. For large and small borrowers, they find negative price effects from the merger; for medium-sized borrowers, they find that the merger increased the price of loans. As with Ashenfelter and Hosken,[52] these mixed results do not support a clear conclusion that this was an ineffective remedy.

- Johnson & Johnson/Pfizer (2006): Steven Tenn and John Yun[53] analyze the divestiture remedy used to resolve the FTC's competitive concerns from this merger. Kwoka acknowledges that the J&J/Pfizer remedy was effective: "[Tenn & Yun] conclude that the postdivestiture performance of the divested brands was similar to their predivestiture performance and the divestitures served to maintain the pretransaction level of competition."[54]

In summary, of the seven studied transactions underlying Kwoka's conclusion that FTC/DOJ divestiture remedies have been ineffective, one study (Xidex/Kalvar) does not measure the effect of the remedy; four studies (Exxon/Mobil, BP/Amoco, Guinness/Grand Met and Fleet/BankBoston) obtained mixed results; one study determined the remedy (J&J/Pfizer) to be an une-

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[49] T.D. STANLEY & HRISTOS DOUCOULIAGOS, META-REGRESSION ANALYSIS IN ECONOMICS AND BUSINESS 17–19 (2012), discuss at length whether meta-analyses should include only published articles, or instead should include all relevant research. Their conclusion is unequivocal: "Our advice, in all cases, is to err on the side of inclusion." *Id.* at 19.

[50] *See* Charles W. Calomiris & Thanavut Pornrojnangkool, *Monopoly-Creating Bank Consolidation? The Merger of Fleet and BankBoston* (Nat'l Bureau of Econ. Research, Working Paper No. 11351, May 2005).

[51] The other study is by Laurence Schumann et al. LAURENCE SCHUMANN, ROBERT P. ROGERS & JAMES D. REITZES, FED. TRADE COMM'N, CASE STUDIES OF THE PRICE EFFECTS OF HORIZONTAL MERGERS (1992).

[52] Ashenfelter & Hosken, *supra* note 41.

[53] Steven Tenn & John M. Yun, *The Success of Divestitures in Merger Enforcement: Evidence from the J&J-Pfizer Transaction*, 29 INT'L J. INDUS. ORG. 273 (2011).

[54] KWOKA, *supra* note 1, at 216.

quivocal success; and only one study (Thomson/West) appears to present clear evidence of a failure to constrain market power.

We are unpersuaded that these academic studies adequately support Kwoka's conclusion that the U.S. antitrust agencies' merger remedies have been inadequate in preventing the advancement of market power or "that many challenged mergers are subject to remedies that fail to prevent post-merger price increases."[55]

C. Non-Divestiture Remedies in Merger Cases

Kwoka also criticizes the use of conduct remedies by the federal antitrust agencies in merger investigations.[56] The term "conduct remedy" refers to a transaction that the agencies allow to proceed, subject to restrictions on the merged entity's post-merger conduct. In contrast to a structural remedy, a pure conduct remedy does not require physical separation or divestiture of assets.

As reported above in Table 1, Kwoka, in Table 7.4, lists four mergers in his sample cleared with a conduct remedy or other conditions, and according to Kwoka's Table 7.9, these transactions exhibit an average price increase of 16.03 percent. Kwoka concludes that "while [neither divestitures nor conduct remedies] seems to have been especially effective in restraining postmerger price increases, conduct remedies were by far the weaker of the two."[57]

Before proceeding with an analysis of the cases that underlie this conclusion (pausing to note that four is a small sample size on which to base Kwoka's broad policy conclusions), it is important to clarify the role conduct remedies play in federal merger enforcement. Readers unfamiliar with federal antitrust policy as normally practiced by the DOJ and the FTC might infer from Kwoka's discussion that the agencies frequently attempt to remedy horizontal mergers with conduct remedies, and that the frequency of such remedies may have increased over time.

Such an inference would be mistaken. As both the DOJ and the FTC emphasize, structural (i.e., divestiture) remedies are strongly preferred in horizontal merger enforcement. The FTC makes this clear in its 2012 formal statement of advice to merging entities:

> Most merger cases involve horizontal mergers, and the Commission prefers structural relief in the form of a divestiture to remedy the anticompetitive

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[55] *Id.* at 159.

[56] "Conduct remedies are more difficult to design and implement than divestitures, thus leading to their demonstrated ineffectiveness. They have nonetheless become more frequently used by the U.S. antitrust agencies." *Id.* at 156.

[57] *Id.* at 120.

effects of an unlawful horizontal merger. Non-structural, or conduct, relief
may also be required in aid of a required divestiture to remedy those
effects.[58]

Conduct remedies are not a standard remedy for ordinary horizontal merger
cases. As the recently released FTC Merger Remedy Study shows, during the
period 2006–2012, 89 percent (76 of 85) of the horizontal mergers studied
were remedied with structural relief.[59] Rather, as noted above, conduct reme-
dies serve as a complement to divestiture remedies to ensure the success of
the latter.[60] Occasionally, conduct remedies are employed in vertical merger
cases,[61] which are not part of Kwoka's study. Conduct remedies also are used
in other exceptional cases, such as consummated mergers. But they rarely are
employed as the principal remedy in traditional horizontal merger investiga-
tions, especially HSR-reportable transactions where the FTC and the DOJ can
initiate enforcement actions prior to consummation. Kwoka's discussion sug-
gests erroneously that the agencies routinely (and increasingly) employ con-
duct remedies as a principal mechanism to mitigate market power in
horizontal merger enforcement.[62]

With this perspective, let us review the four transactions Kwoka identifies
as conduct remedies underlying his reported average price increase of 16.03
percent:

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[58] *See* Bureau of Competition, Fed. Trade Comm'n, Negotiating Merger Remedies
(2012). Similarly, the DOJ has stated*:* "In the case of horizontal mergers, enhanced market
power is the result of combining similar sets of assets that otherwise would be used to compete.
Consequently, if a competitive problem exists with a horizontal merger, the typical remedy is to
prevent common control over some or all of the assets, thereby effectively preserving competi-
tion. Thus, the Division will pursue a divestiture remedy in the vast majority of cases involving
horizontal mergers." *See* Antitrust Div., U.S. Dep't of Justice, Antitrust Division Policy
Guide to Merger Remedies 5 (2011). This policy position has been recently reaffirmed. Makan
Delrahim, Assistant Att'y Gen., U.S. Dep't of Justice, Remarks at the Antitrust Division's Sec-
ond Roundtable on Competition and Deregulation (Apr. 26, 2018), www.justice.gov/opa/speech/
assistant-attorney-general-makan-delrahim-delivers-remarks-antitrust-divisions-second.

[59] *See* FTC's Merger Remedies 2006–2012, *supra* note 5, at 7.

[60] *See* Deborah L. Feinstein, Director, Bureau of Competition, Fed. Trade Comm'n, Address
at GCR Live, The Significance of Consent Orders in the Federal Trade Commission's Competi-
tion Enforcement Efforts (Sept. 17, 2013).

[61] *See*, *e.g.*, Analysis of Agreement Containing Consent Order to Aid Public Comment, In the
Matter of The Coca-Cola Company, 75 Fed. Reg. 61141 (Oct. 4, 2010).

[62] Kwoka states that the agencies have increasingly employed conduct remedies. *See* Kwoka,
supra note 1, at 134. The three cases he cites in support—*Ticketmaster/LiveNation*; *Comcast/
NBCU*; and *Google/ITA*—involved the creation of market power primarily from vertical, rather
than horizontal, consolidation. *See* Competitive Impact Statement, United States v. Ticketmaster
Entm't, Inc., No. 1:10-cv-00139, 2010 WL 5699134 (D.D.C. Jan. 25, 2010), www.justice.gov/
atr/case-document/competitive-impact-statement-209; Competitive Impact Statement, United
States v. Comcast Corp., 808 F. Supp. 2d 145 (D.D.C. Jan. 18, 2011), www.justice.gov/atr/case-
document/competitive-impact-statement-72; Competitive Impact Statement, United States v.
Google Inc., No. 1:11-cv-00688 (D.D.C. Apr. 18, 2011), www.justice.gov/atr/case-document/
competitive-impact-statement-115.

- Scott Graphics/Xidex (1976): This was one of the two consummated mergers studied by Barton and Sherman.[63] Earlier we discussed the Kalvar/Xidex case, noting that Barton and Sherman studied pricing behavior post-merger, but pre-remedy. The identical observation applies for Scott Graphics/Xidex, as Barton and Sherman's data spans 1973 to 1982. However, the order requiring licensing of Scott Graphics' technology did not become final and effective until 1983.[64] This study provides no information regarding the effectiveness of the FTC's remedy because the remedy was outside the data window. This remedy may well have been highly effective, completely ineffective, or something in between.

- Dominican/AMI (1990): Kwoka also includes the Dominican/AMI hospital merger in his sample, studied by Michael Vita and Seth Sacher.[65] This also was a non-HSR reportable transaction, consummated in 1990 prior to the FTC's investigation. After consummation, the acquired hospital had been converted to a skilled nursing facility. Accordingly, restoring the pre-merger state of competition was never an option, as the FTC explained at the time.[66] For this reason, the Dominican/AMI merger provides an invalid basis for assessing agency policy for HSR-reviewable transactions.

- General Mills/Ralcorp (1997): In this HSR transaction, Ralcorp sold its branded Chex cereals to General Mills. The FTC's remedy permitted Ralcorp to produce private label versions of these cereals. We agree that this transaction constitutes a valid test of the effectiveness of a straightforward conduct remedy in an HSR merger case, and it is clear from the results in Ashenfelter and Hosken[67] that this remedy was not effective.

- Evanston/Highland Park (2000): This merger was not reported under HSR, and was consummated in 2000 without agency review. The FTC

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[63] Barton & Sherman, *supra* note 37.

[64] The FTC required the royalty-free licensing of Scott Graphics' diazo microfilm technology. *See id.* at 176.

[65] Vita & Sacher, *supra* note 7.

[66] *See* Dominican Santa Cruz Hosp., 118 F.T.C. 382, 390–92 (1994) (statement of Chairman Steiger). "[T]he acquisition was not reportable under the Hart-Scott-Rodino Act, and was consummated before Commission staff was able to open an investigation to explore the competitive effects of the acquisition[.] [C]onsequently, the Commission never had the opportunity to consider seeking a preliminary injunction under Section 13(b) of the FTC Act to prevent the acquisition from being consummated. Under these circumstances, the Commission is left with less effective or more costly remedial options." *Id.* at 390–91. Because a possibility existed that timely competitive entry into the relevant market might occur, and because forcing a divestiture faced a high risk of asset failure, the FTC chose to impose a "prior approval" remedy on Dominican—that is, Dominican was barred (for 10 years) from acquiring any other hospitals in Santa Cruz County without first obtaining the approval of the FTC.

[67] Ashenfelter & Hosken, *supra* note 41.

challenged the transaction in 2004, ultimately prevailing at trial in 2007. Because the integration of the two facilities occurred many years earlier, the FTC concluded that divesting the acquired hospital would be too costly and risky, and instead opted for a conduct remedy. Kwoka relies on Deborah Haas-Wilson and Christopher Garmon's analysis of the Evanston/Highland Park transaction.[68] The data period for this study was 1998 to 2002. As with the two Xidex mergers discussed previously, the empirical analysis was post-merger, but pre-remedy. Thus, Haas-Wilson and Garmon provide no evidence on the effectiveness of the FTC's remedy, and thus provides no support for Kwoka's conclusion that conduct remedies have been ineffective.

With only four conduct remedy transactions in his sub-sample, eliminating Evanston/Highland Park from Kwoka's sample would reduce substantially the overall average price increase (16.03 percent) reported in Table 7.9. Haas-Wilson and Garmon reported large estimated average price effects from this transaction (20–35 percent, depending on the choice of regression specification and control group).[69]

In conclusion, of the four conduct remedies studied, only one (General Mills/Ralcorp) provides any information about the effectiveness of the remedy in restoring the pre-merger state of competition in an HSR setting. The other three studies involved consummated mergers, and, in two of those cases, the studies provided no information about post-remedy competition and thus cannot support Kwoka's conclusion that conduct remedies are ineffective. In the one study that did examine post-remedy competition (Dominican/AMI), the FTC did not expect, and did not claim, that the remedy would restore the pre-merger level of competition. We conclude that Kwoka provides virtually no support for his conclusion about the ineffectiveness of conduct remedies.

It is unsurprising that Kwoka's sample contains only one transaction where either the FTC or DOJ attempted to remedy an HSR-reportable, purely horizontal transaction with a conduct remedy. As noted above, the federal agencies prefer structural relief in horizontal mergers. Conduct remedies normally supplement structural remedies, resolve vertical competitive concerns, and address other special circumstances. The fact that the only relevant transaction in Kwoka's sample occurred in 1997, nearly 20 years ago, reinforces that conduct relief is the exception rather than the norm in U.S. merger policy.

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[68] Deborah Haas-Wilson & Christopher Garmon, *Hospital Mergers and Competitive Effects: Two Retrospective Analyses*, 18 INT'L J. ECON. BUS. 17 (2011).

[69] *See id.* at 27 tbl.2.

III. KWOKA'S ESTIMATED PRICE EFFECTS: METHODOLOGICAL ISSUES

The empirical core of Kwoka's book is a meta-analysis of the estimated merger-induced price effects presented in the studies that he surveys. However, his analysis does not employ standard empirical methods because (a) he computes simple rather than weighted averages; and (b) he does not use the standard methods of statistical inference.

The goal of meta-analysis is to synthesize optimally and rigorously the findings of a series of empirical studies. A standard text on the use of meta-analysis in economic research describes the basic approach:

> A simple (unweighted) average is often reported to summarize the findings from a literature. However, the weighted average effect size, say an elasticity (η_w),
>
> $\eta_w = \Sigma(w_i \eta_i)/\Sigma w_i$,
>
> is statistically the preferred choice, where the w_i are the weights used, and η_i is the measure of the estimated elasticity. The optimal weights have been shown to be inverse of the estimates' variances.[70]

To see how standard meta-analytic methods might have been applied to a set of retrospective merger analyses, consider first a single retrospective study of a single merger in which competition in only one antitrust market might have been affected. As explained by Kwoka, in a "difference-in-differences" analysis the researcher would estimate the following equation using pre- and post-merger price data on both the merged firms and "control" firms:[71]

$$P = \alpha + \beta \text{MERGE} + \gamma \text{POST} + \delta \text{MERGE*POST} + \varepsilon,$$

where P is the firm's price; MERGE = 1 if the observation is for the merged entity, 0 if it is for a control firm; POST = 1 if the observation is from the post-merger period, 0 otherwise; and ε is a random error term.

In this analysis, the parameter "δ" is the estimated price effect of the merger. Because this parameter is estimated from a sample of data, there will be an associated estimated standard error that reflects the precision of the estimate. If, for example, the price data exhibit substantial variation unrelated to the timing of the merger, then this standard error will tend to be large, making it difficult for the analyst to be confident that the estimated value of δ is capturing systematic differences in pre- and post-merger pricing behavior. Using the estimated value of δ and its standard error, the researcher normally

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[70] Stanley & Doucouliagos, *supra* note 49, at 46. *See also* Mark W. Lipsey & David B. Wilson, Practical Meta-Analysis 113 (2001) ("The mean effect size is computed by weighting each effect size by the inverse of its variance.").

[71] *See* Kwoka, *supra* note 1, at 59.

will test the hypothesis that prices remained the same after the merger, versus the hypothesis that prices changed.[72]

Now consider a set of merger retrospective studies. Each study will produce its own estimated δ, the estimated price effect of the merger that is the subject of the analysis. Each study also will produce an estimate of the standard error of δ, which is a measure of the precision of the estimate.

A very basic meta-analysis of these studies would compute an average of these estimated δ's (call this average "Δ", since it is the average of the individual δ's), yielding an overall estimated average price effect. The starting point in a basic meta-analysis would compute a *weighted* average of these δ's, where each estimated δ would receive a weight reflecting its corresponding variance (equal to the square of the standard error).[73] The logic for this weighting procedure is straightforward (and reflects standard econometric practice): estimates of δ that are imprecisely estimated (i.e., that have large standard errors and large variances) receive low weights, while estimates of δ that are precisely estimated (i.e., small standard errors and small variances) receive larger weights.[74] As Stanley and Doucouliagos note, this weighted average is the preferred estimate of the overall effect: "A simple unweighted average will in most cases give a misleading measure of the effect size."[75] The meta-analysis also would calculate a standard error for Δ, which would be a function of the estimated standard errors of the δ's.

Once these computations have been completed, the analyst usually would then conduct formal hypothesis tests. Here, one would test the null hypothesis that $\Delta = 0$. This is analogous to the test that is performed in each of the individual underlying studies, where the chief objective of each study is to test the null hypothesis that $\delta = 0$; that is, the null hypothesis is that the merger did not cause a change in post-merger pricing. A large positive or negative value for δ would count as evidence against this null hypothesis.

Kwoka does not use any of these standard meta-analytic techniques. He does not weight his observations by their estimated standard errors when he computes the price effects reported earlier in Table 1.[76] The absence of

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[72] That is, the researcher will test the hypothesis that $\delta = 0$, against the alternative that $\delta \neq 0$ using a t-test, where the test statistic equals $\delta/$(standard error of δ).

[73] *See* STANLEY & DOUCOUGLIAGOS, *supra* note 49, at 46.

[74] This is the same estimation criterion employed by generalized least squares in the case of pure heteroscedasticity. *See, e.g.*, ARTHUR S. GOLDBERGER, A COURSE IN ECONOMETRICS 300–01 (1991).

[75] *See* STANLEY & DOUCOUGLIAGOS, *supra* note 49, at 47.

[76] Kwoka does not appear to discuss explicitly how he weights his observations when computing these mean price effects. *See* KWOKA, *supra* note 1. However, in his earlier meta-analysis of merger effects, Kwoka states that the method used in that article "gives each study of a particular transaction equal weight." *See* John E. Kwoka, Jr., *Does Merger Control Work? A Retrospective*

weighting by standard error means that imprecise estimates of price effects receive the same weight as sharply estimated effects, which is a substantial departure from standard meta-analytic (and econometric) methodology.

More importantly, Kwoka does not provide *any* estimated standard errors for his estimated average price effects. This makes hypothesis testing—the primary objective of all the underlying empirical studies in his sample—impossible. One would like to see tests of the null hypothesis that the price effects reported above in Table 1 are equal to zero, or that they are equal to one another. The absence of standard errors makes this impossible.

To illustrate the potential importance of computing a weighted versus an unweighted average, consider the following example. Suppose one wished to conduct a meta-analysis of three merger retrospectives with the following estimated price changes (the δ's from the equation above) and corresponding standard errors (in parentheses): −5% (2.5%); 10% (5.5%); and 20% (16%). A simple unweighted average of the three studies would yield an overall average price effect of 8.3 percent. By contrast, an "inverse variance" weighted average—whereby parameter estimates with small variances (i.e., greater precision) receive greater weight—is *negative* 1.99 percent rather than *positive* 8.3 percent.[77] The standard error of this overall average can then be easily calculated, allowing the researcher to conduct hypothesis tests and to construct confidence intervals.[78] In this example, the standard error of the unweighted mean in 5.69, while the standard error of the weighted mean is considerably smaller (2.32), reflecting the fact that the latter has made efficient use of the information in the sample to estimate more precisely the mean effect.[79]

The procedure described in this example assumes implicitly that the only relevant variance is the "within-study" variance, as measured by the standard error on each δ. That is, the procedure assumes that the true value of δ in each study is the same, with the estimated values differing only because of sam-

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on U.S. Enforcement Actions and Merger Outcomes, 78 Antitrust L.J. 619, 630 (2013). We assume that the same method was used in the book. *See* Kwoka, *supra* note 1.

[77] The formula for the simple "inverse variance" average estimate is $\Sigma\ (w(i)\beta(i)/\Sigma w(i)$, where the weights $(w(i))$ are the estimated variances of the estimated price changes $(\beta(i))$ from the individual studies $[= 1/[S.E.(\beta(i)]^2]$. In this example, this average is computed as $\{(1/2.5)^2 * -5)] + [(1/5.5)^2 * 10)] + [(1/16)^2 * 20)]\}/\{\ [(1/2.5)^2 + [(1/5.5)^2 + (1/16)^2]\}$. *See* Lipsey & Wilson, *supra* note 70, at 114; Stanley & Doucougliagos, *supra* note 49, at 46.

[78] The variance of this mean equals $1/\{[(1/2.5)^2 + [(1/5.5)^2 + (1/16)^2]\} = 5.38$. The standard error is the square root of this variance and equals 2.32.

[79] Many standard software packages (e.g., Stata) include commands specifically for this purpose. *See, e.g.*, Ross J. Harris et al., *Metan: Fixed- and Random-Effects Meta-Analysis*, 8 Stata J. 3 (2008).

pling error.[80] Typically, however, there also will be variance in the true values of δ *across* the studies in the meta-analysis. That is surely true here, given that the studies reviewed by Kwoka cover many different industries in many different time periods. There is no expectation that all would experience similar merger-induced price changes.

It is straightforward to incorporate this additional source of variance into the meta-analysis.[81] Essentially, the weight assigned to each study is adjusted to take account of not just the within-sample variation (as reflected in the reported standard errors for the δ's), but also the between-study variation in the δ's. Compared to the example given above, where the weight applied to each study was 1/variance(δ), the new weight would equal 1/[variance(δ) + T²], where T² is a measure of the across-study variance in the δ's.[82] The estimated variance of the overall mean effect (i.e., Δ) also will be adjusted to take account of this additional source of variance.

As noted, Kwoka does not report *any* standard errors for his estimated price effects, which makes it impossible to test hypotheses about these effects.[83] However, he does provide evidence that there is substantial variation both across different studies, as well as within individual studies. Had this variation been taken properly into account, it is plausible (if not likely) that the resulting average price effects would differ from those reported in Table 1. It also is plausible, if not likely, that the estimated standard errors for these averages would be substantial, with obvious implications for hypothesis tests about the value of Δ.

For price effects estimated at the *transaction* level, Kwoka reports price changes ranging from -16.3 percent to 29.4 percent.[84] For price effects estimated at the *product* level, the estimates range from -16.3 percent to 52.4 percent.[85] Thirteen of the 49 transactions (more than one quarter of his data sample) exhibit a price decrease.[86]

At the *product* level, 46 of the 119 products (about 38.7 percent) in his database exhibit post-merger price *decreases*.[87] The *mean* product-level price

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[80] In the terminology of meta-analysis, this assumption is known as the "fixed effects" model. *See* LIPSEY & WILSON, *supra* note 70, at 116; STANLEY & DOUCOUGLIAGOS, *supra* note 49, at 46.

[81] In the terminology of meta-analysis, this assumption is known as the "random effects" model. *See* STANLEY & DOUCOUGLIAGOS, *supra* note 49, at 46.

[82] *See id.*

[83] KWOKA, *supra* note 1.

[84] *Id.* at 110 tbl.7.1.

[85] *Id.* at 94 tbl.6.4.

[86] *Id.* at 110 tbl.7.1.

[87] *Id.* at 94 tbl.6.4.

effect is 4.31 percent, compared to a *median* of only 0.8 percent,[88] suggesting a distribution with a small number of large price increases.[89] Indeed, Kwoka states that 31 percent of the product-level price changes are clustered in the +/- 1 percent range.[90]

In other words, Kwoka's sample of 49 transactions exhibits a considerable range of positive and negative price effects, with many near zero. Nonetheless, Table 1 above shows that Kwoka calculates substantial average (unweighted) price *increases* for all six categories of agency actions.[91] This invites the conjecture that his unweighted averages depend critically on a small number of studies reporting substantial price increases, and that the calculated values of these averages would not be robust to the application of alternative (but standard) weighting choices. One also questions whether one would reject the null hypothesis that $\Delta = 0$, had Δ and its standard error been estimated using standard meta-analytic procedures.

IV. HAVE THE FEDERAL AGENCIES BECOME "MORE LENIENT" OVER TIME?

Kwoka criticizes the antitrust agencies not only because of (in his view) ineffective merger enforcement, but also because he believes the agencies have become increasingly lenient over time. Does his evidence support his conclusion?

Kwoka's characterization of increased enforcement leniency relies principally on a tabulation of enforcement actions by decade, for all transactions, and for mergers separately. Using only the data for "all transactions," he then calculates the proportion of actions cleared, performing a large sample "equality of proportions" test to assess whether the 1980s and 2000s percentages differ. Table 2 presents the results of his tabulations for both a "narrow" definition of "cleared" (only when the agencies explicitly clear a transaction) versus an "expanded" definition (which includes cases with no explicit approval statement from the agencies).[92] Using the first column of Table 2, Kwoka compares the proportion of cases cleared in the 1980s (0 of 5 = zero) to the

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[88] *Id.* at 95.

[89] Lipsey and Wilson warn of the risk that outliers could distort the outcome of a meta-analysis: "The purpose of a meta-analysis is to arrive a reasonable summary of the quantitative findings of a body of research studies. This purpose is not usually served well by the inclusion of extreme effect size values that are notably discrepant from the preponderance of those found in the research of interest and, hence, unrepresentative of the results of that research and possibly even spurious. In addition, extreme effect size values have disproportionate influence on the values of means, variances, and other statistics used in meta-analysis and may distort them in misleading ways." Lipsey & Wilson, *supra* note 70, at 107.

[90] *See* Kwoka, *supra* note 1, at 95.

[91] *Id.* at 120 tbl.7.9.

[92] These data are taken from Kwoka's Tables 7.5 and 7.6. *See id.* at 116–17.

proportion cleared in the 2000s (3 of 7 = 0.43). A large sample test of the hypothesis that the two proportions are equal yields a p-value of 0.09.[93] Based on this, Kwoka concludes the data show a "more accommodating policy . . . that reflects a bona fide policy change."[94]

TABLE 2:
KWOKA SUMMARY OF AGENCY DECISIONS TO
"CLEAR" TRANSACTIONS, BY DECADE[95]

	Narrow definition of "cleared"		Expanded definition of "cleared"	
	All Transactions	**Mergers only**	**All Transactions**	**Mergers only**
1980s	0/5	0/5	5/10	5/10
2000s	3/7	3/6	4/8	4/7
Asymptotic test of equal proportions p-values	p = 0.09	p = .06	p = 1.0	p = .0.78
Fisher's Exact Test of equal proportions p-values	p = 0.21	p = 0.18	p = 1.00	p = 1.00

Table cell entries in rows 1 and 2 are the number of cases "cleared" divided by the total number of cases. Under the narrow definition of "cleared," cases are included only if the agency publicly announced that it was closing the investigation of the transaction without an enforcement action. For the expanded definition, any case lacking an enforcement action is considered cleared, even if there was no public announcement from the agency.

We note first that the "equality of proportions" statistical test used by Kwoka assumes an (asymptotically) normal distribution. While asymptotic assumptions of normality are valid in large samples, this assumption is likely invalid for small samples (such as the sample we have here). A superior alternative for small samples is "Fisher's Exact Test," which does not rely on asymptotic approximations to the normal distribution.[96] As shown in the bot-

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[93] Kwoka reports a significance level of 0.055. *See id.* at 117. However, he appears to have made an error in his calculation; the actual p-value is approximately 0.09.

[94] *Id.*

[95] These figures are from Kwoka's Tables 7.5 and 7.6. *See id.* at 116–17.

[96] In large samples (e.g., where the number of observations is at least 30), one can use the normal probability distribution to test hypotheses about the equality of proportions in different populations. But when sample sizes are small, as they are here, the preferred statistical test of the null hypothesis of equal proportions would use Fisher's Exact Test, which does not rely on asymptotic approximations to the normal distribution. *See* JOHN H. MCDONALD, HANDBOOK OF BIOLOGICAL STATISTICS 77 (3d ed. 2014).

tom row of Table 2 Fisher's Exact Test yields a p-value of 0.21 using Kwoka's "narrow" sample, which fails to reject (at conventional levels of significance) the null hypothesis of no differences between the 1980s and 2000s. One reaches the same conclusion when one conducts a test of this null hypothesis using the data in column 2 of Table 2, which computes these proportions using data for mergers only; the relevant p-value is 0.18, which leads to acceptance of the null hypothesis at conventional levels of significance.

This technical point about large sample versus small sample tests aside, a more important criticism is that Kwoka only performed his test on the data from the first column of Table 2; i.e., all transactions using a narrow definition of cleared. However, Kwoka presents an additional set of figures using a more broad (and we would argue, more appropriate) definition of cleared,[97] reported in the last two columns of Table 2. When one compares the proportion of cleared cases in the 1980s to the proportion for the 2000s (using Fisher's Exact Test), one accepts the null hypothesis that the proportions were equal in the two decades. Using Kwoka's alternate definition of cleared, his conclusion that the two decades differ lacks statistical support.

Other sections of Kwoka's book also undermine his conclusion that enforcement has become more lenient. Specifically, Kwoka Table 2.10[98] summarizes FTC data from Coate[99] reporting the percentage of FTC HSR merger investigations resulting in enforcement actions.[100] Figure 1 graphs these data, showing the percentage of merger investigations resulting in enforcement actions is higher in every year during the 2000s relative to 1989, the only year from the 1980s for which Coate provides data. More importantly, the percentage of cases with enforcement actions has increased every year since 2004. This does not support the proposition that federal agency policy has become more lenient over time.

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[97] There is no meaningful difference between those cleared transactions that were accompanied by a public statement from the agencies, and those that were not.

[98] *See* Kwoka, *supra* note 1, at 34.

[99] Malcolm B. Coate, Merger Policy at the Federal Trade Commission: What Changes, What Stays the Same? (Sept. 30, 2013) (unpublished manuscript), papers.ssrn.com/sol3/papers.cfm?abstract_id=2262933.

[100] The numerator consists of mergers that either were (1) challenged in court; (2) approved conditional on a negotiated settlement; or (3) abandoned after the FTC announced its intention to challenge in court. The denominator is all merger cases where the FTC issued a "second request." This does not include matters remedied through consent without issuance of a second request.
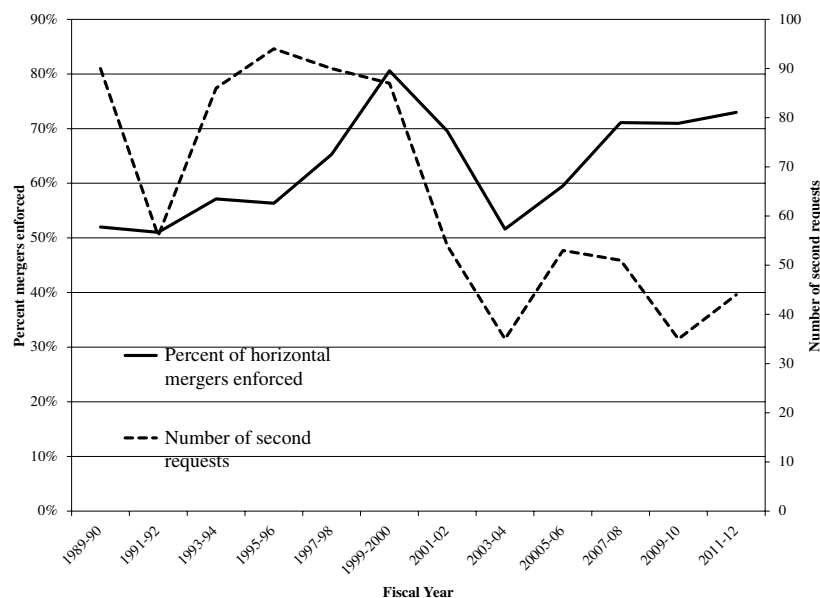
FIGURE 1:
PERCENT OF MERGERS INVESTIGATIONS WITH ENFORCEMENT
ACTIONS, 1989–2012[101]

One can also assess whether "recent merger control has not been suffi-ciently aggressive"[102] by examining the recent cases contained in Kwoka's sample, which consists of the following seven mergers during the 2000s:

- Exxon/Mobil (2000): This merger was approved subject to asset divesti-tures. As described earlier, GAO found a post-merger, post-remedy price increase using a disputed methodology. Applying a more accepted methodology, the FTC found very different results.

- Evanston/Highland Park (2000): As described earlier, the underlying ac-ademic study does not analyze the impact of the remedy in this non-HSR reportable transaction, but rather examines the effect of the merger in the period immediately following the merger but before the remedy. The FTC challenged this consummated merger in court, ultimately suc-ceeding in 2007.

- Victory/Provena St. Therese (2000): This hospital merger also fell be-low HSR thresholds, and thus was investigated by the FTC post-con-

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[101] Coate, *supra* note 99, at 37. Note that in 2001 the Hart-Scott-Rodino thresholds were re-vised upwards (the $15.0 million filing threshold increased to $50.0 million, inflation adjusted), which accounts for the subsequent decline in second requests.

[102] *See* KWOKA, *supra* note 1, at 158.

summation. Ultimately, the FTC did not find sufficient evidence to challenge it. As Kwoka notes, the underlying academic study by Haas-Wilson and Garmon[103] finds that this merger resulted in lower prices.

- Sunoco/El Paso (2004): Sunoco purchased a New Jersey petroleum refinery from El Paso. The FTC concluded that the merger would not create market power because sufficient alternative sources of reformulated gasoline were available. Silvia and Taylor[104] found that this acquisition did not increase prices.

- Valero/Premcor (2004): Valero acquired petroleum refiner Premcor, making Valero the largest refiner of crude oil in the United States with a 13 percent share. Silvia and Taylor[105] found that this merger did not increase prices.

- J&J/Pfizer (2006): As described earlier, this merger was cleared subject to a remedy that Tenn & Yun[106] found to be effective.

- Whirlpool/Maytag (2006): Whirlpool and Maytag were two of the four largest domestic appliance manufacturers. The DOJ approved the merger in 2006. Ashenfelter, Hosken, and Weinberg[107] find differing levels of price effects across types of appliances, with the largest increases in dishwashers and clothes dryers.

In summary, of the seven mergers in the 2000s that Kwoka analyzes, four exhibited no increase in post-merger (or post-remedy) prices (Victory/Provena; Sunoco/El Paso; Valero/Premcor; J&J/Pfizer); one had disputed results (Exxon/Mobil); one represented a successful challenge to a consummated merger (Evanston/Highland Park); leaving only one (Whirlpool/Maytag) indicative of potentially lax enforcement.

This evidence does not support a conclusion that recent merger enforcement policy has been insufficiently aggressive. If anything, it highlights a flaw in Kwoka's analysis: he examines only the number of agency actions by decade without consideration of the mergers' effects. As shown above, all but one cleared merger in the 2000s exhibited neutral or ambiguous price effects. Simply comparing the prevalence of enforcement actions by decade implicitly assumes a comparable risk of potential competitive harm over time. As noted

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[103] Haas-Wilson & Garmon, *supra* note 68.

[104] Silvia & Taylor, *supra* note 47.

[105] *Id.*

[106] Tenn & Yun, *supra* note 53.

[107] Orley C. Ashenfelter, Daniel Hosken & Matthew C. Weinberg, *The Price Effects of a Large Merger of Manufacturers: A Case Study of Maytag-Whirlpool*, Am. Econ. J.: Econ. Pol'y, Feb. 2013, at 239.

earlier,[108] Kwoka has stated elsewhere that the nature of mergers has changed, rendering transactions as recent as the 1990s a poor basis for assessing current policy. It remains unclear why he deems appropriate a comparison of 1980s and 2000s.

V. CONCLUSION

Kwoka's 2015 book provides a useful overview of merger policy, as well as a valuable review of the academic literature on merger retrospectives. One should not underestimate the effort required to canvas 30 years of academic publications.

We support the goal of using retrospective analyses to assess the performance of the antitrust agencies and to identify possible improvements. Unfortunately, Kwoka has drawn inferences and reached conclusions about contemporary federal merger enforcement policy that are unjustified by his data and his methods. His critique of negotiated remedies in merger cases relies on a small number of transactions; a close reading reveals that a number of them are silent on the effectiveness of the associated remedies. His data sample lacks diversity, relying heavily on a small number of studies conducted on a small and unrepresentative set of industries. His statistical methodology departs from well-established techniques for conducting meta-analyses, making it impossible for readers to assess the strength of his evidence using standard statistical tools. His conclusions about the growing permissiveness of enforcement policies lack substantiation. Overall, we are unpersuaded that his evidence can support such broad and general policy conclusions.

None of this is to claim that contemporary antitrust enforcement is, in any sense, perfect. Antitrust enforcers invariably will make mistakes, and agencies like the FTC engage in a continuous process of self-assessment and self-improvement. Indeed, many of the studies in Kwoka's sample were conducted by FTC economists, and the FTC recently released its second large-scale assessment of its merger remedies.[109]

We agree with Kwoka that the benefits of additional merger retrospectives would outweigh the costs. His book "provides a compelling argument for the value of merger retrospectives and certainly for doing more of them."[110] Looking ahead, we anticipate that the retrospective merger analysis will continue to figure prominently in the FTC's research agenda, and we hope the same is true of the academic community.

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[108] Kwoka, *Comment on Merger Remedies*, supra note 26.
[109] *See* FTC's MERGER REMEDIES 2006–2012, *supra* note 5.
[110] *See* KWOKA, *supra* note 1, at 160.

APPENDIX

KWOKA TABLE 6.2:
LIST OF SINGLE MERGERS IN PRICE DATABASE

Firm 1	Firm 2, (3)	Transaction type	Transaction year
Scott Graphics	Xidex	Merger	1976
Kalvar	Xidex	Merger	1979
Weyerhaeuser	Menasha	Merger	1980
SCM	Gulf & Western	Merger	1983
Lone Star Industries	Kaiser Cement	Merger	1985
Northwest Airlines	Republic Airlines	Merger	1986
Ozark Airlines	Trans World Airlines	Merger	1986
Texas Air	People Express	Merger	1987
Delta Airlines	Western Airlines	Merger	1987
USAir	Piedmont Aviation	Merger	1987
Dominican Santa Cruz Hospital	AMI-Community Hospital	Merger	1990
Wolters Kluwer	Lippincott	Merger	1990
Reed Elsevier	Pergamom	Merger	1991
Continental Airlines	America West Airlines	Code share	1994
Northwest Airlines	Alaska Airlines	Code share	1994
Burlington Northern	Santa Fe Pacific	Merger	1995
Thomson	Shepard's	Merger	1995
Wolters Kluwer	CCH	Merger	1995
Reed Elsevier	West Publishing (divested)	Merger	1996
Thomson	West Publishing	Merger	1995
Union Pacific	Southern Pacific	Merger	1995
Wolters Kluwer	Little, Brown	Merger	1996
Aurora Foods	Kraft's Breakfast Syrup	Merger	1997
General Mills	Ralcorp	Merger	1997
Guinness	Grand Metropolitan	Merger	1997
Proctor and Gamble	Tambrands	Merger	1997
Tosco	Unocal	Merger	1997
UDS	Total	Merger	1997
Wolters Kluwer	Thomson, Waverly, Plenum	Merger	1997
BP	Amoco	Merger	1998
Harcourt	Churchill Livingstone, Mosby	Merger	1998
Marathon Oil	Ashland	Joint Venture	1998
New Hanover Regional Medical Center	Columbia Cape Fear Memorial Hospital	Merger	1998
Pennzoil	Quaker State	Merger	1998
Reed Elsevier	Matthew Bender	Merger	1998
Shell Oil	Texaco	Joint Venture	1998
Shell Oil	Star Enterprises	Joint Venture	1998
Continental Airlines	Northwest Airlines	Code share	1999
Fleet Financial	BankBoston	Merger	1999
MAP	UDS	Merger	1999
Sutter	Summit Medical Center	Merger	1999

Firm 1	Firm 2, (3)	Transaction type	Transaction year
Exxon	Mobil	Merger	2000
Evanston Northwestern Healthcare	Highland Park	Merger	2000
Provena St. Therese Medical Center	Victory Memorial Hospital	Merger	2000
Delta	Northwest, Continental	Code share	2003
Sunoco	El Paso, Eagle Point	Merger	2004
Valero Energy	Premcor	Merger	2004
Johnson & Johnson	Pfizer	Merger	2006
Maytag	Whirlpool	Merger	2006