

# The New Merger Guidelines and the Herfindahl-Hirschman Index

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At the Fifteenth New England Antitrust Conference in November 1981, the newly appointed Assistant Attorney General in charge of the Justice Department's Antitrust Division expressed dissatisfaction with his predecessors' method of measuring market concentration:

We think that a rather more sophisticated way of thinking about concentration is appropriate. The four-firm concentration ratio has very serious drawbacks as a measure. It implicitly assumes that size distribution among the first four firms is irrelevant, which is obviously silly. It implicitly assumes that size distribution among firms five through N is irrelevant, which is obviously silly. There are better measures of concentration than that.<sup>1</sup>

The better measure of concentration to which Mr. Baxter referred was the Herfindahl-Hirschman Index (HHI).<sup>2</sup> The Antitrust Division began using this index as part of its screening of mergers<sup>3</sup> early in Mr. Baxter's tenure, and by the time the Justice Department's new Merger Guidelines were issued on June 14, 1982, the HHI had replaced concentration ratios (CR's)<sup>4</sup> as the primary method of measuring concentration in the Antitrust Division's internal deliberations.<sup>5</sup> Since the

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1. W. Baxter, Current Enforcement Policy of the Antitrust Division, Remarks at the Fifteenth New England Antitrust Conference (Nov. 13-14, 1981), *reprinted in* Sixteenth New England Antitrust Conference 7 (1982); *see also* *Baxter Offers Enforcement Positions on Price Fixing, Corporate Acquisitions*, ANTITRUST & TRADE REG. REP. (BNA) No. 1025, at AA-1 (July 30, 1981) (Interview with Mr. Baxter).

2. This index also is frequently referred to simply as the Herfindahl Index. *See infra* note 38.

3. Following the Guidelines, this Article adopts the convention of referring to both mergers and acquisitions as "mergers." The antitrust analysis is the same for both types of transactions.

4. A concentration ratio is the sum of the market shares of a specified number of firms (conventionally four). W. BAUMOL & A. BLINDER, *ECONOMICS* 523 (2d ed. 1982). Where market shares are computed from sales, a CR<sub>4</sub> would be the ratio of the leading four firms' sales to total sales in the market. It is generally recognized that CR's and the HHI are the two most widely accepted measures of concentration. 4 P. AREEDA & D. TURNER, *ANTITRUST LAW* ¶ 913, at 74-75 (1980); F. SCHERER, *INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE* 274 (2d ed. 1980).

5. Interview with Mark P. Leddy, Deputy Director for Operations in the Antitrust Division (Oct. 29, 1982).

stated purpose of the new Guidelines is to "describe the general principles and specific standards normally used by the Department in analyzing mergers,"<sup>6</sup> it is not surprising that the HHI has been incorporated into the Guidelines. Of course, the Guidelines' drafters aspire to more than a descriptive role.<sup>7</sup> The 1968 Merger Guidelines<sup>8</sup> had an important influence on successor administrations,<sup>9</sup> courts,<sup>10</sup> the Federal Trade Commission,<sup>11</sup> commentators and students,<sup>12</sup> and firms contemplating mergers and their counsel. Presumably its drafters anticipate that the new Guidelines will make a comparable impact, and that the HHI will gain general recognition as the preferred measure of concentration.

This Article begins by describing the HHI, its principal properties, and its use in the Guidelines, the literature, and the case law. It then evaluates the advantages of the HHI as compared to CR's, the measure of concentration used in the 1968 Guidelines.<sup>13</sup> Finally, it considers the practical consequences of changing to the HHI, and the wisdom of this change. This Article concludes that use of the HHI in the new Guidelines probably will change few prosecutorial or adjudicatory decisions about mergers except as part of a larger process of instilling in the Antitrust Division staff, and perhaps tribunals and successor administrations, a more lenient attitude toward mergers than formerly

6. U.S. Dep't of Justice, Merger Guidelines § I, 47 Fed. Reg. 28,493, 28,494 (1982), *reprinted in* 71 CALIF. L. REV. 649, 649-50 (1983) [hereinafter cited without cross-reference as Guidelines]; *see also* Baxter, *A Justice Department Perspective*, 51 ANTITRUST L.J. 287, 287 (1982) (describing the Guidelines as "a fairly careful description of a way of going about thinking about mergers—a thought process about mergers—and our own intuitive reactions to a series of mergers that we saw over a period of time."); William French Smith, *Introduction to Merger Guidelines*, *reprinted in* TRADE REG. REP. (CCH) No. 546, at 5 (June 16, 1982) (special supplement to 2 TRADE REG. REP. (CCH) ¶ 4225 (Aug. 9, 1982)).

7. Areeda, *Justice's Merger Guidelines: The General Theory*, 71 CALIF. L. REV. 303 (1983); *cf. Fed Is Advised to Defer Action on Guides Until Justice Unveils Revised Merger Guidelines*, 42 ANTITRUST & TRADE REG. REP. (BNA) at 826 (Apr. 22, 1982) (Baxter urged Federal Reserve Board to issue merger guidelines only after reviewing the ones to be published by DOJ).

8. U.S. Dep't of Justice, Merger Guidelines—1968 (May 30, 1968), *reprinted in* 2 TRADE REG. REP. (CCH) ¶ 4510, at 6881-89 [hereinafter cited as 1968 Guidelines].

9. *See* Edwards, Joffe, Kolasky, McGowan, Mendez-Penate, Ordovery, Proger, Soloman & Toepke, *Proposed Revisions of the Justice Department's Merger Guidelines*, 81 COLUM. L. REV. 1543, 1547 (1981) [hereinafter cited as Edwards Task Force]; Government Litigation Under Section 7: The Old Merger Guidelines and the New Antitrust Majority, Address by Donald Baker before the Southwestern Legal Foundation 8-10 (Feb. 24, 1977).

10. *See* ABA ANTITRUST SECTION, MONOGRAPH NO. 7, MERGER STANDARDS UNDER U.S. ANTITRUST LAWS 69-79 (1981); Edwards Task Force, *supra* note 9, at 1547; C. Mendez-Penate, *The Guidelines in the Courts: An Overview* (1981) (unpublished manuscript on file with the *California Law Review*).

11. ABA ANTITRUST SECTION, *supra* note 10, at 69-79; Edwards Task Force, *supra* note 9, at 1546-47.

12. *See, e.g.*, R. POSNER & F. EASTERBROOK, ANTITRUST 457-64 (2d ed. 1981); L. SULLIVAN, HANDBOOK OF THE LAW OF ANTITRUST 620 (1977).

13. 1968 Guidelines, *supra* note 8, paras. 5-6, 2 TRADE REG. REP. (CCH) at 6884.

prevailed. Except to the extent one considers this effect valuable, however, the costs of changing measures of concentration appear to outweigh the benefits.

## I DESCRIPTION OF THE HHI AND ITS USE IN THE GUIDELINES

### A. *Properties of the HHI*

Calculating an HHI is a straightforward process once percentage market shares are determined.<sup>14</sup> The market share of each participant in the market is squared, and the resulting amounts are then totalled.<sup>15</sup> Thus, the HHI for a market consisting of three firms with shares of 50%, 30%, and 20%, respectively, is the sum of  $50^2$ ,  $30^2$ , and  $20^2$ , or  $2500 + 900 + 400 = 3800$ .<sup>16</sup>

Several important properties of the HHI are readily apparent. First, the HHI is highly responsive to asymmetry of market shares. For any given number of participants in a market, the HHI will be lowest when market shares are equal, and highest when one firm has an extremely large share of the market. To vary the example given above, a market consisting of three firms with equal shares has an HHI of 3333 ( $33\frac{1}{3}^2 \times 3 = 1111 \times 3 = 3333$ ), but a three-firm market in which one firm has a 99% share would have an HHI of more than 9800 ( $99^2 = 9801$ ). This sensitivity to asymmetry is one of the principal claimed advantages of the HHI.<sup>17</sup>

This sensitivity, however, carries with it a serious drawback: small errors in estimating the leading firms' market shares can produce large differences in the HHI.<sup>18</sup> The significance of the error will itself vary according to the sizes of the shares that are inadvertently overestimated and the shares that are correspondingly reduced. Take as an example a four-firm market where the two leading firms have 40% shares and the

14. An HHI, like any other measure of concentration, is limited by the quality of the definition of the (product and geographic) market whose competitiveness it is measuring and the precision of the market shares used. *E.g.*, U.S. Dep't of Justice, *Explanation and Summary of the Merger Guidelines*, 2 TRADE REG. REP. (CCH) ¶ 4500, at 6881-2 (August 9, 1982) [hereinafter cited as *DOJ Explanation*].

15. Guidelines § III(A), 47 Fed. Reg. at 28,497, 71 CALIF. L. REV. at 655.

16. Alternatively, this computation could use market shares expressed as decimal fractions ( $.52 + .32 + .22 = .25 + .09 + .04 = .38$ ), as has been more common heretofore. *See, e.g.*, F. SCHERER, *supra* note 4, at 58; Weinstock, *Using the Herfindahl Index to Measure Concentration*, 27 ANTITRUST BULL. 285, 286-87 (1982). The Guidelines wisely avoid decimals and thus make the HHI easier to understand and accept. *See infra* notes 58-61 and accompanying text (HHI used erroneously because decimals gave the illusion of low concentration and small changes in HHI).

17. *E.g.*, *DOJ Explanation, supra* note 14, at 6881-2; 4 P. AREEDA & D. TURNER, *supra* note 4, ¶ 913a, at 75-76; W. Baxter, *supra* note 1.

18. F. SCHERER, *supra* note 4, at 58.

other two 10% shares. This distribution would result in an HHI of 3400 ( $40^2 + 40^2 + 10^2 + 10^2 = 1600 + 1600 + 100 + 100 = 3400$ ). Now suppose that the market share of one of the leading firms is erroneously estimated as 45% rather than 40%. If at the same time the other leader's share is estimated as 35%, then the HHI is increased only by 50 ( $45^2 + 35^2 + 10^2 + 10^2 = 2025 + 1225 + 100 + 100 = 3450$ ). But if it is the share of one of the smaller firms that is underestimated, as by assigning that firm only a 5% share, the HHI increases to 3750 ( $45^2 + 40^2 + 10^2 + 5^2 = 2025 + 1600 + 100 + 25 = 3750$ ), exceeding its correct value by over 10%.<sup>19</sup>

A second important property of the HHI is that it reflects the shares of every firm in the market. There is no need for an a priori determination of how many firms are significant in measuring market concentration; such a determination, which is inevitably somewhat arbitrary,<sup>20</sup> obviously must be made before computing a CR. This feature of the HHI is regularly cited as one of the HHI's advantages,<sup>21</sup> although it is beneficial only if summing each firm's squared market share accurately indicates the competitiveness of the market. The fact that the HHI includes every firm also is cited as a potential limitation on its use, given the difficulty of learning smaller market shares,<sup>22</sup> although it is unlikely that fringe firms will contribute significantly to HHI's that are reaching levels of antitrust concern.<sup>23</sup>

A third attribute of the HHI, demonstrated in 1969 by Morris Adelman, is that any HHI can be interpreted as a "numbers equivalent."<sup>24</sup> This means that one can readily compute the number of firms with equal market shares that would be necessary to produce any given HHI. This is done by multiplying the HHI by 0.0001 and taking

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19. According to the Guidelines, competitive concerns about concentration become "significant" when the HHI reaches 1000 and they become "quite serious" when it reaches 1800. Guidelines § III(A)(1)(b), 47 Fed. Reg. at 28,497, 71 CALIF. L. REV. at 656.

20. *But see* Kwoka, *The Effect of Market Share Distribution on Industry Performance*, 61 REV. ECON. & STAT. 101 (1979) (empirical study indicating superiority of CR2). CR4's were used widely in U.S. research because the U.S. Census Bureau chose to collect data for CR4's. The United Kingdom, on the other hand, used CR3's. G. STIGLER, *THE ORGANIZATION OF INDUSTRY* 30 (1968).

21. *See, e.g.*, 4 P. AREEDA & D. TURNER, *supra* note 4, ¶ 913a1, at 75; W. Baxter, *supra* note 1; J. Grundfest, *Antitrust Analysis, Market Concentration and the Herfindahl Index* 11-12, 17 (Oct. 1, 1981) (unpublished manuscript on file with the *California Law Review*).

22. *See, e.g.*, Markham, *Concentration: A Stimulus Or Retardant to Innovation?*, in *INDUSTRIAL CONCENTRATION: THE NEW LEARNING* 247, 259 (H. Goldschmid, H. Mann & J. Weston eds. 1974).

23. *See* Guidelines § III(A) n.29, 47 Fed. Reg. at 28,497 n.29, 71 CALIF. L. REV. at 655 n.29; F. SCHERER, *supra* note 4, at 58; Ordover, Sykes & Willig, *Herfindahl Concentration, Rivalry, and Mergers*, 95 HARV. L. REV. 1857, 1866 (1982).

24. Adelman, *Comment on the "H" Concentration Measure as a Numbers-Equivalent*, 51 REV. ECON. & STAT. 99 (1969).

the reciprocal of that product.<sup>25</sup> For example, an HHI of 1250 corresponds to a market of eight equal-sized firms, since the reciprocal of 0.125 ( $1250 \times 0.0001$ ) is 8. Conversely, to obtain the HHI corresponding to a market with a given number of equal-sized firms, one multiplies the reciprocal of that number by 10,000. Accordingly, the HHI corresponding to a market of five equal-sized firms would be  $1/5 \times 10,000 = 2000$ . This property aids in conceptualizing the meaning of a particular HHI value.<sup>26</sup>

### B. Use of the HHI in the Guidelines

The Guidelines use the HHI for three quite different purposes. The first, and most novel, application is to demarcate so-called "safe harbors."<sup>27</sup> According to the Guidelines, the Department is unlikely to challenge any merger, no matter how large, that would produce a post-merger HHI of less than 1000.<sup>28</sup> There is some suggestion that this safe harbor is intended by the Justice Department to establish almost a guarantee that a merger will not be challenged—a stronger promise, for instance, than the Department's representation that it is unlikely to challenge mergers increasing the HHI by less than threshold amounts in more concentrated markets.<sup>29</sup>

The second purpose for which the Guidelines use the HHI is the same as that for which concentration statistics were employed in the 1968 Guidelines: to establish a certain level of concentration (a post-merger HHI above 1800, in the case of the new Guidelines) that trig-

25. Since Adelman was using HHI's in decimal form, *see supra* note 16, multiplying by 0.0001 was unnecessary.

26. For instance, the Guidelines have engaged in this type of conceptualization. *See* Guidelines § III(A)(1), 47 Fed. Reg. at 28,497, 71 CALIF. L. REV. at 656.

27. *See* Baxter, *supra* note 6, at 291; Snith, *Changing Enforcement Policy*, 51 ANTITRUST L.J. 95, 101 (1982).

28. Guidelines § III(A)(1)(a), 47 Fed. Reg. at 28,497, 71 CALIF. L. REV. at 656. Measuring HHI's on a postmerger basis serves as an important limitation. For instance, a merger leading to the formation of a firm with a 31% market share would be analyzed with an HHI of more than 961 ( $31^2$ ).

The Guidelines report that an empirical study of firm dispersion indicated that an HHI of 1000 corresponds to a CR4 of 50%. Guidelines § III(A), 47 Fed. Reg. at 28,497, 71 CALIF. L. REV. at 655-56. *Accord* Scarbrough & Pfunder, *New Merger Guidelines Not Always Less Restrictive*, Legal Times (Washington), Jan. 10, 1983, at 19, 27 (Monte Carlo simulation assuming 25 firms with a log-normal distribution; HHI of 1000 found to correspond to CR4 of 50.8%). Although highly unlikely, a 1000-point HHI could be associated with CR4's as great as 63% and as small as 32%. P. Pautler, *A Guide to the Herfindahl Index for Antitrust Attorneys* 14 (fig. 1) (unpublished manuscript on file with the *California Law Review*) (forthcoming in 5 RESEARCH IN L. & ECON. (Fall 1983)).

29. *Cf.* Baxter, *supra* note 6, at 291 ("Heeding the admonition, 'never say never,' we did not quite come out and say 'we will never attack mergers in that region.' But I truly expect it will be an unusual phenomenon where difficulty is found with a merger answering that description.").

gers a more stringent standard of review for horizontal mergers.<sup>30</sup> Moreover, this threshold is not a bright line test. The higher the HHI, the greater the likelihood that a horizontal merger will be challenged, irrespective of whether the HHI exceeds 1800.<sup>31</sup>

Finally, the Guidelines use the increase in the HHI caused by a merger to measure quantitatively the likely competitive impact of a merger. The 1968 Guidelines indicated the Department normally would challenge mergers in "less highly concentrated" markets involving firms with shares of at least 5% and 5%, 10% and 4%, 15% and 3%, 20% and 2%, or 25% and 1%, and mergers in "highly concentrated" markets with shares of at least 4% and 4%, 10% and 2%, or 15% and 1%.<sup>32</sup> The new Guidelines, by contrast, quantitatively measure the impact of a merger by the resulting increase in the HHI, which is considerably simpler. This increase is equal to twice the product of the market shares of the merging firms; a merger of firms with market shares *a* and *b* will increase the HHI by  $2ab$ .<sup>33</sup> Where a market will be "highly concentrated" following a merger, the Department is unlikely

30. Compare Guidelines § III(A)(1)(a), 47 Fed. Reg. at 28,497, 71 CALIF. L. REV. at 656 (setting out threshold for "highly concentrated" markets) with 1968 Guidelines, *supra* note 8, para. 7, 2 TRADE REG. REP. (CCH) at 6884 (same). Such a use is well established in the case law. *E.g.*, *United States v. Aluminum Co. of Am. (Rome Cable)*, 377 U.S. 271, 279-80 (1964); *Grumman Corp. v. LTV Corp.*, 665 F.2d 10, 15 (2d Cir. 1981). The 1968 Guidelines used a premerger measure (CR4 of 75%), whereas the new Guidelines use a postmerger measure. The new Guidelines also use the 1800 point threshold to identify markets in which potential competition may be important, Guidelines § IV(A)(3)(a), 47 Fed. Reg. at 28,500, 71 CALIF. L. REV. at 661, and in which vertical mergers may lessen competition, *id.* § IV(B)(1)(c), 47 Fed. Reg. at 28,501, 71 CALIF. L. REV. at 663-64. This Article discusses only the horizontal Merger Guidelines' use of the HHI, since successful government challenges of non-horizontal mergers are rare.

The Guidelines report that an empirical study of firm dispersion indicated that an HHI of 1800 corresponded to a CR4 of 70%. Guidelines § III(A), 47 Fed. Reg. at 28,497, 71 CALIF. L. REV. at 655-56. See also Scarbrough & Pfunder, *supra* note 28 (Monte Carlo simulation assuming 25 firms with a log-normal distribution; HHI of 1800 found to correspond with a CR4 of 67.3%). Although highly unlikely, an 1800-point HHI could be associated with CR4's as great as 85% and as small as 42%. P. Pautler, *supra* note 28.

31. Guidelines § III(A)(1)(b)-(c), 47 Fed. Reg. at 28,497, 71 CALIF. L. REV. at 656-57; Baxter, *supra* note 6, at 292.

The Guidelines also contain a "leading firm proviso" that states that the Department is likely to challenge any merger involving a leading firm with a 35% share and another firm with a share of at least 1%, where the second largest firm in the industry is approximately half the size of the leader (or smaller). *Id.* § III(A)(2), 47 Fed. Reg. at 28,497-98, 71 CALIF. L. REV. at 657.

32. 1968 Guidelines, *supra* note 8, paras. 5-6, 2 TRADE REG. REP. (CCH) at 6884. Under the current Guidelines the thresholds for "less highly concentrated" markets are (in whole numbers) 7% & 7%, 8% & 6%, 10% & 5%, 12% & 4%, 16% & 3%, 25% & 2%, and 50% & 1%. Guidelines § III(A)(1)(b) n.31, 47 Fed. Reg. at 28,497 n.31, 71 CALIF. L. REV. at 656 n.31.

The thresholds for "highly concentrated" markets are (in whole numbers) 5% & 5%, 6% & 4%, 8% & 3%, 12% & 2%, and 25% & 1%. Guidelines § III(A)(1) nn.31-32, 47 Fed. Reg. at 28,497 nn.31-32, 71 CALIF. L. REV. at 656 nn.31-32.

33. Guidelines § III(A)(1) n.30, 47 Fed. Reg. at 28,497 n.30, 71 CALIF. L. REV. at 656 n.30. The Guidelines explain this conclusion as follows. Before the merger, the two firms contribute separately to the HHI, and their contributions together equal  $a^2 + b^2$ . The merger results in a firm

to challenge a merger if it increases the HHI by less than 50 points.<sup>34</sup> It is likely to challenge a merger if it increases the HHI by 100 points or more,<sup>35</sup> and the Department will use a number of additional factors in deciding whether to challenge a merger increasing the HHI by an amount between those two figures.<sup>36</sup> In markets that will not be highly concentrated following a merger, the Department is unlikely to challenge either "safe harbor" mergers or mergers increasing the HHI by less than 100 points.<sup>37</sup>

Like the HHI itself, this third application of the HHI is quite sensitive to disparities in firm sizes. For any given combined share, the increase in the HHI will be highest where the two firms have equal market shares, and lowest where the inequality is extreme. For example, in the case of a merger of two firms with a combined market share of 10%, the postmerger HHI increase will vary from 50 points (5% and 5%) to 18 points (9% and 1%).

The reasons for using the HHI can best be understood, and the persuasiveness of those reasons can be more readily evaluated, by reviewing the gradual ascendancy of the HHI as a measure of concentration.

## II

### THE HISTORY OF THE HHI

When William Baxter introduced the HHI in the Department of Justice, he took it from the literature of industrial organization, not from judicial precedent. While the HHI has prospered, albeit hesitantly at first, in the writings of economists and lawyer-economists, it has appeared only rarely and to mixed reviews in the case law.

#### *A. The HHI in the Literature*

The names Herfindahl and Hirschman have been linked not be-

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with a share of  $(a + b)$  and a contribution to the HHI of  $(a + b)^2$ . Since  $(a + b)^2 = a^2 + 2ab + b^2$ , the increase is  $2ab$ .

34. Combinations of the following market shares represent HHI increases of approximately 50 points: 5% & 5%, 6% & 4%, 8% & 3%, 12% & 2%. Guidelines § III(A)(1)(c) n.32, 47 Fed. Reg. at 28,497 n.32, 71 CALIF. L. REV. at 656 n.32.

35. Combinations of the following market shares represent HHI increases of approximately 100 points: 7% & 7%, 8% & 6%, 10% & 5%, 12% & 4%, 16% & 3%, 25% & 2%. *Id.* § III(A)(1)(b) n.31, 47 Fed. Reg. at 28,497 n.31, 71 CALIF. L. REV. at 656 n.31.

36. *Id.* § III(A)(1)(c), 47 Fed. Reg. at 28,497, 71 CALIF. L. REV. at 656-57. These additional factors are ease of entry; relevant product heterogeneity; closeness of next-best substitutes; differences in the products and in the selling locations of the merging firms; absence of detailed market information about specific transactions, prices, and output levels; bulkiness of orders; and other indicia of competitive market behavior and likelihood of continued competitive behavior. *Id.* § III(B)-(C), 47 Fed. Reg. at 28,498-99, 71 CALIF. L. REV. at 657-60.

37. *Id.* § III(A)(1)(a)-(b), 47 Fed. Reg. at 28,497, 71 CALIF. L. REV. at 656.

cause the two men worked together to develop the index, but rather because each developed it independently.<sup>38</sup> Hirschman used a variation of it as a measure of the concentration of a country's foreign trade.<sup>39</sup> Herfindahl proposed his version of the index because traditional measures of concentration were sensitive only to disparities in market shares, not to paucity of competitors.<sup>40</sup> He used it to measure "gross changes" in the concentration of the United States steel industry, and cautioned that "[o]n *a priori* grounds, a concentration coefficient probably cannot be trusted to move closely with the degree of monopoly."<sup>41</sup>

Herfindahl's thesis adviser, George Stigler, was probably more important than either Herfindahl or Hirschman in bringing about the acceptance of the HHI.<sup>42</sup> Stigler demonstrated that under certain conditions the HHI measures the expected normal fluctuation of market shares, with a lower HHI indicating greater fluctuation. This is important, Stigler argued, because the likelihood of collusion depends on the ability of colluding firms to detect cheating on agreed prices. Stable market shares facilitate the detection of cheating, because shippage in market share is unlikely absent cheating.<sup>43</sup> Stigler thus suggests that the HHI is an appropriate measure of concentration "if we wish concentration to measure likelihood of effective collusion."<sup>44</sup>

Despite some questioning of Stigler's assumptions—questioning to which we return below—the HHI soon became many economists' ideal measure of concentration.<sup>45</sup> It appeared in the legal literature in 1969 when Richard Posner advocated its use as a measure of concentration.<sup>46</sup> Phillip Areeda and Donald Turner later endorsed the HHI, al-

38. See Hirschman, *The Paternity of an Index*, 54 AM. ECON. REV. 761 (1964). The index is sometimes referred to as the "Herfindahl Index," see, e.g., 4 P. AREEDA & D. TURNER, *supra* note 4, ¶ 913a2, at 76, but this fails to accord recognition to Hirschman, the original proponent of the index. The Guidelines appropriately use the term "Herfindahl-Hirschman Index."

39. A. HIRSCHMAN, NATIONAL POWER AND THE STRUCTURE OF FOREIGN TRADE 98-99, 155-62 (1945).

40. O. Herfindahl, Concentration in the Steel Industry 16-18 (1950) (doctoral thesis on file with the *California Law Review*).

41. *Id.* at 22, 169. The historical origin of the index is discussed in Fox, *The New Merger Guidelines—A Blueprint for Microeconomic Analysis*, 27 ANTITRUST BULL. 519, 569-74 (1982).

42. Stigler, *A Theory of Oligopoly*, 72 J. POL. ECON. 44 (1964); see J. Kwoka, *The Herfindahl Index in Theory and Practice* (Dec. 1982) (unpublished manuscript on file with the *California Law Review*).

43. See G. STIGLER, *supra* note 20, at 31.

44. Stigler, *supra* note 42, at 55.

45. F. SCHERER, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE 51-52 (1st ed. 1970); Markham, *supra* note 22, at 258; Schmalensee, *Using the H-Index of Concentration with Published Data*, 59 REV. ECON. & STAT. 186 (1977). It may be more accurate to call the HHI an idealized measure, because the paucity of data meant it was seldom used. See *infra* note 109.

46. Posner, *Oligopoly and the Antitrust Laws: A Suggested Approach*, 21 STAN. L. REV. 1562, 1602-03 (1969). Posner suggested defining a "safe harbor" at the same 1000 point level used in the



beit without enthusiasm.<sup>47</sup> Only recently, a task force of lawyers and economists proposing new merger guidelines also concluded that the HHI should be used to measure concentration.<sup>48</sup>

### B. *The HHI in the Courts*

Merger cases normally use CR's to measure market concentration and combined market shares to measure the impact of a merger.<sup>49</sup> Almost every judicial and Federal Trade Commission merger decision has measured concentration by CR's (most commonly CR4's).<sup>50</sup> Most merger cases have determined the antitrust significance of a merger by focusing on the combined market shares of the merged firms.<sup>51</sup> In contrast, the HHI has appeared in opinions in only six cases, and most of these cases are, to a greater or lesser degree, embarrassments.<sup>52</sup> The HHI's checkered history in litigation is powerful testimony to the danger posed by a little knowledge of economics.<sup>53</sup> If nothing else, the Guidelines' explication of the HHI should raise the level of judicial discourse on economic principles.

The HHI's first and most ignominious appearance in the reported

Guidelines, *id.* at 1603, and further suggested automatically challenging any merger in industries with HHI's over 2000 where the HHI increase due to the merger exceeded 40. *Id.* Posner made clear he cared more about the approach than the particular numbers. *See also* R. POSNER, ANTI-TRUST LAW: AN ECONOMIC PERSPECTIVE 55 n.26 (1976).

47. 4 P. AREEDA & D. TURNER, *supra* note 4, ¶ 913b2.

48. Edwards Task Force, *supra* note 9, at 1561, 1564.

49. *See, e.g.*, Brown Shoe Co. v. United States, 370 U.S. 294, 322 n.38, 343 (1962); Tenneco, Inc. v. FTC, 689 F.2d 346, 352 (2d Cir. 1982).

50. See cases collected in 4 P. AREEDA & D. TURNER, *supra* note 4, ¶ 909, at 29-51.

51. *E.g.*, United States v. Philadelphia Nat'l Bank, 374 U.S. 321, 364 (1963); Liggett & Myers, Inc., 87 F.T.C. 1074 (1976), *aff'd*, 567 F.2d 1273 (4th Cir. 1977); *see* 4 P. AREEDA & D. TURNER, *supra* note 4, ¶ 909; 13 B. FOX & E. FOX, CORPORATE ACQUISITIONS AND MERGERS § 8.02[2][a] (1982). Courts less frequently have looked at the increase in market share resulting from the merger. *Id.* § 8.02[2][a][i].

52. As will be shown, the HHI was incorrectly used and ultimately rejected in United States v. Black & Decker Mfg. Co., 430 F. Supp. 729 (D. Md. 1976), and Litton Indus. 82 F.T.C. 793, 799 (1972) (initial decision), *rev'd*, 82 F.T.C. 979 (1973), *modified*, 85 F.T.C. 333 (1975). It was acknowledged as an acceptable measure of concentration but nonetheless not used in BASF Wyandotte Corp., No. 9125 (FTC May 14, 1982) (initial decision) (available on LEXIS, Trade library, FTC file), *order adopted*, 3 TRADE REG. REP. (CCH) ¶ 21,941 (FTC July 12, 1982), and Marathon Oil Co. v. Mobil Corp., 530 F. Supp. 315, 323 n.15 (N.D. Ohio), *aff'd*, 669 F.2d 378 (6th Cir. 1981), *cert. denied*, 102 S. Ct. 1490 (1982), and it was relied on without its exact level being determined in Pabst Brewing Co. v. G. Heileman Brewing Co., No. Civ. 82-440 (D. Del. July 21, 1982) (order granting preliminary injunction). The HHI was used correctly, but as only cumulative evidence, in Kellogg Co., No. 8883 (FTC Sept. 1, 1981) (initial decision), *noted at* 3 TRADE REG. REP. (CCH) ¶ 21,864 (1981), *vacated and complaint dismissed*, 3 TRADE REG. REP. (CCH) ¶ 21,899 (FTC Jan. 15, 1982). Judge Mansfield's recent dissent in *Tenneco*, 689 F.2d at 359, also mentioned the HHI in noting that the market in issue was concentrated whether one applied CR's or the HHI.

53. *See generally* Hay, *A Confused Lawyer's Guide to the Predatory Pricing Literature*, in STRATEGY, PREDATION, AND ANTITRUST ANALYSIS 155, 155-56 (S. Salop ed. 1981).

cases was in the initial decision in *Litton Industries, Inc.*<sup>54</sup> The case involved the acquisition by Litton of most of the stock of Triumph-Werke Nurnberg, A.G., Adlerwerke A.G., and their associated companies.<sup>55</sup> It presented the still vexing question of whether mergers of relatively small firms in markets with dominant competitors should be discouraged in order to preserve opportunities for possible deconcentration, or allowed in order to promote "viable" competition.<sup>56</sup>

The hearing examiner boldly adopted the HHI as the proper measure of concentration in view of IBM's dominant role, saying that the "two and four firm" concentration index of measuring concentration is inappropriate in this case. . . .

The Herfindahl Index, on the other hand, presents a more realistic picture of competition in this industry because it takes precise account of each company's market share and therefore reflects the exact composition of the industry.<sup>57</sup>

Only once did the hearing examiner use the HHI to determine whether the typewriter industry or any part of it was concentrated. In that instance, he determined that an HHI in excess of .31 (3100 if one does not use decimals)<sup>58</sup> indicated "low" concentration,<sup>59</sup> which is simply incorrect.<sup>60</sup> The hearing examiner relied on the HHI principally for quantifying the impact of the acquisition. He ruled that HHI increases of .005 and .006 in the office typewriter market (50 and 60 points, if one does not use decimals) were not significant, since the increase "was discernible only at the third decimal place."<sup>61</sup>

Commissioner Dennison detected the hearing examiner's errors, but nonetheless concurred reluctantly in the Commission's finding of a

54. 82 F.T.C. 793, 799 (1972) (initial decision), *rev'd*, 82 F.T.C. 979 (1973), *modified*, 85 F.T.C. 333 (1975).

55. *Id.* at 793.

56. *Compare id.* at 969-70 (initial decision accepting countervailing power argument) with *Litton Indus., Inc.*, 82 F.T.C. 333, 1013-14 (rejecting it), *modified*, 85 F.T.C. 333 (1975). *See generally infra* note 117 (current debate about countervailing power). In *Litton*, the dominant competitors were IBM (office typewriters) and SCM (portable typewriters).

57. 82 F.T.C. at 904, 906 (initial decision). The hearing examiner's adoption of this measure may have resulted from its advocacy by defense witnesses J. Fred Weston and Betty Bock. The examiner clearly was impressed with these experts. *See id.* at 888.

58. *See supra* note 16.

59. 82 F.T.C. at 911 (initial decision). The opinion does not actually give the HHI value used by the hearing examiner, but it states that the market share figures he used were 54.3% for IBM and 12.6% for Royal (Litton). These market share figures alone contribute more than 3100 points toward an HHI.

60. For example, the Guidelines state that a market with an HHI in excess of 1800 is "highly concentrated." Guidelines § III(A)(1)(c), 47 Fed. Reg. at 28,497, 71 CALIF. L. REV. at 656.

61. 82 F.T.C. at 907. In contrast, the Guidelines say that the Department is unlikely to challenge mergers in highly concentrated markets where the HHI increase is less than 50 points. Guidelines § III(A)(1)(c), 47 Fed. Reg. at 28,497, 71 CALIF. L. REV. at 656; *see supra* text accompanying note 36.

violation.<sup>62</sup> However, Dennison also wrote that he did not give much weight to increases in the CR2's and CR4's in view of the asymmetry of market shares in the relevant product lines,<sup>63</sup> and that he saw no error in using the HHI.<sup>64</sup> The full Commission proved unwilling to condone abandoning CR's in favor of the HHI. It noted that the examiner had declined to use traditional CR's, and reversed him in that respect: "We believe that the traditional four-firm concentration ratio analysis is well suited for the purpose of merger law enforcement and see no compelling reason to ignore it in this case."<sup>65</sup>

The HHI also was rejected—and misunderstood—in its next appearance in a reported decision, *United States v. Black & Decker Manufacturing Co.*<sup>66</sup> The case is particularly interesting because both the government's and the defendant's economists testified that the HHI was preferable to concentration ratios as a measuring device.<sup>67</sup> Despite this unanimity of support, the court relied principally on the CR2, CR4, and CR8. The court apparently was confused by testimony that the HHI "reflects the number of firms in the market,"<sup>68</sup> for it wrote as follows:

The critical problem with the Herfindahl index, aside from its non-recognition by courts which have uniformly used concentration ratios and its concomitant lack of comparability to data from earlier authority, is that one or two firms could have sizable market shares but if enough small, insignificant firms existed, the market could appear relatively de-

62. 82 F.T.C. at 970, 976 (initial decision). Dennison based his decision on the high concentration and the corresponding need to prevent even small increases in concentration. He gently suggested that the hearing examiner "failed to take into account that a statistical peculiarity of this Index (not shared by 2-firm or 4-firm concentration ratios which antitrust lawyers are more accustomed to) is that it tends to be skewed toward very small values." *Id.* at 976 n.5.

63. *Id.* at 976.

64. *Id.* at 976 n.5.

65. *Id.* at 1010 (reversal) (footnote omitted). The Commission recognized that "the Herfindahl Index is capable of reflecting the size inequality of market shares among the industry members, [and thus] may be useful in judging which of the two or more horizontal combinations within a particular market is likely to have the greater anticompetitive effect from a structural point of view." *Id.* at 1011 n.35. It then said, somewhat confusingly, that an illegal merger continues to be illegal regardless of whether more anticompetitive ones can be hypothesized. *Id.*

66. 430 F. Supp. 729 (D. Md. 1976).

67. Record at 1701, *Black & Decker* (cross-examination of government witness Jernigan) ("It is a better measure, summary measure of industry concentration than any other single measure, I would think."); *id.* at 2562-63 (direct examination of defense witness Epstein) ("Economists would prefer to use the Herfindahl Index . . . , because it has more information in it. . . . [I]f you can get [information on each firm's market share] then you use the Herfindahl Index, because this takes account of all the information that is available."). The government's economist objected to using the HHI only because complete information on all market participants was available, so it was unnecessary to use a summary measure at all. *Id.* at 1701-02. However, he calculated CR's, but not HHI's, for purposes of comparison. *Id.* at 1702.

68. *Id.* at 1702 (cross-examination of Jernigan); *cf. id.* at 2560 (direct examination of Epstein).

concentrated. The competitive effect of these small firms might well be marginal, but the Herfindahl index by reflecting them, could significantly distort by underestimation the market power of the leading firms.<sup>69</sup>

The HHI's four most recent appearances reflect somewhat greater acceptance of it as a measure of concentration. In *Marathon Oil Co. v. Mobil Corp.*<sup>70</sup> and *BASF Wyandotte Corp.*,<sup>71</sup> the tribunals, while acknowledging that the measure was accepted, ignored it and relied solely on CR's. In a third case, the Federal Trade Commission's "shared monopoly" case,<sup>72</sup> HHI's in excess of 2700 and CR4's of over 80% were found to indicate extremely high concentration.<sup>73</sup> The most recent case, *Pabst Brewing Co. v. G. Heileman Brewing Co.*,<sup>74</sup> measured concentration solely by the HHI in preliminarily enjoining a transaction.

The trial court in the *Mobil-Marathon* litigation wrote that "[a]ccepted measures of concentration in a particular industry include the four- and eight-firm concentration ratios . . . and the Herfindahl Index . . ."<sup>75</sup> However, no HHI's were given in the court's opinion, which discussed only the combined shares of the two firms in various markets and the increases in CR4's in those markets.<sup>76</sup> The court relied principally on the combined market shares as opposed to other measures of competitive impact.<sup>77</sup> The HHI was not even mentioned by the appellate court, which in affirming the decision below also relied primarily on combined market shares.<sup>78</sup>

The administrative law judge in *BASF Wyandotte*<sup>79</sup> wrote that

69. *Black & Decker*, 430 F. Supp. at 748 n.38. This reasoning is, of course, erroneous. See *supra* text accompanying note 23.

70. 530 F. Supp. 315, 323 n.15 (N.D. Ohio), *aff'd*, 669 F.2d 378 (6th Cir. 1981), *cert. denied*, 102 S. Ct. 1490 (1982).

71. No. 9125 (FTC May 14, 1982) (initial decision) (available on LEXIS, Trade library, FTC file), *order adopted*, 3 TRADE REG. REP. (CCH) ¶ 21,941 (FTC July 12, 1982).

72. Kellogg Co., No. 8883 (FTC Sept. 1, 1981) (initial decision), *noted at* 3 TRADE REG. REP. (CCH) ¶ 21,864 (1981), *vacated and complaint dismissed*, 3 TRADE REG. REP. (CCH) ¶ 21,899 (FTC Jan. 15, 1982).

73. *Id.*, slip op. at 66-70. The law judge ordered the complaint dismissed because complaint counsel had failed to show noncompetitive conduct and market performance. *Id.* at 263-66.

74. *Pabst Brewing Co. v. G. Heileman Brewing Co.*, No. Civ. 82-440 (D. Del. July 21, 1982) (order granting preliminary injunction).

75. *Mobil-Marathon*, 530 F. Supp. at 323 n.15. Ironically, the court's willingness to rely on traditional concentration measures may have been based in part on testimony by George Stigler, the HHI's principal academic proponent. Stigler said that the HHI and the CR4 are "the accepted measures of concentration," and that both measures should be reviewed. Record at 633, 754, *Mobil-Marathon*.

76. 530 F. Supp. at 323-24.

77. *See id.* at 323, 326.

78. 669 F.2d at 380.

79. No. 9125 (FTC May 14, 1982) (initial decision) (available on LEXIS, Trade library, FTC file), *order adopted*, 3 TRADE REG. REP. (CCH) ¶ 21,941 (FTC July 12, 1982).

"[s]ubstantial authority regards the Herfindahl Index as superior to concentration ratios."<sup>80</sup> However, his finding of presumptive illegality was based on a 10.6% combined market share in a "inoderately concentrated" market (CR4 between 47.3% and 49.6%; CR8 between 71.2% and 76.4%).<sup>81</sup> The law judge's discussion of the HHI was confined to his findings of fact, and he never addressed BASF's argument that HHI's of 780 to 850<sup>82</sup> indicated a competitive structure.

Only one case, *Pabst-Heileman*,<sup>83</sup> has considered the HHI subsequent to the issuance of the Guidelines.<sup>84</sup> The judge in that case, ruling from the bench, preliminarily enjoined JMSL Acquiring Corp. from purchasing Pabst's voting securities and then dividing Pabst's assets between JMSL and G. Heileman Brewing Co. Although Pabst argued that precedent compelled measuring the competitive impact of the transaction by means of combined market shares and the CR4,<sup>85</sup> the court relied exclusively on the HHI to evaluate concentration and to measure quantitatively the impact of the proposed acquisition. The parties apparently accepted the Guidelines' HHI thresholds as appropriate if the HHI was to be used,<sup>86</sup> and debated only whether to use adjusted or unadjusted numbers.<sup>87</sup> Although the latter set of numbers indicated that a government challenge was unlikely according to the Guidelines, the court found that either set of numbers indicated that an antitrust violation was possible and, in light of other factors, probable.<sup>88</sup>

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80. *Id.*, slip op. at 150.

81. *Id.* at 182. The law judge also ruled that this presumption had been rebutted by a showing of effective competition, and accordingly ordered the complaint dismissed. *Id.* at 190-91.

82. *Id.* at 150. These were apparently premerger levels.

83. No. Civ. 82-440 (D. Del. July 21, 1982) (order granting preliminary injunction).

84. The only other case decided subsequent to the issuance of the Guidelines turned on market definition, and the court's opinion used no measures of concentration. *United States v. Virginia Nat'l Bankshares*, 1982-2 Trade Cas. (CCH) ¶ 64,871 (W.D. Va. 1982) (oral opinion).

85. Brief in Support of Plaintiff's Motion for a Preliminary Injunction at 38-39, 42-43, *Pabst-Heileman*.

86. *Id.* at 44 n.43; Brief of G. Heileman Brewing Co. in Opposition to Plaintiff's Motion for a Preliminary Injunction *passim*, *Pabst-Heileman*; Defendant JMSL Acquiring Corp.'s Brief in Opposition to Plaintiff's Motion for a Preliminary Injunction at 35-37, *Pabst-Heileman*.

87. Under a straight HHI calculation, the postmerger industry HHI in the upper midwest region (which the court found to be the relevant geographic market, *Pabst-Heileman*, slip op. at 4) was approximately 1660 with an increase of approximately 50. Defendant JMSL Acquiring Corp.'s Brief in Opposition to Plaintiff's Motion for a Preliminary Injunction at 37; Affidavit of Douglas Greet at exh. 17. Plaintiff Pabst offered an "adjusted" HHI producing a postmerger figure of 1661 with an increase of 161. *Id.* JMSL had proposed giving Heileman the exclusive right to sell Pabst brand beer in Michigan and Ohio, with JMSL retaining exclusive rights in the ten other upper midwest states. *Id.* at 18. Pabst's "adjusted" HHI increase compared the HHI after the entire transaction was completed with an HHI computed before the merger but after the market division.

88. Although the court did not base its finding of an antitrust violation on HHI considerations only, the court had this to say about the HHI statistics:

The HHI's generally disappointing role in the cases should not be seen as suggesting that all tribunals uncritically apply CR's. Some of the thinking behind the HHI has been established in the cases even if the index itself has not. For example, as already noted,<sup>89</sup> one of the principal claimed strengths of the HHI is its weighting of asymmetry. Yet as early as 1976, the Federal Trade Commission relied in part on the symmetry of market shares to find that a market would be competitive after a merger.<sup>90</sup> More recently, the Commission relied in part on a concern about high market shares by the leading two firms (41.9%) to support a presumption that a market was sufficiently concentrated that further increases should be carefully scrutinized.<sup>91</sup>

### III

#### EVALUATION OF THE HHI IN LIGHT OF CURRENT ECONOMIC LEARNING

In a recent study of the HHI, Paul Pautler, a Federal Trade Commission economist, concluded that the HHI is "at least as good a summary measure [of concentration] as any of the popular alternatives."<sup>92</sup> One can go further and say that the HHI is generally regarded, based on economic learning available today, as slightly superior to alternative summary measures of concentration.<sup>93</sup> Both theory and empirical results indicate that the HHI should be somewhat better than CR's at predicting supracompetitive pricing, but neither theory nor empirical results are unambiguous.<sup>94</sup> Moreover, there is some question as to whether any measure of market concentration can accurately predict supracompetitive pricing.

Largely owing to Stigler's work, the theoretical basis for using the HHI is considerably stronger than that for using CR's. However, the

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The Court recognizes that the parties' interpretation of the proper use of the Herfindahl-Hirschman Index raises complex questions—such as, whether the adjusted or nonadjusted HHI should be used to calculate the pre-merger market concentration. Nevertheless, the Court also realizes that the Herfindahl-Hirschman Index should be used by the courts as a "rule of thumb" and not as an ironclad rule. The Court finds that whatever numbers are used, it is abundantly clear that the HHI factors alone and the increases in the HHI caused by the JMSL/Heileman transaction indicate that there is at least a possibility of an antitrust violation.

*Pabst-Heileman*, slip op. at 4-5.

89. See *supra* text accompanying note 17.

90. Warner-Lambert Co., 87 F.T.C. 812, 870 (1976).

91. Heublein, Inc., 96 F.T.C. 385, 577 (1980) (Pitofsky, Comm'r) (citing Kwoka, *supra* note 20); see also *Black & Decker*, 430 F. Supp. at 748 n.38 (comparing 2-firm, 4-firm, and 8-firm trends).

92. P. Pautler, *supra* note 28, at 31.

93. J. Grundfest, *supra* note 21, at 32.

94. An ideal measure of concentration should satisfy both criteria. Stigler, *Comment*, 76 YALE L.J. 718, 718 (1967); accord G. STIGLER, *supra* note 20, at 30 (adding that "[r]emarkably little has been done along either route.").

theoretical case for using the HHI has serious weaknesses.<sup>95</sup> Stigler's theory assumes that sellers cannot discover whether competitors are cheating by learning the actual prices of competitors, but that sellers have perfect information on customers lost or gained by competitors.<sup>96</sup> Neither assumption seems correct.<sup>97</sup> Moreover, John Kwoka has objected that a cartel must reach a pricing understanding and then deter cheating as well as detect it, so a theory devoted solely to detection may not be sufficient.<sup>98</sup> Authors after Stigler have attempted, without overwhelming success, to demonstrate theoretically that the HHI is an accurate predictor of supracompetitive pricing.<sup>99</sup> One recent analysis showed that the HHI should be an accurate measure "in the context of an industry composed of non-price-taking firms that neither cooperate nor compete."<sup>100</sup> Again, this description may not apply to all or even most industries in which questionable mergers occur.

Some economic theory suggests that collusion or interdependent pricing is facilitated by the presence of a leading firm, or firms, with large market shares.<sup>101</sup> The HHI's sensitivity to asymmetry is responsive to this concern, but theory has not shown that the HHI will consistently and accurately reflect the likelihood of such pricing. Even Assistant Attorney General Baxter freely concedes that the HHI's squaring of market shares is somewhat arbitrary:

Now I heard the [question from the floor], maybe improperly, as "Why square it? Why not cube it? Why not raise it to the 1.7 power or the 2.2 power?" There I would have to say I have no answer to that. . . . Squaring it is in the right general direction, but whether we might not do a great deal better by raising it to some other power than exactly 2.0 is a quite realistic possibility, an empiric question to which I have no answer.<sup>102</sup>

95. J. Kwoka, *supra* note 42, at 18. In addition, concentration ratios are not without theoretical support. *See id.* at 17; P. Pautler, *supra* note 28, at 29-30 & n.30.

96. Stigler notes, as an exception, firms engaged in selling to the government where it reveals full information about sealed bids. Stigler, *supra* note 42, at 48.

97. McKinnon, *Stigler's Theory of Oligopoly: A Comment*, 74 J. POL. ECON. 281, 285 (1966); *cf.* J. Kwoka, *supra* note 42, at 15.

98. J. Kwoka, *supra* note 42, at 16. Kwoka also questions Stigler's assumptions as to what level of departure from expected shares will be observed, and his use of inconsistent assumptions about old and new customers. *Id.* at 15-16 (citing McKinnon, *supra* note 97).

99. Cowling & Waterson, *Price-Cost Margins and Market Structure*, 43 *ECONOMICA* 267 (1966); J. Ordovery & R. Willig, *Herfindahl Concentration Index*, in *Background Papers re: Merger Guidelines* (S. Edwards coord.) (1981) (memorandum to ABA Section 7 Clayton Act Comm.) (unpublished manuscript on file with the *California Law Review*); *see* J. Kwoka, *supra* note 42.

100. Ordovery, Sykes & Willig, *supra* note 23, at 1866.

101. L. SULLIVAN, *supra* note 12, at 621.

102. Hills, Baxter, Campbell & Turner, *Panel Discussion: The New Merger Guidelines*, 51 *ANTITRUST L.J.* 317, 326 (1982) [hereinafter cited as *Panel Discussion*]; accord F. SCHERER, *supra* note 4, at 59 n.46; Posner, *supra* note 46, at 1602.

Furthermore, some economists believe that collusion or interdependent pricing is facilitated by *equality*—not asymmetry—of market shares.<sup>103</sup> To the extent this is correct (and the effect is not outweighed by other factors) the HHI's emphasis is misplaced.<sup>104</sup>

Empirical work in the United States and other countries also has failed to result in a clear preference for the HHI over the more traditional CR's. After reviewing numerous studies, Frederic Scherer concluded that "[t]he results are equivocal. . . . The differences for the most part tended to be small, suggesting that a verdict be deferred until data of greater quality and abundance are tested."<sup>105</sup> A more recent review by Kwoka found only a small amount of evidence suggesting that the HHI is superior to the CR4.<sup>106</sup>

Thus, although the HHI may be slightly preferred on both theoretical and empirical grounds, both the CR4 and the HHI are accepted measures of concentration, and "the authenticity of one of these measures is not so overwhelming relative to the other at this stage in our science that one has the right to ignore the other . . . ."<sup>107</sup> Moreover, the literature concerning "critical levels" of CR's is far richer than the literature concerning the HHI. Numerous studies consider the point at which CR's suggest reason for concern about supracompetitive pricing.<sup>108</sup> There is no comparable body of literature for the HHI.<sup>109</sup> Assistant Attorney General Baxter concedes, with commendable candor, that the Guidelines' HHI thresholds are somewhat arbitrary.<sup>110</sup> For instance, seven months before the Guidelines were issued, one of their

103. See F. SCHERER, *supra* note 4, at 160; Hay, *Oligopoly, Shared Monopoly, and Antitrust Law*, 67 CORNELL L. REV. 439, 447 (1982); see also P. Pautler, A Review of the Economic Basis for Broad-Based Horizontal Merger Policy 54 n.197 (July 1982) (unpublished manuscript forthcoming in the ANTITRUST BULL.).

104. See F. SCHERER, *supra* note 4, at 58.

105. *Id.* at 279-80.

106. J. Kwoka, *supra* note 42, at 21, 30-31. Kwoka also found both measures to be inferior to the CR2, see also Kwoka, *supra* note 20, at 103, 106, 108, but his results have been attacked by several commentators, e.g., F. SCHERER, *supra* note 4, at 281 n.48; Phillips, *Comments on Weiss*, in ANTITRUST L. & ECON. 286, 289 (O. Williamson ed. 1980).

107. Record at 663, 754 (testimony of George Stigler), *Marathon Oil Co. v. Mobil Corp.*, 530 F. Supp. 315 (N.D. Ohio), *aff'd*, 669 F.2d 378 (6th Cir. 1981), *cert. denied*, 102 S. Ct. 1490 (1982); accord R. POSNER & F. EASTERBROOK, *supra* note 12, at 462.

108. E.g., Dalton & Penn, *The Concentration-Profitability Relationship: Is There a Critical Concentration Ratio?*, 25 J. INDUS. ECON. 133 (1972); White, *Searching for the Critical Concentration Ratio: An Application of the "Switching of Regimes" Technique*, in STUDIES IN NONLINEAR ESTIMATION 61 (S. Goldfeld & R. Quandt eds. 1976).

109. The difficulty of computing HHI's has limited their use in the literature. See Kelly, *A Generalized Interpretation of the Herfindahl Index*, 48 S. ECON. J. 50, 50 (1981); Markham, *supra* note 22, at 259.

110. Baxter, *supra* note 6, at 292 ("Mergers on both sides of those lines really should be treated the same. The lines themselves are arbitrary and reflect the fact that we were born with ten fingers and have gotten used to a base ten system. They have no magical qualities beyond that.").



principal drafters identified 1600 as the critical HHI threshold indicating high concentration.<sup>111</sup> On the other hand, George Stigler has testified that he does not become concerned about industry concentration until the HHI reaches 2000 to 2500.<sup>112</sup>

Apart from the question of whether CR4's or the HHI enjoys stronger theoretical and empirical support, during the past decade there has been increasing questioning of the assumption that concentration, however measured, is causally linked with supracompetitive pricing.<sup>113</sup> Importantly, observers in the "liberal" and "conservative" schools have increasingly recognized that there is often a strong correlation between profitability and individual firm market shares.<sup>114</sup> Scholarly debate now focuses on two issues, namely whether concentration *also* makes a significant difference (and if so, under what circumstances), and whether the correlation between market share and profitability represents only the greater efficiency and cost savings of firms with high market shares, or, as some evidence suggests, also may reflect an element of pricing discretion at least where products are differentiated.<sup>115</sup>

This debate has considerable importance for merger enforcement, for it raises the question of whether high concentration independently contributes toward supracompetitive pricing. An interesting recent study found evidence that concentration acts only as a proxy for high individual-firm market shares.<sup>116</sup> If this is correct, it could suggest that substantially more attention should be given to market shares than to

111. *Changing Currents in Antitrust Enforcement are Probed by Government Officials, Practitioners*, ANTITRUST & TRADE REG. REP. (BNA) No. 1040, A-2, at A-5 (Nov. 19, 1981).

112. Record at 646-47, *Marathon Co. v. Mobil Corp.*, 530 F. Supp. 315 (N.D. Ohio), *aff'd*, 669 F.2d 378 (6th Cir. 1981), *cert. denied*, 102 S. Ct. 1490 (1982).

113. *E.g.*, Bork, *Emerging Substantive Standards—Developments and Need for Change*, 50 ANTITRUST L.J. 179, 184 (1982) ("Oligopoly theory has been decimated in the past few years, both by theoretical argument and empirical studies."). The literature is exhaustively reviewed in P. Pautler, *supra* note 103.

114. See F. SCHERER, *supra* note 4, at 282-85; Deimsetz, *Two Systems of Belief About Monopoly*, in *INDUSTRIAL CONCENTRATION: THE NEW LEARNING* 164 (H. Goldschmid, H. Maim & J. Weston eds. 1974); Gale & Branch, *Concentration versus market share: which determines performance and why does it matter?*, 27 ANTITRUST BULL. 83 (1982); Kwoka, *supra* note 20; J. Ordover & R. Willig, *supra* note 99, at 6. *But cf.* Landes & Posner, *Market Power in Antitrust Cases*, 94 HARV. L. REV. 937, 944-47, 958-59 (1981) (arguing that market power is a function of market share, market elasticity of demand, and elasticity of supply of competing firms, so inferences from market share alone can be misleading).

115. See F. SCHERER, *supra* note 4, at 284; P. Pautler, *supra* note 103; Porter, *The Structure Within Industries and Companies' Performance*, 61 REV. ECON. & STAT. 214, 226-27 (1979). *But cf.* Gale & Branch, *supra* note 114, at 92-97 (efficiency and cost saving more important than pricing effects); D. Ravenscraft, *Structure-Profit Relationships at the Line of Business and Industry Level* (Mar. 1982) (unpublished manuscript on file with the *California Law Review*) (same).

116. D. Ravenscraft, *supra* note 115, at 26. Ravenscraft's work follows earlier and not altogether successful efforts to separate the effects of market share from the effects of concentration. See Shepherd, *The Elements of Market Structure*, 54 REV. ECON. & STAT. 25 (1972).

concentration, whether measured by CR's or by the HHI.<sup>117</sup>

#### IV

#### THE SIGNIFICANCE AND WISDOM OF THE CHANGE

By switching from traditional concentration ratios to the HHI, the new Guidelines abandoned CR's in favor of a measure of which, it was estimated, "not one in ten members of the merger and acquisition bar has even heard."<sup>118</sup> The significance and wisdom of using the HHI instead of CR's is different for each of the three ways the Guidelines use the index: to establish safe harbor post merger concentration levels, to establish a concentration level above which the Department will look upon a merger with increased scrutiny, and to measure the likely competitive impact of a merger.<sup>119</sup>

##### A. Safe Harbor

Because of their insensitivity to the division of market shares among the leading firms, concentration ratios are unsuitable for establishing safe harbors of low concentration where mergers will not be challenged. Adopting the HHI for this purpose, however, will probably result in little improvement in section 7 enforcement. For one thing, there is some question whether safe harbors are needed at all. For another, even if the need for safe harbors is conceded, the HHI might not be well suited to the task.

The unsuitability of using CR's to establish safe harbors was explained by Posner more than a decade ago.<sup>120</sup> He suggested that a plausible CR-based rule would exempt mergers from challenge unless the CR8 was 50% or more after the merger. However, in a market consisting of two firms each having a 20% share and numerous firms with de minimis shares, such a rule would allow the leading firms to merge—which was implicitly unacceptable.<sup>121</sup> The same analysis

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117. If concentration by itself is of less concern than high market shares, particularly of leading firms, this also supports the suggestion that mergers of firms with relatively large market shares occasionally should be permitted in order to allow more effective competition for leading firms. See P. Pautler, *supra* note 103, at 60; Ordoover, Sykes and Willig, *supra* note 23, at 1870-71; Porter, *Strategic Interaction: Some Lessons From Industry Histories for Theory and Antitrust Policy*, in STRATEGY, PREDATION, AND ANTITRUST ANALYSIS 449, 495-97 (S. Salop ed. 1981). But see 4 P. AREEDA & D. TURNER, *supra* note 4, at ¶ 912b.

118. Pelster & Stangle, *New Antitrust Chief and Herfindahl Index*, N.Y.L.J., Mar. 17, 1981, at 1, col. 1, at 2, col. 1.

119. See *supra* Section I-B.

120. Posner, *supra* note 46, at 1602-03.

121. *Id.* at 1603. Posner was writing about a general standard to use in judging mergers, not a safe harbor as such, but the analysis is the same. His preferred standard was the same one adopted by the Guidelines for markets that are not "highly concentrated," namely a 100 point increase in the HHI. *Id.*

would apply to a standard based on the CR4. To be useful, any safe harbor level would have to be sufficiently high that it would have the unwanted effect of allowing mergers of leading firms with large market shares. For instance, few observers would consider a market concentrated unless the CR4 was 45% or higher,<sup>122</sup> yet few would presume a merger creating a firm with a 45% share to be lawful.<sup>123</sup> Thus, it is inappropriate to use CR's for safe harbor purposes.

Safe harbors may not be needed at all, however. Certainly it would be a mistake to guarantee that mergers in this region will not be challenged. Posner proposed such a guarantee many years ago,<sup>124</sup> and at that time it may have made sense as a means of reducing the risk that a merger unexpectedly would be challenged after consummation. Since that time, however, the Hart-Scott-Rodino Act has been enacted,<sup>125</sup> and participants in most substantial mergers now learn, from feedback during the waiting period mandated by that Act, whether challenge is likely.<sup>126</sup> Given this relatively quick and inexpensive review and the absence of moral stigma associated with proposing illegal mergers, uncertainty about the likelihood of government challenge is not likely to prevent many mergers.

Another problem with a safe harbor of low concentration is the incentive it provides for firms to merge. If an industry is near the safe harbor threshold and rumors suggest that mergers will be occurring, an industry member contemplating a future horizontal merger will be under pressure to act quickly.<sup>127</sup> Since this effect adds to merger planning a strategic consideration unrelated to economic efficiency, it can be expected to result in some suboptimal decisions.

Even if a safe harbor is advisable at all, the wisdom of using the HHI to demarcate it depends on one's confidence in the accuracy of the HHI as a predictor of supracompetitive pricing. As the previous Section has shown, the HHI's accuracy is far from unfailing. Even the Guidelines qualify their reliance on the HHI with the "leading firm proviso."<sup>128</sup>

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122. See authorities cited in Heublein, Inc., 96 F.T.C. 385, 577 & n.9 (1980).

123. See *infra* note 135.

124. Posner, *supra* note 46, at 1603.

125. Hart-Scott-Rodino Antitrust Improvements Act of 1976, Pub. L. No. 94-435, 90 Stat. 1383.

126. See *Panel Discussion, supra* note 102, at 334-35 (remarks of Thomas J. Campbell, Director, FTC Bureau of Competition). See generally S. AXINN, B. FOGG & N. STOLL, ACQUISITIONS UNDER THE HART-SCOTT-RODINO ANTITRUST IMPROVEMENTS ACT (1979).

127. It is interesting to compare the concern of practicing antitrust attorneys about this effect, see Spivack, *The New Merger Guidelines Are Substantially Different*, *Legal Times* (Washington), Aug. 2, 1982, at 38, 41, with the antitrust agencies' lack of concern, see *Panel Discussion, supra* note 102, at 330.

128. See *supra* note 31 and accompanying text.

Admittedly, concern that merger enforcement not interfere with the achievement of efficiency has been a recurrent theme in the recent literature,<sup>129</sup> and it has been recognized that economies of scale can be achieved only at levels of production that, in some industries, may require substantial market shares.<sup>130</sup> However, most scale economies can be enjoyed without market shares greater than 14%—a combined share unlikely to be challenged, according to the Guidelines, in all but highly concentrated markets.<sup>131</sup> One study of twelve major United States industries found that in only one such industry would national market shares in excess of 14% be needed to recognize most if not all advantages of multi-plant size.<sup>132</sup> Achieving efficiencies is least likely to require large market shares in very unconcentrated markets,<sup>133</sup> and yet it is in those markets that the HHI-based safe harbor serves presumptively to allow mergers of firms with very large shares. Safe harbors based on HHI's are thus not well suited to respond to concerns about efficiency.<sup>134</sup>

At no safe harbor threshold do the benefits of establishing a safe harbor appear to outweigh the costs. The level established by the Guidelines—1000 points—probably is too high. The weight of the economic learning suggests that in certain circumstances firms with 30% market shares—which could be formed while staying within the 1000 point threshold—can enjoy some market power.<sup>135</sup> Indeed, there is

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129. See, e.g., Muris, *The Efficiency Defense Under Section 7 of the Clayton Act*, 30 CASE W. RES. L. REV. 381 (1980); Williamson, *Economies as an Antitrust Defense Revisited*, 125 U. PA. L. REV. 699 (1977). The Guidelines provide for an "efficiencies defense," but only in "extraordinary cases"; they claim that the thresholds are sufficiently high that available efficiencies can be achieved in "the overwhelming majority of cases." Guidelines § V(A), 47 Fed. Reg. at 28,502, 71 CALIF. L. REV. at 665.

130. F. SCHERER, *supra* note 4, at 81-118.

131. See *supra* notes 115-16 and accompanying text.

132. F. SCHERER, *supra* note 4, at 117-19. The industries were beer brewing, cigarettes, fabric weaving, paints, petroleum refining, shoes, glass bottles, cement, ordinary steel, bearings, refrigerators, and storage batteries. Only the refrigerator industry required a share of between 14% and 20% to achieve scale economies. Scherer noted, however, that the steel industry may have changed since he studied it, and he also mentioned that preliminary analyses of the Profit Impact of Market Strategy (PIMS) data set "imply large-firm cost advantages, real and pecuniary, greater than those uncovered through [his] interview survey of 12 manufacturing industries." *Id.* at 284.

133. Turner, *Observations on the New Merger Guidelines and the 1968 Merger Guidelines*, 51 ANTITRUST L.J. 307, 311 (1982).

134. In contrast, the Edwards task force of lawyers and economists proposed a presumption that mergers involving combined shares of less than 10% (or less than 20%, if one firm's market share is less than 2%) would not be challenged. Edwards Task Force, *supra* note 9, at 1561.

135. *Id.* at 1563; cf. Kwoka, *supra* note 20, at 107 (where the leading firm had at least a 26% share, price-cost margins increased by 4 percentage points); Landes & Posner, *supra* note 114, at 972-73 (where the elasticity of supply is 0 and the elasticity of demand is 2, a merger of 20% and 10% share firms would increase market power by 5.9%, even if collusion is not facilitated); Wentz, *Mobility Factors in Antitrust Cases: Assessing Market Power in Light of Conditions Affecting Entry and Fringe Expansion*, 80 MICH. L. REV. 1545, 1575 (1982) (in a market with three 10% firms and

even some question whether the Department will honor its commitment not to challenge such mergers.<sup>136</sup> Recall also that a market with an HHI of 1000 could have a CR4 of over 60%.<sup>137</sup> Lowering the safe harbor threshold to 500 points would permit the formation by merger of firms with up to only 21%-22% shares, and the attaining of CR4s of up to only 45%,<sup>138</sup> but consider how rarely such a safe harbor could apply. The HHI before the merger would have to be below 400 and the merging firms would have to be contributing more than 98 points to this amount.<sup>139</sup> Such a merger is conceivable, but neither so common nor so clearly beneficial that the added complexity of establishing a safe harbor seems justifiable.

For these reasons, establishing a safe harbor of low concentration probably is ill-advised. A guaranteed safe harbor, and a safe harbor of 1000 HHI points, seem particularly inappropriate. Lowering that threshold would reduce both the costs and the benefits, with the benefits never quite catching up with the costs.

### B. Increased Scrutiny

Use of the HHI instead of CR's to specify a threshold to trigger increased scrutiny by antitrust enforcement agencies is unlikely to have a substantial effect on the selection of mergers for challenge. Given this, and given also the costs associated with changing indexes, there is no persuasive reason for changing to the HHI unless change is desired for its own sake.

The threshold triggering increased scrutiny is considerably less important in the new Guidelines than in the 1968 version. In the 1968 Guidelines a finding of high concentration resulted in a downward adjustment in the market share combinations likely to be challenged, whereas in the new Guidelines a similar finding merely moves a case from the "unlikely to challenge" category to an indeterminate category

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with the remaining firms being only fringe participants, a merger of two of the leaders would result in a potential for supracompetitive pricing well above what market concentration indexes alone would indicate). *But see* R. BORK, *THE ANTITRUST PARADOX* 221-22 (1978); Y. BROZEN, *MERGERS IN PERSPECTIVE* 80-85 (1982) (combined shares of even 50% will not increase prices if there are at least two major competitors). *See generally* sources cited *supra* note 114.

136. *See* Turner, *Horizontal Mergers*, in *TWENTY-SECOND ANNUAL ADVANCED ANTITRUST SEMINAR* (PLI) 143, 153-54 (Oct. 7, 1982) ("I would hesitate to encourage a merger of two leading firms (each with, say, 10% or more of the market) who are much larger than their competitors.").

137. *See supra* note 28.

138. *See* P. Pautler, *supra* note 28, at 14 (fig. 1).

139. Increases of less than 100 points are presumptively permitted in all but highly concentrated markets even without a safe harbor. The smallest combined share permitted by the 100-point threshold is 14% (7% & 7%, with an HHI increase of 98 points), and before merging two such firms would contribute 98 points to an HHI.

where further analysis is required.<sup>140</sup> Moreover, the new Guidelines emphasize the importance of numerous factors other than market shares and concentration,<sup>141</sup> including especially the complex issue of ease of entry.<sup>142</sup> Since it has become a signal for further study rather than for enforcement action, and since market share is itself but one of many factors considered, the "highly concentrated" threshold is of limited significance.

Accordingly, using the HHI instead of CR's for that threshold would have a significant effect only if the results of the two measures frequently differ. They do not. Several empirical studies have found that the CR4 and the HHI have "highly correlated numerical values."<sup>143</sup> Moreover, the correlation may be especially high in very concentrated markets.<sup>144</sup> Thus, the adoption of the HHI is unlikely to change the results of many merger reviews.<sup>145</sup>

Even allowing for the probability that changing from CR's to the HHI will rarely make any significant difference, changing to the HHI would be appropriate if the HHI were clearly preferable to CR's as a matter of theory and empirical proof. However, as has already been shown,<sup>146</sup> that is not the case. The HHI may be slightly superior to the CR4 as a predictor of supracompetitive pricing, but several practical disadvantages counsel against changing to it, given its limited benefits, unless change is desired for its own sake.

First, the HHI requires more information, is somewhat harder to use, and may be subject to greater error than CR's.<sup>147</sup> The cost of

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140. Compare 1968 Guidelines, *supra* note 8, para. 5, 2 TRADE REG. REP. (CCH) at 6884 with Guidelines § III(A)(1)(c), 47 Fed. Reg. at 28,497, 71 CALIF. L. REV. at 656.

141. See *supra* note 36. The Federal Trade Commission may give even greater attention to these other factors. FTC, Statement Concerning Horizontal Mergers § III (June 14, 1982), reprinted in TRADE REG. REP. (CCH) No. 546, at 71, 75 (June 16, 1982) (special supplement to 2 TRADE REG. REP. (CCH) ¶ 4225 (Aug. 9, 1982)).

142. Guidelines § III(B), 47 Fed. Reg. at 47,828, 71 CALIF. L. REV. at 657. See generally 4 P. AREEDA & D. TURNER, *supra* note 4, ¶ 917; W. BAUMOL, J. PANZER & R. WILLIG, CONTESTABLE MARKETS AND THE THEORY OF INDUSTRY STRUCTURE (1982); Wentz, *supra* note 135 (discussing complexity and importance of determining ease of entry).

143. F. SCHERER, *supra* note 4, at 58 & nn.51-52; Bailey & Boyle, *The Optimal Measure of Concentration*, 66 J. AM. STAT. ASS'N 702 (1971). But cf. Kwoka, *Does the Choice of Concentration Measure Really Matter?*, 29 J. INDUS. ECON. 445 (1981).

144. See Schmalensee, *supra* note 45, at 188, 192 (defining "highly concentrated" as CR4 greater than or equal to 50%). But see Hause, *The Measurement of Concentrated Industrial Structure and the Size Distribution of Firms*, 6 ANNALS OF ECON. & SOC. MEAS. 73, 94-95 (1977) (correlation between CR4 and HHI in a study of Swedish industries was relatively low, and particularly low for "highly concentrated" industries—defined as those in which HHI equalled or exceeded 1600).

145. Changing indexes is particularly unlikely to change such results if, as we have seen has happened on occasion, reviewers using CR's consider the distribution of market shares.

146. See *supra* text accompanying notes 95-112.

147. See *supra* text accompanying notes 18-19.

changing indexes is imposed not only on government agencies reviewing mergers for enforcement purposes, but also on businesses and their attorneys reviewing mergers in advance without benefit of discovery.<sup>148</sup> Use of the HHI complicates business planning of mergers because the HHI is considerably less familiar to American business, although the Guidelines may change this, and the significance of various HHI levels is less apparent to the untrained observer than the significance of CR's.

Second, changing indexes may have a ratchet-like effect. Where the case law is against the Department, the Department probably will not prevail regardless of the Guidelines; however, regardless of the case law, the Department will have difficulty challenging mergers ostensibly permitted by the Guidelines.<sup>149</sup> The importance of this effect should not be overstated, however, since much of it would be associated with any easing of the Guidelines.

Third, the Guidelines' use of the HHI will complicate and make less predictable government and private merger litigation. With a few, mostly unfortunate exceptions, judicial precedents use CR's and combined shares rather than HHI's and changes in HHI's.<sup>150</sup> The Department recognizes it will have to try cases under existing law, so its recent merger complaints use CR's, combined shares, and HHI's.<sup>151</sup> The *Pabst-Heileman* experience suggests that private litigation also will involve proof of and argument about HHI's as well as traditional measures.<sup>152</sup> Thus, merger litigation will be complicated by the addition of an extra issue—which measure to use—and the need to calculate and prove the significance of HHI's as well as traditional measures.<sup>153</sup>

148. The need to have every firm's market share before an HHI can be computed also may increase the burden of discovery requests.

149. See, e.g., *United States v. Tracinda Inv. Corp.*, 464 F. Supp. 660, 664-65 (C.D. Cal. 1979) (temporary restraining order denied where defendant showed 1968 Guidelines not violated); *United States v. Hammermill Paper Co.*, 429 F. Supp. 1271, 1280 (W.D. Pa. 1977) (complaint dismissed, in part because 1968 Guidelines not violated). But see, e.g., *United States v. Northwest Indus.*, 301 F. Supp. 1066, 1084 (N.D. Ill. 1969); *United States v. Atlantic Richfield Co.*, 297 F. Supp. 1061, 1073 (S.D.N.Y. 1969) (recognizing that the Guidelines are not binding on either the Department or the courts).

The Guidelines have this to say about the problem:

In appropriate cases, the Department will challenge mergers that are competitively objectionable under the general principles of the Guidelines regardless of whether they are covered by the specific standards . . . [T]he Guidelines are designed primarily to indicate when the Department is likely to challenge mergers, not how it will conduct the litigation of cases that it decides to bring.

Guidelines § I, 47 Fed. Reg. at 28,494, 71 CALIF. L. REV. at 649.

150. See *supra* Section II-B. The 1968 Guidelines, in comparison, were described as a restatement of § 7 law. ABA ANTITRUST SECTION, *supra* note 10, at 69; see also authorities cited in Joffe, *Guidelines—Past, Present and Future*, 50 ANTITRUST L.J. 187, 190 n.9 (1981).

151. Interview with Mark P. Leddy, *supra* note 5.

152. See *supra* text accompanying notes 83-88.

153. The result can be one of ships passing in the night, as in the *Pabst-Heileman* litigation, where Pabst's brief focused almost exclusively on traditional measures and the case law, JMSL's

Moreover, where the HHI suggests a different result than would obtain under the traditional measures, use of the HHI by itself makes the outcome of litigation less certain.

Fourth, the palpable simplicity of the CR serves to make unthinking reliance on it less likely, perhaps, than will be the case with the all-inclusive HHI. Choosing the best available summary measure of concentration is less important than understanding the uses and limitations of whatever measure is chosen.<sup>154</sup> The antitrust agencies, and most courts, now understand the limitations of CR's and often consider them in light of developing economic wisdom.<sup>155</sup> HHI's, although appearing to be more precise and sophisticated than CR's, are only slightly superior, and it would be unfortunate if the HHI were regarded as substantially less fallible.

For these reasons, the costs of changing indexes outweigh the benefits, unless change is a desirable end in itself. As we shall see below, that in fact may be the case.

### C. *Impact of a Merger*

Using the change in the HHI as the quantitative measure of the impact of a merger differs little from the 1968 Guidelines' approach. The 1968 Guidelines specified numerical thresholds that roughly approximate a 75 point increase in the HHI for mergers in "less highly concentrated" markets,<sup>156</sup> and a 35 point increase for mergers in "highly concentrated" markets,<sup>157</sup> as opposed to the 1982 Guidelines' threshold increases of 100 points and 50 points, respectively.<sup>158</sup> Thus, the

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and Heileman's briefs focused almost exclusively on HHI's and the Guidelines, and the court discussed only HHI's but never decided whether the Guideline thresholds were exceeded. *See supra* text accompanying notes 83-88.

154. F. SCHERER, *supra* note 4, at 59.

155. *Cf. supra* text accompanying notes 89-91. A thorough analysis is particularly important because the economic learning about market structure and behavior is in a state of flux. P. Pautler, *supra* note 103, at 43; Sullivan, *Thirty Years of Merger Law Enforcement: Choosing Among Competing Styles of Analysis in the Development of Merger Policy*, 49 ANTITRUST L.J. 1395, 1407 (1980). Most of the important research has concerned CR's and market shares, and these should continue to be important in future research. *See, e.g.,* Schmalensee, *supra* note 45, at 186; *see also supra* text accompanying notes 108-09. The use of the HHI may be expected to increase as a result of its espousal by the Guidelines, but difficulty in collecting data should continue to make CR's at least as common.

156. This is depicted graphically in P. Pautler, *supra* note 28, at 19 fig. 2. The 1968 Guidelines' threshold, in HHI equivalents, are 50 points (5% & 5%), 80 points (10% & 4%), 90 points (15% & 3%), 80 points (20% & 2%), and 50 points (25% & 1%). 1968 Guidelines, *supra* note 8, para. 6, 2 TRADE REG. REP. (CCH) at 6884.

157. *See* P. Pautler, *supra* note 28, at 19. The 1968 Guidelines' threshold, in HHI equivalents, are 32 points (4% & 4%), 40 points (10% & 2%), and 30 points (15% & 1%). 1968 Guidelines, *supra* note 8, para. 5, 2 TRADE REG. REP. (CCH) at 6884.

158. *See supra* note 32.



"change" to the HHI really is not much of a change.<sup>159</sup> This Section will briefly explore whether the Guidelines could have been improved upon by adopting instead a combined share measure of impact.<sup>160</sup>

The combined market share approach finds support in the case law,<sup>161</sup> and from Areeda and Turner, who favor a 13% combined share test for presumptive unlawfulness.<sup>162</sup> It is simple and easy to understand and apply. Moreover, basing the threshold on combined market share would recognize that minimum market shares often can be needed to achieve efficiencies, but that shares above a certain level are rarely necessary.<sup>163</sup>

In contrast, the Guidelines' 100 point standard would allow, presumptively, the formation by merger of firms with 35% shares (34% and 1%),<sup>164</sup> 26% shares (24% and 2%), or 19% shares (16% and 3%). Such shares are likely to exceed those needed for efficiency gains, and accordingly there is less to be lost by presuming them to be unlawful in the first instance. Conversely, the regular challenging of mergers in highly concentrated industries involving HHI increases of 50 points or less—for instance, if a Justice Department more hostile to mergers lowers the threshold—could prevent the formation of firms with 10% or smaller market shares. Such shares may well be needed for efficient production, and preventing their attainment could be costly to society. A combined market share test would be more sensitive to this problem.

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159. Although the new Guidelines raise the thresholds, switching to the HHI to determine "high concentration" means that certain markets will be highly concentrated under the new standard (HHI above 1800) or the previous standard (CR4 of 75%), but not both, and since an HHI of 1800 corresponds most closely with a CR4 of 67%-70%, *see supra* note 30, more markets will be highly concentrated under the new standard than under the previous one. Nonetheless, the new Guidelines should prove more lenient than the 1968 Guidelines, because under the new Guidelines a finding of "high concentration" merely shifts many mergers into an indeterminate category where further scrutiny is applied, while such a finding under the 1968 Guidelines rendered a comparable category of mergers subject to presumptive challenge, and because the 1968 Guidelines, unlike the new ones, imposed stricter standards whenever a trend toward increasing concentration had been shown. *See Spivack, supra* note 127; *cf. Scarbrough & Pfunder, supra* note 28 (the extent of the additional leniency will depend on enforcement discretion).

160. Little discussion is needed to show that it would be impractical to measure the size of a merger by the resulting change in a concentration ratio, rather than the HHI. The unacceptability of CR's for this purpose stems from their insensitivity to changes involving firms already included in the calculation. Where the fifth largest share of a market is 5%, the CR4 will increase by 5% whether a merger involves the first and second firms or the fourth and fifth. 4 P. AREEDA & D. TURNER, *supra* note 4, ¶ 913b1.

161. *See supra* note 51.

162. 4 P. AREEDA & D. TURNER, *supra* note 4, ¶ 907c (also proposing an 18-20% threshold where one firm's share was 2% or less). A de minimis exception is needed because section 7 only prevents lessening of competition. Clayton Act § 7, 15 U.S.C. § 18 (1976).

163. *See supra* notes 130-32 and accompanying text.

164. The Guidelines' "leading firm proviso," *see supra* note 31, indicates that the Department may be likely to challenge a merger involving a leading firm with a 35% share even if the 100 point threshold is not exceeded.

An HHI-based test also is more sensitive to errors in computing market shares. Problems in making accurate calculations are exacerbated by the multiplication of shares. Whenever two merging firms have different shares, the size of the smaller share is critical, since it is being multiplied by the larger.<sup>165</sup>

If one were certain that merger enforcement should be concerned only with preventing increases in the likelihood of tacit and actual collusion, and that the HHI accurately predicted this likelihood, the increase in the HHI nonetheless would be the obvious choice of measure.<sup>166</sup> If, however, one is uncertain about the accuracy of the HHI as a predictor of supracompetitive pricing, one should be more hesitant. Furthermore, if there is a significant chance that individual market shares are linked directly with supracompetitive pricing,<sup>167</sup> it makes more sense to look at the market share of the firm created by the merger than at the increase in the HHI.

#### D. Indirect Effect of Using the HHI

Decades of merger litigation have left precedents finding violations of section 7 based on CR's, combined shares, and concentration trends that would not trouble the current Antitrust Division.<sup>168</sup> These old cases continue to be cited in briefs and judicial decisions, and inevitably may influence the thinking of Antitrust Division staff, the Federal Trade Commission, and the courts. Had the Antitrust Division merely adjusted the 1968 Guidelines by raising the thresholds, enforcement staff and adjudicators would have compared the new Guidelines' thresholds to those of the 1968 Guidelines and to the case law. The natural tendency, especially of adjudicators, would have been to view the new thresholds in that context, and as only another source of guidance. Instead, adopting the HHI offers a clean break with the past. Court decisions offer no useful guidance as to what thresholds should raise concern, and the literature offers little more. In the *Pabst-Heile-*

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165. This is an illustration of the mathematical principle that the percentage error of the product of two quantities is approximately equal to the sum of the percentage errors in each of the quantities. Measuring a market share to a precision of one percentage point may be acceptable for an 8% firm (12.5% error) but not for a 1% firm (100% error).

The problem is further compounded by the unavoidable time lag in obtaining data. A merger challenged in 1983 will be judged, at least in the first instance, on 1982 (or even 1981) market shares. Estimation of 1983 market shares will inevitably introduce error due to the guesswork involved.

166. Cf. Ordovery, Sykes & Willig, *supra* note 23 (in certain instances changes in the HHI can be useful indicators of mergers' competitive effects).

167. See *supra* notes 114-16 and accompanying text.

168. See Fox, *supra* note 41, at 563-65, 575-91. Some of these precedents are criticized even by the most liberal commentators. See Kramer, *Antitrust Today: The Baxterization of the Sherman and Clayton Acts*, 1981 Wis. L. Rev. 1287, 1290.

man litigation, for instance, none of the briefs suggested thresholds differing from those in the Guidelines. The Guidelines' thresholds, for all practical purposes, are "the only game in town."

Changing indexes probably accelerated the acceptance by the Antitrust Division staff of a somewhat more relaxed attitude toward mergers, since the HHI has been the standard measure of concentration starting shortly after the arrival of Assistant Attorney General Baxter. It may have had the same result at the Federal Trade Commission, where the staff now regularly reviews HHI's, but only rarely examines CR's and combined shares.<sup>169</sup> Other government agencies charged with reviewing mergers also have started using, or are considering using, the HHI, and at least thus far have used the numerical thresholds in the Guidelines.<sup>170</sup> The effect on the courts is more difficult to predict. The *Pabst-Heileman* litigation suggests that courts will rely on the Guidelines, although perhaps not as heavily as in the past, and on the HHI. To the extent this occurs, and to the extent the HHI becomes accepted as the preferred quantitative measure of concentration and of the impact of a merger on competition, reversion to the former judicial hostility to mergers may become less likely. It is in these ways that the change to the HHI may make the greatest difference.<sup>171</sup>

#### CONCLUSION

Although the Justice Department states that using the HHI instead of CR's is a "significant" change,<sup>172</sup> the change is more of form and language than of substance. Few decisions as to whether to challenge a merger will come out differently because the threshold for increased scrutiny turns on an HHI rather than a comparable CR4. Quantitatively measuring the impact of a merger by the increase in the HHI may be more elegant than using the paired market shares in the 1968 Guidelines, but had comparable thresholds been selected the results

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169. Interview with Walter Vandaele, Economic Adviser to the Director, FTC Bureau of Competition (Jan. 14, 1983). The FTC staff now routinely examines increases in HHI's caused by mergers, but also considers market shares of merging firms and other competitors in addition to other factors.

170. Delegation of Authority Regarding Holding Company Acquisition and Debt, 48 Fed. Reg. 170, 172; Processing of Applications, 48 Fed. Reg. 178, 185, 187 (Jan. 3, 1983) (Federal Home Loan Bank Board regulations); Interview with Stephen Rhoads, Senior Economist, Federal Reserve Board (Jan. 21, 1983) (Federal Reserve Board considering adopting HHI for its merger guidelines).

171. Victor Kramer recently made an observation similar to the one proposed here, and inferred a slightly sinister purpose for the shift: "[W]e are still going to use the numbers game . . . but we are going to use a different set of numbers. . . . One need not be clairvoyant to predict that the objective is to permit mergers that the existing merger guidelines suggest are unlawful." Kramer, *supra* note 168.

172. *DOJ Explanation, supra* note 14, at 6881-2.

generally would have been the same. Only for purposes of establishing a safe harbor would using the HHI instead of a CR change the outcome of many merger reviews (indeed, CR's are clearly unsuited for this purpose), but this is a new and probably ill-advised use of a concentration measure.

It is through the change in language and form of measurement that adoption of the HHI may have further reaching consequences. Given the current paucity of alternative sources of guidance as to appropriate HHI thresholds, adoption of the HHI by adjudicators as the preferred measure of concentration could accord great importance to the numerical thresholds of the new Guidelines. By contrast, the plethora of sources of guidance as to appropriate CR and market share thresholds would have minimized the impact of the new thresholds using traditional measures. Use of the HHI may have already contributed to the prompt institutionalization in the antitrust agencies of the more lenient standards of the new Guidelines. In the HHI, the Justice Department may have found, whether by inadvertence or design, a device that will facilitate the prompt, widespread, and perhaps enduring acceptance of a particular set of policy preferences. If, and only if, these new policies represent a substantial improvement over the status quo, do the benefits of shifting to the HHI outweigh the costs of increased complexity, uncertainty, and possible undue deference to an imperfect index.