Measuring Media Market Diversity: Concentration, Importance, and Pluralism

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I. INTRODUCTION

In *Prometheus Radio Project v. Federal Communications Commission*,[1] the Third Circuit reviewed the media cross-ownership limits proposed by the Federal Communications Commission ("FCC").[2] The Third Circuit critically examined the FCC's use of a "Diversity Index" to reach its proposed rules[3] and then remanded the Cross-Media Limits to the FCC for justification or modification.[4] Given this somewhat unusual decision—a court not deferring to an administrative agency on a technical rule-making issue—there has been surprisingly little reaction from the academic community.[5]

This Article begins with a discussion of *Prometheus*, ultimately concluding that the FCC's Diversity Index scheme is fatally flawed because it cannot simultaneously satisfy two assumptions shared by the FCC and the Third Circuit: (1) diversity in a media market decreases with ownership concentration; and (2) the contribution to diversity of an individual entity—"diversity importance"[6]—increases with the weighted market shares of that entity's outlets. In Part II, this Article considers two alternatives to the Diversity Index: one designed by Professor Eli Noam to emphasize pluralism—the number of voices in media markets—and one original index specifically designed to simultaneously satisfy the two assumptions shared by the FCC and the Third Circuit. In Part III, this Article tests these alternative indices by applying them to one of the FCC's

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1. 373 F.3d 372 (3d Cir. 2004), *cert. denied*, 125 S. Ct. 2904 (2005).

2. *See id.* at 402–12; 2002 Biennial Regulatory Review—Review of the Commission's Broadcast Ownership Rules and Other Rules Adopted Pursuant to Section 202 of the Telecommunications Act of 1996, *Report and Order and Notice of Proposed Rulemaking*, 18 F.C.C.R. 13,620 (2003) [hereinafter *Order*].

3. *See* 373 F.3d at 403–12.

4. *Id.* at 403.

5. *Compare* Byron L. Dorgan, *The FCC and Media Ownership: The Loss of the Public Interest Standard*, 19 NOTRE DAME J.L. ETHICS & PUB. POL'Y 443, 452–54 (2005) (criticizing the Diversity Index and commenting on the Third Circuit's remand of the Cross-Media Limits in *Prometheus*), *with* John F. Sturm, *Time for Change on Media Cross-Ownership Regulation*, 57 FED. COMM. L.J. 201, 205–06 (2004) (criticizing the Third Circuit's decision to remand the Cross-Media Limits). *See also* Ellen P. Goodman, *Media Policy Out of the Box: Content Abundance, Attention Scarcity, and the Failures of Digital Markets*, 19 BERKELEY TECH. L.J. 1389, 1411–13 (2004).

6. *See Order*, *supra* note 2, para. 396 (discussing diversity importance).

sample markets: Altoona, Pennsylvania. Part III concludes with the observation that the index proposed in this Article not only satisfies the two assumptions shared by the FCC and the Third Circuit, but also places greater practical weight on pluralism than Professor Noam's index. Finally, the Article concludes with the suggestion that adopting a suitable formulaic measure of media diversity could be the first step in a broader review of governmental regulation of media markets.

II. ANALYZING *PROMETHEUS*

In *Prometheus*, the Third Circuit found that the FCC employed "several irrational assumptions and inconsistencies" when deriving the Cross-Media Limits.[7] In particular, the court found that the FCC had "inconsistently derived the Cross-Media Limits from its Diversity Index results."[8] This Part begins with a review of how the FCC defined the Diversity Index, applied it to various consolidation scenarios, and then used the results to determine its Cross-Media Limits. Subpart B then reviews the Third Circuit's analysis of these procedures and its grounds for holding that the FCC had inconsistently derived the Cross-Media Limits. Finally, Subpart C explains how the Third Circuit had in fact understated the problem, showing that the Diversity Index is fatally flawed because it cannot simultaneously satisfy all of the critical assumptions shared by the FCC and the Third Circuit.

A.   The FCC Procedure for Deriving Cross-Media Limits

This Subpart reviews the three-step procedure the FCC used to derive its Cross-Media Limits. The first section describes the FCC's Diversity Index and how the FCC applied the Diversity Index to media markets. The second section explains how the FCC used the Diversity Index to evaluate various hypothetical consolidation scenarios in media markets. The final section then describes the Cross-Media Limits that the FCC derived from its analysis of these consolidation scenarios.

1.   The Diversity Index

The FCC designed the Diversity Index to identify "at risk" media markets and based it on the Herfindahl-Hirschmann Index ("HHI"), which the Department of Justice and the Federal Trade Commission use to measure the concentration effects of proposed mergers in local markets.[9] An HHI score is calculated by summing the squares of the market shares of

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7. 373 F.3d at 402.

8. *Id.* at 403.

9. *See id.* (quoting *Order*, *supra* note 2, para. 394).

the competitors in a market. "At its core," the Diversity Index used the same formula.[10]

The FCC first selected which types of media outlets to include in calculating the Diversity Index by looking at "consumers' reported preferences for sources of local news and information."[11] It then assigned a relative weight to each type of media outlet based on the popularity of that source.[12] Using this procedure, the FCC assigned a weight of 33.8% to broadcast television, 20.2% to daily newspapers, 8.6% to weekly newspapers, 24.9% to radio, 2.3% to cable Internet, and 10.2% to other Internet sources.[13]

To apply the Diversity Index to a specific market, the FCC counted the number of outlets in the market within each included media type and assigned each outlet within the same type an equal market share.[14] So, for example, each of the twenty-three television stations in the New York City

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10. *Id. See also infra* Table 1 (providing the Diversity Index formula and sample calculations).

11. 373 F.3d at 403. Local news is the FCC's "recognized indicator of viewpoint diversity in local markets." *Id*. at 405 (citing *Order*, *supra* note 2, para. 394, which states, "News and public affairs programming is the clearest example of programming that can provide viewpoint diversity . . . [and] the appropriate geographic market for viewpoint diversity is local . . . ."). Of course, one could wonder whether the FCC's focus on local news contributes to an artificial sense of an ongoing crisis in viewpoint diversity insofar as other sources of information and perspectives are becoming substitutes for local news. However, such considerations are beyond the scope of this Article. Nonetheless, providing an adequate formula for measuring viewpoint diversity could be the first step in a broader reconsideration of the FCC's regulation of media diversity. *See infra* Part V.

12. *See* 373 F.3d at 403 (citing *Order*, *supra* note 2, paras. 412, 415, 417).

13. *Id.* Notably absent from this list is cable television. However, the Third Circuit held that the FCC properly excluded cable television "because of serious doubts as to the extent that cable provided independent local news . . . ," meaning news not also provided by local broadcast television. *Id.* at 405. But the Third Circuit then held that the same considerations should have led to the exclusion of Internet sources from the list on the ground that most of the local news on the Internet is also duplicative. *See id.* at 405–07. The court also reasoned that even though the Internet provides a "universe of information" through the Web sites of individuals and organizations, those Web sites typically fall short of being actual media outlets because they fail to provide the same aggregation and distillation functions as the traditional media. *Id.* at 407. Accordingly, the Third Circuit held that "[o]n remand, the Commission must either exclude the Internet from the media selected for inclusion in the Diversity Index or provide a better explanation for why it is included in light of the exclusion of cable." *Id.* at 408. As a factual matter, one might object that the Third Circuit is mischaracterizing much of what the Internet has to offer. *Cf. id.* at 406 n.34 (describing the *Drudge Report*, an online source identified by the FCC as an aggregator of news stories). Again, however, these considerations are outside the scope of this Article, although an adequate formula for measuring media diversity may be a useful component in a broader reconsideration of the FCC's role in regulating media diversity on these grounds. *See infra* note 66 and accompanying text.

14. 373 F.3d at 403.

market was assigned an equal 4.3% share of the television market.[15] The FCC then multiplied the assigned market shares of the outlets within each media type by the relative weight for that type.[16] Continuing the prior example, each broadcast television market share in New York City would be multiplied by 33.8% (.338) in order to calculate its weighted market share.[17]

The FCC then derived the weighted ownership shares of a single entity by combining the weighted market shares of all of the media outlets owned by that entity.[18] So, for example, ABC owned one television station and four radio stations in New York City.[19] The FCC combined ABC's weighted television share with its weighted radio share (4.3% multiplied by .338, which equals 1.45% for the weighted television share combined with a total of 6.7% for four radio stations multiplied by .249 for the radio market weight, which equals 1.67%).[20] Accordingly, the FCC assigned a total weighted ownership share of 3.12% to ABC's combination.[21]

Finally, the FCC summed the squares of the weighted ownership shares to calculate the market's Diversity Index score.[22] New York City, for example, received a total Diversity Index score of 373, to which ABC's squared weighted ownership share had contributed 9.8 points.[23] The FCC also used this methodology to calculate Diversity Index scores for several media markets of different sizes, measuring market size by the number of television stations in the market.[24]

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15. *Id.* The Third Circuit ultimately held that the FCC could not justify its use of these assigned equal shares rather than actual-use data in each market and remanded on this ground as well. *See id.* at 408–09. This was an independent ground for remand, however, and all of the other considerations in this Article should apply if the FCC adopts an actual-use methodology for determining an outlet's market share. As an aside, one can note that the effect of assuming equal shares rather than using actual-use data would be to understate concentration as measured by the Diversity Index. *See infra* Table 1 (showing that a market with ten equally-weighted outlets would receive a lower Diversity Index score and thus be deemed more diverse than a market with ten outlets and an uneven distribution of shares).

16. *See* 373 F.3d at 404.

17. *Id.*

18. *See id.*

19. *Id.*

20. *Id.*

21. *Id.*

22. *Id.*

23. *See Order*, *supra* note 2, app. C.

24. *See* 373 F.3d at 404 (citing *Order*, *supra* note 2, app. D). Appendix C of the *Order* also contains sample calculations for ten of these markets. *Order*, *supra* note 2, app. C.

2.   Consolidation Scenarios

Next, the FCC looked at how the markets' Diversity Index scores would change given different hypothetical consolidation scenarios.[25] The FCC considered seven possible combinations: (1) one newspaper and one television station; (2) one television station and all of the radio stations allowed under the local radio rule;[26] (3) one newspaper and all of the radio stations allowed under the local radio rule; (4) one newspaper, one television station, and half of the radio stations allowed under the local radio rule; (5) two television stations; (6) one newspaper and two television stations; and (7) one newspaper, two television stations, and all of the radio stations allowed under the local radio rule.[27] To determine the hypothetical effects of such combinations on media diversity, the FCC compared the Diversity Index scores of the markets before and after the combinations; the difference, an increase in the Diversity Index score, provided the FCC's measure of the loss of diversity due to the consolidation scenario.[28]

3.   The Cross-Media Limits

Finally, the FCC set the Cross-Media Limits, which varied with the size of the market, purportedly based on whether or not the relevant consolidation scenarios "resulted in acceptable increases to the average Diversity Index score[]" for that size of market.[29] For markets with three or fewer television stations, the FCC prohibited all newspaper/television, newspaper/radio, and radio/television combinations.[30] In markets with nine or more television stations, the FCC imposed no limits on cross-media ownership.[31] In markets with four to eight television stations, the FCC rule allowed all of the scenarios except for two: a combination of a newspaper and two television stations, or a combination of a newspaper, two television stations, and all of the radio stations allowed under the local radio rule.[32]

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25. 373 F.3d at 404.

26. The local radio ownership rule is an independent rule, established by statute, which limits the number of commercial radio stations a single entity can own in a market based upon the total number of commercial radio stations in that market. *Id.* at 387 n.9 (citing the Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 110 (codified at scattered sections of 47 U.S.C.)).

27. 373 F.3d at 404 (citing *Order*, *supra* note 2, app. D).

28. *See id.*

29. *See id.*

30. *Id.*

31. *Id.*

32. *Id.* (citing *Order*, *supra* note 2, para. 466). Obviously, these are not separate rules. The rule prohibiting a combination of a newspaper and two television stations also prohibits a combination of a newspaper, two television stations, and any additional media outlets.

B.   *The Third Circuit's Review*

After analyzing the Diversity Index and its use by the FCC, the Third Circuit held that the FCC: (1) had not justified its choice and weighting of the specific kinds of media outlets to include in the Diversity Index; (2) had not justified its assumption of equal market shares among media outlets of the same kind for the purposes of calculating the Diversity Index; and (3) had not rationally derived the Cross-Media Limits from the Diversity Index results.[33] The last of these three holdings is the focus of this Subpart.

The Third Circuit held that "[a]lthough the Commission is entitled to deference in deciding where to draw the line between acceptable and unacceptable increases in markets' Diversity Index scores, we do not affirm the seemingly inconsistent manner in which the line was drawn."[34] To support this conclusion, the Third Circuit highlighted the FCC's chart of the effects of different "consolidation scenarios."[35] As the Third Circuit noted, the proposed "Cross-Media Limits allow[] some combinations where the increases in Diversity Index scores were generally higher than for other combinations that were not allowed."[36]

The court particularly noted that in midsized markets, the markets with four to eight television stations, one combination—a newspaper, television station, and half of the radio stations allowed under the local radio rule—allowed by the FCC's rule caused "considerably higher" Diversity Index score increases than the other combinations allowed by the FCC.[37] In fact, this combination generally led to higher increases than a combination that the FCC did not allow—a newspaper and two television stations.[38]

The Third Circuit concluded that "[t]he Commission's failure to provide any explanation for this glaring inconsistency is without doubt arbitrary and capricious, and so provides further basis for remand of the Cross-Media Limits."[39] The court rejected the argument that the relevant difference between a combination of a newspaper and two television stations and a combination of a newspaper, one television station, and half of the allowed radio stations is that "a newspaper will benefit more from . . . the consolidation with its first-acquired TV station than with

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33. *See id.* at 404–11.

34. *Id.* at 411.

35. *Id.* at 409–10 (citing *Order*, *supra* note 2, app. D). *See also infra* Table 2 (reproducing the FCC's chart).

36. 373 F.3d at 411.

37. *Id.*

38. *Id.*

39. *Id.*

subsequently acquired stations."[40] The court concluded that this argument "does not address why the newspaper + 1 TV station + 50% allowed radio stations combination was permitted when its Diversity Index score increases were overall much greater than the Diversity Index score increases for other allowed combinations."[41]

As this exchange illustrates, the Third Circuit was implicitly adopting the Diversity Index as an appropriate measure of media diversity and then requiring the FCC to justify any departures from the implied ordering of consolidation scenarios based on this measure. Moreover, the Third Circuit was requiring the FCC to justify not only departures where scenarios with similar effects on Diversity Index scores were treated differently, but also departures where scenarios with dissimilar effects on Diversity Index scores were treated the same—a very robust use of the FCC's own formula, despite the FCC's disclaimer that the Diversity Index is "a blunt tool capable only of capturing and measuring large effects or trends in typical markets."[42]

C. *The Underlying Issue: A Fatal Flaw in the Diversity Index*

Although the Third Circuit based its holding on inconsistent line-drawing, the court actually understated the underlying problems with the FCC's use of the Diversity Index. The FCC's real problem is not finding a consistent line to draw when using the Diversity Index; instead, the Diversity Index itself is fatally flawed because it cannot simultaneously satisfy two underlying assumptions about the relationship between media market share and media diversity. This Subpart first explains how the Diversity Index, as designed by the FCC and adopted by the Third Circuit, was intended to satisfy these two assumptions: (1) diversity in a media market should decrease with ownership concentration; and (2) the contribution to diversity of an individual entity, its diversity importance, should increase with the weighted market shares of that entity's outlets. Section 2 shows that the Diversity Index as it is currently structured cannot

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40. *Id.* at 411 n.41 (citing *Order*, *supra* note 2, para. 467).

41. *Id.*

42. *Order*, *supra* note 2, para. 398. *See also* 373 F.3d at 473 (Scirica, J. dissenting in part, concurring in part) (arguing that the Cross-Media Limits were reasonable and should be upheld, even though the Diversity Index results "do not correspond to the Commission's final rule for all combinations in all markets," because the Diversity Index nonetheless "lent transparency and empirical footing to this massive undertaking"). The fact that the Third Circuit was willing to use the FCC's own formula, even with these disclaimers, to justify remanding the FCC's rule lends support to the claim that adopting a formulaic approach to measuring media diversity can limit the discretion of government officials. *See infra* note 66 and accompanying text.

simultaneously satisfy both of these assumptions. Accordingly, Part II concludes with the suggestion that the FCC should consider alternatives to the Diversity Index.

1.   The Two Assumptions Underlying the Diversity Index

On the one hand, the Diversity Index is designed to treat increased ownership concentration in a media market as having a negative impact on diversity. Like the HHI, the Diversity Index sums the squares of the weighted ownership shares. Mathematically, this formula can measure increases in concentration in the market because each entity's contribution to the concentration score before summation does not just increase linearly with its weighted ownership share, in which case the distribution of ownership shares would have no effect on the total score of the market once all of the entities' shares were summed. Rather, each entity's contribution to the concentration score before summation increases exponentially, making the total Diversity Index score of the market following the summation dependent on the distribution of ownership shares.[43]

On the other hand, the Diversity Index also seems designed to treat higher weighted market shares as representing a greater contribution to a market's diversity. As the Third Circuit noted in *Prometheus*, the FCC, in justifying its relative weighting of media types, stated that it has "no reason to believe that all media are of equal importance"[44] and that "[n]ot all voices . . . speak with the same volume."[45] The court further noted that the FCC's stated reason for departing from a simple voice-counting test and moving to the Diversity Index methodology was that it wanted to take into account the "diversity importance" of hypothetical merging parties.[46] Indeed, the FCC suggested that, for example, "if radio has less diversity weight than television, then a merger of a television station and a radio station will cause less of a loss of diversity than will a merger of two television stations."[47]

Thus, when the Diversity Index calculates the weighted market shares of media outlets by multiplying the outlets' assigned market shares with weighting factors derived from the consumer popularity of various media sources, it is creating a positive correlation between the weighted market

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43. *See* 373 F.3d at 403 (discussing the mathematical characteristics of the HHI). *See also infra* Table 1 (providing sample calculations using the Diversity Index).

44. 373 F.3d at 408 (citing *Order*, *supra* note 2, para. 409) (internal quotation marks omitted).

45. *Id.* (quoting *Order*, *supra* note 2, para. 445) (internal quotation marks omitted).

46. *Id.* (quoting *Order*, *supra* note 2, para. 396).

47. *Order*, *supra* note 2, para. 396.

share of an outlet and the calculated "importance" of that outlet, or the "volume" of that voice, in the market. Consequently, this portion of the Diversity Index scheme assumes that there should be a positive correlation between a media outlet's weighted market share and the magnitude of its contribution to diversity in the market.

The FCC did not clearly explain why it believed that greater actual use of an outlet, as represented by its market share, should represent greater diversity importance. The FCC stated, "[O]ur method for measuring viewpoint diversity weights outlets based on the way people actually use them rather than what is actually available as a local news source. We adopt this approach out of an abundance of caution because we are protecting our core policy objective of viewpoint diversity."[48] But the FCC had previously stated in its *Order* that "[v]iewpoint diversity refers to *availability* of a wide range of information and political perspectives on important issues,"[49] and that "what ultimately matters here is the range of choices *available* to the public . . . ."[50] Accordingly, despite the FCC's claim that it was adopting this actual-use methodology out of an "abundance of caution," it appears that the FCC was in fact implicitly redefining viewpoint diversity by shifting its focus to the actual use of media outlets.[51]

The Third Circuit implicitly reached a similar conclusion when it criticized the FCC's assignment of equal market shares within each media type because that assignment generated "absurd results."[52] Focusing on the New York City market, the court compared a community college television station's weighted ownership share of 1.5% with the New York Times

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48. *Id.* para. 399.

49. *Id.* para. 393 (emphasis added).

50. *Id.* para. 394 (emphasis added).

51. *Id.* para. 399. Assessing whether this was a permissible or justifiable revision of the FCC's definition of viewpoint diversity is outside the scope of this Article. *Cf. FCC v. Nat'l Citizens Comm. for Brdcst.*, 436 U.S. 775, 796–97 (1978) ("Diversity and its effects are . . . elusive concepts, not easily defined let alone measured . . . .") (quoting *Nat'l Citizens Comm. for Brdcst v. FCC*, 555 F.2d 938, 961 (D.C. Cir. 1977)). Nonetheless, it may be worth observing that the FCC describes its diversity goal as "fostering competition in the marketplace of ideas." *Order*, *supra* note 2, para. 393 (internal quotations omitted). Obviously, that metaphorical market does not include only media outlets on the supply side and media consumers on the demand side. Instead, presumably, once media outlets have supplied information or perspectives to their consumers, many of those consumers will then resupply those ideas to other participants in this marketplace. In that sense, ideas first transmitted through media outlets with a larger market share will be more competitive simply by virtue of having a larger number of resuppliers in these second-stage transactions. In other words, there is a straightforward sense in which ideas first transmitted by relatively unpopular media outlets will be less available to second-stage consumers of ideas.

52. 373 F.3d at 408.

Company's weighted ownership share, derived from a co-owned newspaper and radio station, of 1.4%.[53] The court concluded, "A Diversity Index that requires us to accept that a community college television station makes a greater contribution to viewpoint diversity than a conglomerate that includes the third-largest newspaper in America also requires us to abandon both logic and reality."[54] Consequently, the court also appears to have concluded that an entity's weighted ownership share should correlate positively with the magnitude of that entity's contribution to diversity.[55]

2. The Diversity Index Cannot Simultaneously Satisfy These Two Assumptions

The Diversity Index scheme, as used by the FCC, cannot simultaneously satisfy these two assumptions: (1) diversity in a media market should decrease with ownership concentration; and (2) the contribution to diversity of an individual entity should correlate positively with the weighted market shares of that entity's outlets. By calculating the Diversity Index score as the sum of the squares of the weighted ownership shares, the Diversity Index score contribution of a given entity increases exponentially with the weighted market shares of its outlets. Consequently, the Diversity Index score positively correlates with both increased ownership concentration, as traditionally measured by the HHI formula, and increased weighted market shares on an outlet-by-outlet basis. Increases in the Diversity Index score of a media market could thus be treated as representing decreases in diversity, in accordance with Assumption (1). But such a scheme, by implication, would treat an individual entity's contribution to diversity as correlating negatively, not positively, with the weighted market shares of its outlets, thus violating Assumption (2).[56] Conversely, treating increases in the Diversity Index

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53. *Id.*

54. *Id.* (citations omitted).

55. Again, a critical review of the court's decision is beyond the scope of this Article. But it is certainly worth noting that the court could have questioned this entire approach, perhaps even remanding the case to the FCC on the ground that it had not justified defining viewpoint diversity with respect to actual use of media outlets. Instead, the court not only accepted this definition, but also used it as a substantive basis for reviewing the details of the FCC's Diversity Index methodology.

56. For comparison, it may be worth noting that an HHI analysis of a media market for the purpose of gauging concentration effects would also implicitly treat an entity's individual contribution to those effects as increasing with the market shares of that entity's outlets. Of course, in that context, such an assumption is appropriate. In other words, it would not be objectionable to say that a media company with a large share of the media market, such as the New York Times Company in New York, contributes more to media concentration than a company with a smaller share of the media market. Again, the problem in this context is that the New York Times Company is also, by the assumptions of the Third

score as representing increases in diversity would satisfy Assumption (2), but would then violate Assumption (1).

Consequently, any use of the Diversity Index scheme is bound to violate the basic assumptions of the Third Circuit, and indeed the FCC itself. Accordingly, to truly satisfy the Third Circuit on remand, the FCC should consider alternatives to the Diversity Index. Part III presents two such alternatives, one proposed by Professor Noam and one original to this Article.

III. ALTERNATIVES TO THE DIVERSITY INDEX

As noted in the Introduction, there has been surprisingly little commentary on the Third Circuit's discussion of the Diversity Index and its remand of the Cross-Media Limits. Professor Eli Noam, however, broadly addressed the FCC's attempts to measure media market diversity in a column for the *Financial Times* Online edition.[57] Professor Noam was not primarily concerned with the issues discussed in this Article, but he also proposed an alternative to the Diversity Index. Accordingly, this Part begins with Professor Noam's analysis of the Diversity Index and his proposal of an alternative, which I will call the Noam Index ("NI").[58] Subpart B then proposes an original index specifically designed to simultaneously satisfy the two assumptions of the FCC and Third Circuit.

A.   The Noam Index

Professor Noam identified two problems with the Diversity Index. Noting that the Diversity Index is based on the HHI used in conventional analysis of market concentration for antitrust purposes, he stated, "[t]he issue is partly whether the concentration threshold for media should be lower, and also whether the HHI methodology itself accounts sufficiently for media pluralism."[59] Addressing the second issue, Professor Noam argued that while the HHI is a good measure of market power, it fails to properly account for pluralism.[60] Contending that both pluralism and

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Circuit and FCC, contributing more to the diversity of that market than entities owning less "important," or lower "volume," media outlets.

57. Eli Noam, *How to Measure Media Concentration*, FT.COM, Aug. 30, 2004, http://www.ft.com/cms/s/da30bf5e-fa9d-11d8-9a71-00000e2511c8.html (last visited Oct. 4, 2005). Noam is a Professor of Economics and Finance at the Columbia Business School and Director of the Columbia University Institute for Tele-Information.

58. Following the convention established with the HHI, I will use personal names to identify the indices in this Article, with the exception of the Diversity Index.

59. Noam, *supra* note 57. This Article focuses primarily on the second of these issues.

60. *Id.* Professor Noam described an example of a radio market:

  [I]f [] two smaller stations were replaced by 20 stations, each with 1 per cent [sic] of the market, the HHI would decline only slightly, from 3400 to 3220. Yet the

market power are important considerations, he concluded that "one should not have to choose between a measure of market power (the HHI) or of pluralism . . . ."[61]

Accordingly, Professor Noam proposed an alternative to the Diversity Index that incorporates both concerns. The NI takes the HHI as a measure of market power and then divides it by the square root of the number of voices in the market.[62] As Professor Noam explained, the more voices there are in a market, the lower the NI score will be.[63] To provide for a practical test, he advocated limiting the counting of voices to those above a certain size threshold, and he proposed 1%.[64] Finally, he proposed that this same approach could be used for cross-media analysis, "since a company might have no special market power in any particular medium but be involved in several media so that overall it would hold significant power, especially if it were to have multiple holdings in one city."[65]

As an aside, it is worth noting that the NI does not appear to deal with the underlying problem identified in this Article—the inability of the Diversity Index to simultaneously satisfy Assumptions (1) and (2). Rather, the NI is designed to give extra weight to the loss or addition of voices when assessing media concentration. But the NI provides a useful comparison for the purposes of this Article because it is also a formulaic alternative to the Diversity Index, designed to fulfill the same basic purpose—measuring the media diversity of individual markets. Professor Noam argued broadly in favor of such an approach:

> [To some], any numerical test is suspect as mechanistic. They would prefer a case-by-case consideration of many factors relevant to a media market. But this would leave a judgment call over media ownership to government officials able to reward friends and punish enemies, or enable powerful media companies to thwart unfavourable decisions— both undesirable options given the inherently adversarial relationship of government and media. This argues for a relatively clear-cut test, with a relatively clear-cut methodology.[66]

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diversity of the local radio market would clearly be significantly increased by the presence of 18 additional radio station providers.

Id.

    61. *Id.*

    62. *Id. See also infra* Table 1 (using sample calculations for the Noam Index).

    63. Noam, *supra* note 57.

    64. *Id.* Unfortunately, Professor Noam did not specify exactly how this percentage should be calculated.

    65. *Id.* Professor Noam did not explain exactly how his index would apply to the cross-media case, but this Article will assume that the NI could be applied to weighted market shares as determined by the FCC.

    66. *Id.* In response to Professor Noam, Professor Richard Epstein argued that in light of the online media market, including such entities as "bloggers," the actual number of media

Accepting the potential benefits of such formulaic approaches, the next section of this Article proposes another alternative to the Diversity Index—one specifically designed to address the underlying assumptions of the Third Circuit and the FCC.

B.   *The Hill Index*[67]

Holding aside the issues of how to select media types, how to weigh those types, and then how to assign market shares to outlets within those types, we can assume that the FCC started with appropriately-weighted market shares.[68] As with the Diversity Index and the NI, the Hill Index ("HI") would combine the weighted market shares of co-owned outlets to derive weighted ownership shares. However, instead of summing the squares of these shares, the HI would sum the square roots of these shares.[69]

As with the Diversity Index, an individual entity's contribution to the market's HI score would increase with the entity's weighted market share. Accordingly, under Assumption (2), increases in this modified Diversity Index score should be treated as representing increases, not decreases, in diversity. In other words, a greater HI score represents a more diverse market, and a lower HI score represents a less diverse market.[70]

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voices is much larger than Professor Noam assumes. Richard A. Epstein, *No Need to Fight Yesterday's Wars*, FT.COM, Aug. 30, 2004, http://news.ft.com/cms/s/da30bf5e-fa9d-11d8-9a71-00000e2511c8.html (last visited, Oct. 20, 2005). Also in response to Professor Noam, Thomas Hazlett argued that the broader context is a "regulatory failure" in the broadcast segment of the media market, and he concluded that courts should extend the protections of the First Amendment from print media to all "communications." Thomas W. Hazlett, *The 'Noam Index'*, FT.COM, Aug. 30, 2004, http://news.ft.com/cms/s/da30bf5e-fa9d-11d8-9a71-00000e2511c8.html (last visited, Oct. 4, 2005). Taken together, these responses suggest that the proper conclusion may be that there should be a more limited role for the FCC in this area, and perhaps no role at all. Although such an argument is mostly outside the scope of this Article, it is worth noting that a formulaic approach to measuring media diversity, properly applied in light of actual facts, may bolster such arguments. *See infra* Part V. In that sense, Professor Noam's observation that a formulaic approach limits the ability of government officials to "reward friends and punish enemies" applies equally well to these broader questions of whether the government should be regulating at all. Noam, *supra* note 57.

67. At the risk of seeming immodest, this Article will continue to use the convention of identifying indices by proper names for the sake of clarity.

68. Examining these prior steps is beyond the scope of this Article, but it is worth noting that doing so would be one way to initiate the broader discussion of whether any ongoing regulation in these areas is warranted. *See generally* Epstein, *supra* note 66. *See also supra* notes 13, 15, 66, and accompanying text.

69. *See infra* Table 1 (comparing, side-by-side, the formulas used in the Diversity Index, NI, and HI).

70. It may be important to stress the contrast between the HI and the Diversity Index and NI. In both of the latter indices, a greater score indicates a less diverse market. With the

With the HI formula, an entity's contribution to diversity increases in a diminishing, not increasing, fashion as its weighted ownership share increases.[71] As a result, treating increases in the HI score as representing increases in diversity would not violate Assumption (1). Indeed, decreases in the HI score could be treated as representing decreases in diversity under both assumptions.

For example, a media market with only one outlet, and thus with a weighted ownership share of 100, would have an HI score of 10 (the square root of 100). For comparison, using the same share of 100 in the Diversity Index formula would result in a score of 10,000 (the square of 100). Moving to a market with 10 separately-owned outlets, each with an equal weighted share of 10, the HI score would *increase* to 31.6 (the sum of 10 square roots of 10). By contrast, the Diversity Index score would *decrease* to 1,000 (the sum of 10 squares of 10). Similarly, moving then to a market still with 10 separate outlets, but one with a weighted share of 50, one with a share of 10, and the remaining 8 with shares of 5, would result in a *decrease* in the HI score to 28.1, and an *increase* in the Diversity Index score to 2,800. Alternatively, moving from a market with 10 equal outlets to a market with 8 equal outlets, each with a share of 12.5, would result in a *decrease* of the HI score to 28.3, and an *increase* of the Diversity Index score to 1,250.[72]

As this example demonstrates, treating decreases in the HI score as decreases in diversity is consistent with the assumption that increases in ownership concentration in media markets correlate with decreases in media diversity. Unlike both the Diversity Index and the NI, the HI accommodates both of the assumptions shared by the Third Circuit and FCC.

In order to determine whether the HI is useful in practice, including for the purpose of evaluating the effects of consolidation scenarios, it must be tested. Part IV considers the results of applying all three indices to a sample market: Altoona, Pennsylvania.

HI, in contrast, a greater score indicates a more diverse market. *See infra* Table 1 (comparing sample calculations for all three indices).

71. For example, an entity with a weighted ownership share of 10 would contribute 3.16 (the square root of 10) to the HI score. Increasing the entity's weighted ownership share to 20 would increase its contribution to 4.47—an increase of 1.31. But then increasing its share from 20 to 30 would only increase its contribution to 5.48—a further increase of 1.01. As this example demonstrates, the marginal increase in its contribution to the HI score decreases as an entity grows, a mathematical consequence of using the square root function.

72. *See infra* Table 1 (comparing the sample calculations across the Diversity Index, NI, and HI).

IV. A TEST CASE: ALTOONA, PENNSYLVANIA

The natural next step would be to apply the NI and HI to all of the data underlying the FCC's chart of consolidation scenarios, comparing the results with the Diversity Index. Unfortunately, the FCC did not provide all of this information in its published *Order*.[73] However, the FCC did provide sample base Diversity Index calculations for ten markets in Appendix C of the *Order*. For one of those ten markets—Altoona, Pennsylvania—the FCC also provided two sample calculations for hypothetical consolidation scenarios.[74] As it turns out, Altoona is a suitable test case for the NI and HI because it fits within the range of markets subject to the rules held inconsistent by the Third Circuit: Altoona has six television stations, placing it within the disputed range.[75]

This Part begins by confirming that the application of the Diversity Index to the Altoona market leads to the same sort of inconsistent results that the court identified with respect to the FCC's Cross-Media Limits. Subpart B then applies the NI and HI to the Altoona market, comparing the results given the relevant consolidation scenarios. On the basis of this comparison, this Part confirms that only the HI simultaneously satisfies the two basic assumptions shared by the FCC and the court. Moreover, this Part also concludes that the HI puts greater practical weight on the loss of voices than the NI, and thus is also better-suited to address the issues of media pluralism that motivated Professor Noam to create an alternative index.

A.   *Altoona and the Diversity Index*

Before applying the NI and HI to the Altoona market, it is necessary to check whether applying the Diversity Index to the combination scenarios as applied in Altoona would lead to results comparable to those represented in the FCC's summary chart. One immediate difficulty is that there are not unique ways to carry out the scenarios described by the FCC. Altoona apparently has both a daily and a weekly newspaper, although the weekly newspaper remained unnamed in the FCC's chart, and thus the combinations involving a newspaper could take two different forms.[76] Similarly, combinations involving multiple radio stations could be created out of different combinations of the existing radio groups. For example, the

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73.   *See Order*, *supra* note 2, app. D.

74.   *See Order*, *supra* note 2, app. C.

75.   *See Order*, *supra* note 2, app. C. *See also infra* Table 3 (reproducing the FCC's analysis of the Altoona media market).

76.   *See Order*, *supra* note 2, app. C. *See also infra* Table 3.

local radio rule allows a combination of up to five stations,[77] and in Altoona this result could be reached by combining three independent stations with one two-station group, or an independent station with a four-station group, and so on. Finally, combinations involving two television stations could be formed by acquiring two independent stations, or one two-station group.

To resolve these issues, this Article calculates results using several different scenarios, taking the average of the results. So, for combinations involving a newspaper, scenarios for each newspaper were calculated. For combinations involving two television stations, scenarios were calculated both for combining two independent stations and for one two-station group. Hence, for the combination involving a newspaper and two television stations, four scenarios were calculated, as a result of compounding both of these rules.

For the radio combinations involving five stations, scenarios for a 1-1-1-2 combination and 1-4 combination were calculated. For radio combinations involving three stations, scenarios for a 1-1-1 combination and a single three-station group were calculated. Again, when combined with the newspaper rule, this rule resulted in four possible scenarios.[78]

As noted above, this Article also uses combinations involving three stations when calculating the scenario involving acquisition of half of the radio stations allowed by the local rule. Half of the five stations allowed by the local rules would have been 2.5 stations, and it is unclear whether the FCC intended to round up or down in such circumstances. However, as it turned out, the Altoona market failed to mirror the results of the FCC's chart when only two stations were used. Since, as discussed below, using three stations did bring Altoona into alignment with the chart results, that interpretation was adopted for the sake of this test case.

The result of applying these rules to the Altoona market is shown in Table 4. As noted by the Third Circuit with respect to the overall chart, a combination of a newspaper, television station, and half of the allowed radio stations, three in this test case, led to a greater average increase in the Diversity Index (386) than a combination of a newspaper and two

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77. Because Altoona has fourteen radio stations, the local radio ownership rule provides that a single party can own up to five stations. 373 F.3d at 387 n.9 (citing Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. at 110 (codified at scattered sections of 47 U.S.C.)).

78. As an aside, this Article did not calculate results for two combinations on the FCC chart: the newspaper, radio, and two television station combination, and the two television station combination. The first combination was uncontroversially prohibited, and calculating the results after applying the above rules would have required eight scenarios. The second combination was uncontroversially allowed and mathematically uninteresting. *See generally id.* at 411 (reviewing the FCC's chart).

television stations (356). Similarly, the former combination led to a considerably higher average increase than any of the other allowed combinations: a television station and five radio stations (142), a newspaper and five radio stations (297), or a newspaper and one television station (162). As a result, the Altoona market seems to present a specific case of the general problem identified by the Third Circuit, at least when the FCC's combination scenarios are interpreted as above.

B.   *Applying the Noam and Hill Indices*

Having confirmed that Altoona is a suitable test case, this Subpart applies the NI and HI to the Altoona market. The results of applying the NI and HI are also summarized in Table 4.

The NI starts with a base of 240—the HHI score of 960 divided by the square root of the number of voices. Since there are 16 voices in Altoona the base-case denominator in the NI is 4.[79] The average change in the NI for each combination is represented as a positive number, indicating a loss of diversity. The HI starts with a base of 37.73.[80] As noted above, the average change in the HI for each combination is negative, also representing a loss of diversity.

One obvious question is whether either the NI or the HI could shield the FCC from the Third Circuit's conclusion that the FCC engaged in inconsistent line-drawing. The answer is no. Both alternative indices led to the same result: a combination of one newspaper, one television station, and three radio stations averaged higher than a combination of one newspaper and two television stations, and substantially higher than any other allowed combination.

With the details of the Altoona market before us, it is now obvious why this result occurs. The three additional radio stations have approximately the same total weighted share (5.4) as the one additional television station (5.6).[81] Accordingly, a combination of a newspaper, television station, and three radio stations will result in a media group with approximately the same weighted share as a combination of a newspaper and two television stations. However, the former combination will, on

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79. Note that the Internet is represented by two voices: cable and "other." Although this approach accords with the general methodology of the FCC, and although commentary on that methodology is outside the scope of this Article, it is once again worth noting that this analysis is controversial at best. *See generally* Epstein, *supra* note 66.

80. *See infra* Table 5 (breaking down the Altoona market as analyzed by the HI).

81. The numbers underlying these calculations are found in Table 5. A single radio station has a weighted share of 1.779. Thus, three radio stations would have a weighted share of 5.4 (after rounding). As Table 5 also indicates, a single independent television station has a weighted share of 5.633, or 5.6 after rounding.

average, eliminate more independent outlets than the latter. For that reason, by any of these measures, the former will lead to a greater net loss of diversity.

The NI only underscores this effect by giving greater weight to the greater loss of voices caused by the radio combination. The HI leads to the same result because the positive benefits of creating a combination with a greater weighted share are approximately equal in each case, allowing the loss of additional voices to dominate. All three indices support the Third Circuit's holding that the FCC had drawn an inconsistent line by allowing this particular combination.

The various indices do, however, disagree on other issues. According to the Diversity Index, the next-worst combination is the combination of a newspaper and two television stations, a combination the FCC sought to prevent. In contrast, the next-worst combination for both the NI and HI is the combination of a newspaper and all the radio stations allowed by the local rule. As it was designed to do, the NI picked out a scenario which led to a significant reduction in the number of voices. The HI reached the same result for a slightly different reason: the radio stations each added relatively little to the voice of the newspaper, so the marginal increase in the voice of the combination was heavily outweighed by the loss of the independent voices.[82] The NI and HI both indicate that the FCC should also reconsider allowing this combination but prohibiting a combination of newspaper and two television stations.[83]

So far in this discussion, both the NI and HI have lived up to their intended purposes. At the next stage, however, the NI arguably breaks down. After the newspaper and full radio combination, the next-worst combination for the HI is the television station and full radio combination. Somewhat surprisingly, however, the next-worst combination for the NI is not that combination, but rather the newspaper and two television station combination—even though the combination picked out by the HI results in the loss of more voices.[84]

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82. For example, the combined daily newspaper and radio group contributed 5.398 points to the HI score. Separately, the components of this group had been contributing either 10.388 points (1-1-1-2 scenario) or 8.501 points (1-4 scenario). Similarly, the combined weekly newspaper and radio group contributed 4.177 points to the HI score. Separately, the components had been contributing either 8.813 or 6.926. *See infra* Table 5.

83. Of course, the FCC could address this problem in several different ways: disallowing both combinations; allowing both combinations; or, inverting its prior rule by allowing combinations of a newspaper and two television stations, but disallowing combinations of a newspaper and all the radio stations allowed under the local radio rule.

84. It may be worth recalling that Professor Noam had provided an example of media pluralism based on increasing the number of radio stations. *See* Noam, *supra* note 57.

This occurs because the HHI, as indicated by the Diversity Index, increases more rapidly in response to the combination of one big player (a newspaper) and two medium players (the television stations) than it does to the combination of one medium player (the television station) and five small players (the radio stations). In the NI, the numerator's rapid increase, which is a consequence of the summing of the squares of combined market shares, can outweigh the denominator's gradual decrease, which is a consequence of taking the square root of the number of voices.

In the HI, by contrast, the fact that the combination resulting from a television station and five radio stations is smaller than the combination resulting from a newspaper and two radio stations actually counts against the former. That is because the lower strength of the smaller combination's voice is more easily outweighed by the loss of additional voices.[85]

In summary, like the Diversity Index, the NI violates Assumption (2) by treating larger combinations as contributing less to diversity. As a result of doing so, it arguably violates its own preference for a greater number of voices: it treats increasingly large combinations as an increasing problem, while treating a diminishing number of voices as a diminishing problem. In contrast, as discussed above, the HI simultaneously satisfies both Assumption (1) and Assumption (2). Moreover, the HI can actually put greater practical weight on the loss of voices than can the NI. When an increasing number of small voices are combined, the HI registers for each additional voice a fixed loss of diversity and a decreasing marginal benefit in terms of the "strength" of the combined voice. Consequently, the HI both provides an internally consistent measure of media diversity and also effectively fosters media pluralism.

V. CONCLUSION

As Professor Noam implied, a formulaic test for media diversity could have the beneficial effect of constraining government regulators who might, intentionally or unintentionally, abuse excessive discretion. In *Prometheus*, the Third Circuit, somewhat surprisingly, did not defer to the FCC's discretion with respect to the Cross-Media Limits, and that decision was facilitated by the FCC's inconsistent use of a formulaic test, the

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85. The combined television and radio group contributed only 3.811 points to the HI score; whereas, individually the components had contributed 8.261 (1-1-1-2) or 6.374 (1-4). In contrast, the newspaper and two television station groups contributed 5.614 (daily) and 4.452 (weekly), compared with a prior total of either 9.246 (daily plus 1-1) and 7.857 (daily plus 2), or 7.671 (weekly plus 1-1) and 6.282 (weekly plus 2). In other words, according to the HI, the diversity lost through combination was roughly equivalent in each of these cases, but the strength of the resulting combination was lower for the television and radio group, resulting in a greater net diversity loss for that combination. *See infra* Table 5.

Diversity Index. But the court also implicitly undermined the entire Diversity Index scheme because the Diversity Index fails to coherently reflect the assumptions of the court, and indeed the FCC itself, with respect to diversity in media markets.

Placing this discussion in a broader context, Professor Noam suggested important considerations of pluralism that also militate in favor of adopting an alternative to the Diversity Index. Although Professor Noam suggested his own index, the Altoona test case indicates that the HI not only reconciles the assumptions of the Third Circuit and the FCC, unlike the NI, but also surpasses the NI itself with respect to protecting media pluralism.

However, determining the most appropriate index of media diversity is only the first step in a broader project. With a proper understanding of the facts of media markets, applying an appropriate index may do more than simply sort the possible regulations with respect to something like cross-media ownership. Rather, applying such an index may suggest that in light of modern media markets, no such regulations are warranted. The first step in making such an argument, however, is to find a rule which can reasonably and effectively be used to bind the regulators.

TABLE 1
SIDE-BY-SIDE COMPARISON OF DIVERSITY INDEX, NOAM INDEX, AND
HILL INDEX, WITH SAMPLE CALCULATIONS

	Diversity Index	Noam Index	Hill Index
Formula (w=weighted market share)	$\Sigma(w^2)$	$(\Sigma(w^2))/\sqrt{N}$ (N=number of outlets)	$\Sigma(\sqrt{w})$

Examples			
1 x 100	$100^2 = 10000$	$10000/\sqrt{1} = 10000$	$\sqrt{100} = 10$
10 x 10	$10 \times (10^2) = 1000$	$1000/\sqrt{10} = 316$	$10 \times \sqrt{10} = 31.6$
50, 10, 8 x 5	$50^2 + 10^2 + 8 \times (5^2)$ $= 2800$	$2800/\sqrt{10} = 885$	$\sqrt{50} + \sqrt{10} + 8 \times$ $\sqrt{5} = 28.1$
8 x 12.5	$8 \times (12.5^2) = 1250$	$1250/\sqrt{8} = 442$	$8 \times \sqrt{12.5} = 28.3$

Source: The figures are derived from sample calculations. The entries in the grid apply the formula in the first (boxed) row to the numbers in the first column.

Note: For Diversity and Noam Indices, higher scores represent less diversity. For the Hill Index, higher scores represent more diversity. Note that the numerator for the Noam Index is always equal to the Diversity Index score.

TABLE 2
REPRODUCTION OF THE FCC CHART SUMMARIZING
AVERAGE CHANGES IN DIVERSITY INDEX GIVEN VARIOUS
HYPOTHETICAL CONSOLIDATION SCENARIOS

Base Case		Average Change in Diversity Index, Resulting from Mergers						
TV stations in market	Average Diversity Index score	100% Radio + 1 TV station	Newspaper + 100% Radio	Newspaper + 1 TV station	Newspaper +1 TV station + 50% Radio	2 TV stations	Newspaper + 2 TV stations	Newspaper +100% Radio+2 TV stations
1	1701	651	271	910	1321			
2	1316	301	335	731	1009			
3	1027	390	242	331	515			
4	928	138	236	242	408			
5	911	111	263	223	393	91	376	846
6	889	79	239	200	340	63	357	688
7	753	73	171	121	247	47	242	533
8	885	79	299	152	314	36	308	734
9	705	64	198	86	207	28	172	473
10	635	56	107	51	119	23	101	292
15	595	43	149	48	145	10	97	302
20	612	49	222	40	128	6	80	350

Source: *Prometheus*, 373 F.3d at 409–10 (citing *Order*, *supra* note 2, app. D).

Note: Shaded areas indicate combinations prohibited by the FCC's proposed rules. Dark boxes indicate areas of contention where the Third Circuit found that the FCC had drawn an inconsistent line.

TABLE 3
REPRODUCTION OF FCC'S CHART ANALYZING THE ALTOONA, PA
MEDIA MARKET.

Media Market		Ownership Shares			Percentage Share of Media Market		
% of Media	% of Medium	Parent Company	# of Stations	% Share	%Share (AxBxE)	Cross Ownership	Col. F Squared
A	B	C	D	E	F	G	H
Television 33.8%	Broadcast 100.0%	Clear Channel Communications	1	16.7	5.6		31.7
		Cornerstone TV, Inc.	1	16.7	5.6		31.7
		Cox Broadcasting	1	16.7	5.6		31.7
		Peak Media LLC	2	33.3	11.3		126.9
		Penn State University	1	16.7	5.6		31.7
Radio 24.9%		Allegheny Mountain Network	3	21.4	5.3		28.5
		Altoona Trans Audio Corp Inc	1	7.1	1.8		3.2
		B&F Enterprises	1	7.1	1.8		3.2
		Forever Broadcasting Incorporated	4	28.6	7.1		50.6
		Martinsburg Broadcasting	2	14.3	3.6		12.7
		Sounds Good Incorporated	1	7.1	1.8		3.2
		Vital Licenses	2	14.3	3.6		12.7
Newspaper 28.8%	Daily 70.3%	Altoona Mirror	1	100.0	20.2		409.9
	Weekly 29.7%	Weekly Newspaper	1	100.0	8.6		73.2
Internet 12.5%	Cable 18.3%	Cable	1	100.0	2.3		5.2
	Other 81.7%	Dial-up, DSL, and other	1	100.0	10.2		104.3
Cross-Ownership		None					
Diversity Index (Sum of Column H)							960

Source: *Order*, *supra* note 2, app. C.

TABLE 4

AVERAGE CHANGE IN INDICIES RESULTING FROM HYPOTHETICAL
CONSOLIDATION SCENARIOS IN THE ALTOONA MEDIA MARKET

Index	Base Case	100% Radio plus 1 TV Station	100% Radio plus Newspaper	Newspaper plus 1 TV station	Newspaper plus 1 TV station plus 50% Radio	Newspaper plus 2 TV stations
Diversity	960	142	297	162	386	356
Noam	240	66	110	50	134	106
Hill	37.73	(3.51)	(3.87)	(1.66)	(4.24)	(2.73)

Source: *Order*, *supra* note 2, app. C. The basic methodology for applying each index is explained throughout this Article.

Note: Again, increases in the Diversity and Noam Indices represent a loss of diversity, as do decreases in the Hill Index.

TABLE 5
ANALYSIS OF ALTOONA MEDIA MARKET USING HILL INDEX

Media Weights		Ownership Shares			HI Analysis	
% of Media	% of Medium	Parent Company	# of Outlets	% Share Medium	Weighted Share	Square Root of Weighted Share
Television 33.8%	Broadcast 100%	Clear Channel Communications	1	16.67	5.633	2.373
		Cornerstone TV, Inc.	1	16.67	5.633	2.373
		Cox Broadcasting	1	16.67	5.633	2.373
		Peak Media LLC	2	33.33	11.267	3.357
		Penn State University	1	16.67	5.633	2.373
Radio 24.9%		Allegheny Mountain Network	3	21.43	5.336	2.310
		Altoona Trans Audio Corp Inc	1	7.14	1.779	1.334
		B&F Enterprises	1	7.14	1.779	1.334
		Forever Broadcasting	4	28.57	7.114	2.667
		Martinsburg Broadcasting Incorporated	2	14.29	3.557	1.886
		Sounds Good Incorporated	1	7.14	1.779	1.334
		Vital Licenses	2	14.29	3.557	1.886
Newspaper 28.8%	Daily 70.3%	Altoona Mirror	1	100	20.246	4.500
	Weekly 29.7%	Weekly (no name in data)	1	100	8.554	2.925
Internet 12.5%	Cable 18.3%	Cable (no name in data)	1	100	2.288	1.512
	Other 81.7%	Dial-up, DSL, and other (no names in data)	1	100	10.213	3.196
Hill Index (sum of square roots of weighted ownership shares)						37.733

Source: The first four columns are taken from the FCC's chart for Altoona. *See Order*, *supra* note 2, app. C. The fifth column is calculated by dividing the number of outlets for the parent company in the fourth column by the total number of outlets in that media type. These figures are identical to those found in the FCC's chart, except that they are taken to an additional significant digit. The sixth column multiplies the media weights in the first two columns with the share in the fifth column. These figures, too, are identical to those found in the FCC's chart, except they are taken to two additional significant digits. Finally, the last column is the square root of the sixth column.