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UNITED STATES OF AMERICA

FEDERAL COMMUNICATIONS COMMISSION

In the Matter of Amendment of Part 74 of the Commission's Rules Concerning FM Translator Stations	)	MM Docket No. 88-140 RM-5416 RM-5472

January 23, 1989

COMMENTS OF THE STAFF OF THE BUREAU OF ECONOMICS OF THE UNITED STATES FEDERAL TRADE COMMISSION

I. Introduction and Summary[1]

In a Notice of Inquiry (NOI) released on June 2, 1988, the Federal Communications Commission (FCC) solicited comment on its regulations governing the use and licensing of low-power FM commercial translators ("translators").[2] The staff of the Bureau of Economics of the Federal Trade Commission submitted a comment on this NOI suggesting that granting increased flexibility in the use of translators may benefit consumers by permitting greater competition and increasing listening options.[3] On November 4, 1988, the National Association of Broadcasters (NAB) submitted to the FCC a Supplement to its Reply Comments.[4] The Supplement focuses on asserted weaknesses in the analytical and empirical analyses offered in the FTC staff comments. This comment is submitted by the staff of the Bureau of Economics of the Federal Trade Commission in response to the FCC's invitation for comments on the NAB's submission,[5] and it examines

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[1] These comments are the views of the staff of the Bureau of Economics of the Federal Trade Commission. They are not necessarily the views of the Federal Trade Commission or of any individual Commissioner. Please contact staff economist Robert P. Rogers at (202) 326-3382 should you have any questions regarding our comments.

[2] Federal Communications Commission, In the Matter of Amendment of Part 74 of the Commission's Rules Concerning FM Translator Stations, MM Docket No. 88-140, RM-5416, and RM-5472 (released June 2, 1988).

[3] Federal Trade Commission, Bureau of Economics, Comments of the Staff of the Bureau of Economics of the United States Federal Trade Commission, MM Docket No. 88-140, filed August 15, 1988.

[4] National Association of Broadcasters, Supplement to Reply Comments, MM Docket No. 88-140, filed November 4, 1988, and National Association of Broadcasters, Reply Comments, MM Docket No. 88-140, filed September 15, 1988.

[5] Federal Communications Commission, Order Reopening the Period for Filing Comments, MM Docket No. 88-140, December 5, 1988 in 47 CFR part 74, Federal Register, Vol 53, No. 250, December 29, 1988.

three points of the NAB critique to show how each is potentially misleading.

The NAB asserts first that the FTC staff, by using erroneous data, overestimated the impact of increasing the number of stations on the number of formats and on total radio audiences. Second, NAB claims to show that most new FM translators are not directed at low population areas but rather at high population areas which already have adequate radio service. Third, NAB asserts that FM translators are likely to drive out established full power stations and thereby lessen the consumer benefits derived from radio service.

In this comment, the staff will demonstrate that the NAB critique does not, in fact, invalidate the FTC staff's estimate of the impact of the number of stations on format diversity and listenership. Moreover, a reconsideration of the issue suggests that, although the estimate in the original comment was the best possible given the nature of the available data, the comment probably understated, rather than overstated, the relationship that staff sought to uncover. We also show that contrary to NAB assertions, most new FM translator applications are targeted to low population areas. Finally, we demonstrate that the hypothesized demise of a full power radio station due to the entry of an FM translator would be unlikely to reduce and may increase total consumer benefits.

II. The NAB and the FTC Statistical Analyses

A. TALO Survey Data and the FTC Format Model

The NAB Supplement criticizes the data used by the FTC staff to uncover the impact of additional stations on the number of programming

formats and audience size. The NAB claims to show that the FTC staff used incomplete data for its variable depicting the number of stations (NS) available to the average listener in given radio markets. The NAB Supplement describes a survey of radio listeners in every county in the continental United States and in the metropolitan areas of Anchorage, Alaska, and Honolulu, Hawaii; it is called the Total Audience Listening Output (TALO) Survey. The survey defines the number of radio stations in a given county to include any radio station to which any survey respondent listened during the survey period. The NAB asserts that this number is a better indicator of the number of stations available to the average listener than the number used by the FTC staff. The NAB asserts that the number used by the FTC staff understates the number of available radio stations in a market and therefore overstates the impact of the number of stations on listenership.

The variable (NS) used by the FTC staff is the number of stations listed in the Arbitron Market Survey. To be included in this list, a radio station must fulfill the following three minimum standards: (1) be reported as having been heard for at least five minutes by 10 or more Survey participants; (2) have been heard by at least 0.05 per cent (unrounded) of the persons twelve years old and over in the market (as shown by the survey); and (3) have garnered an average quarter-hour share of 0.05 per cent during that portion of the day the station is on the air.[6] In other words, the station must have a minimally significant market share; from this information, the staff inferred that most

[6] For Arbitron rating purposes, the day is divided into 15 minute time periods. The Average Quarter-Hour Metro Rating is an average of the station market shares for these fifteen minute periods over the day.

listeners in a given area could receive most if not all of these stations. In contrast, the TALO sample for a given county includes any radio station to which any survey participant listened for five minutes or more during the survey period. Thus, it is not surprising that the TALO estimate of the number of stations available in a given area is often much larger than the number of stations with enough listeners to get an Arbitron rating.[7] To put this issue in perspective, the methodology the FTC staff used would count a station as present in the market if only one out of 2000 persons (e.g. 0.05 per cent of the total) in the market listened to it. In the NAB's view this approach is underinclusive. The NAB would count a station even if only one person in a sample of 6200 persons listened to it during the survey period.[8] Indeed, under the NAB's approach, if only one person in a given market was able to receive and listened to a particular radio station, that station would be counted as available to all listeners in a market area. While not all the stations in the Arbitron list are received by all the listeners in a market, the number of these stations seems to be a better indicator of the number of stations available to the average listener than the number of stations on the TALO list.

A brief review of the FTC staff's analysis will help the reader to understand why the Arbitron Market Survey was used. The FTC staff first

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[7] Exacerbating this tendency is the TALO Survey requirement that the respondents report any radio station to which they listened during the survey period even when they were traveling outside of the market area. Given the size of the sample, it is unlikely that none of the respondents traveled during the survey period. When traveling, the respondent could listen to radio stations that could never be heard by listeners in the home market.

[8] The largest sample in the Arbitron survey (for the New York City area) has 6200 respondents.

used regression analysis to estimate a formula for predicting the number of programming formats in a market: the goal of the analysis being to estimate the impact of increasing the number of stations on the programming diversity available to the average listener. In the regression formula, the (logarithm of the) number of stations is an independent variable which is multiplied by a positive constant (which gives information on the impact of the number of stations on formats), and the (logarithm of the) number of formats is the dependent variable. The results of this analysis indicate that increasing the number of radio stations would increase the number of programming formats. In a second regression analysis, the (logarithm of the) number of programming formats is an independent variable that has a positive impact on the dependent variable, total radio listenership.[9] Accordingly, increasing the number

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[9] See Federal Trade Commission, Bureau of Economics, Comments of the Staff of the Bureau of Economics of the United States Federal Trade Commission, MM Docket No. 88-140, filed August 15, 1988, for a fuller description of the data. The equation used to determine the number of programming formats present in a market area is the following log-log function:

$$\ln FOR = \ln b_0 + b_1 \ln NS + b_2 \ln POP + b_3 \ln X_1 + u$$

where FOR equals the number of formats, NS equals the number of stations in an Arbitron-defined market, POP is the population in a radio market, and X_1 is a vector of other market characteristics that might affect the number of formats. The regression coefficients, b_0, b_1, b_2, and b_3 are constants that reflect the impact of each independent variable on the dependent variable, and u is a residual. The regression coefficient for NS, b_1, is positive as predicted.

The regression equation for listenership is as follows:

$$\ln [P/(1 - P)] = \ln a_0 + a_1 \ln FOR + a_2 \ln X_1 + v$$

where P equals the average proportion of the population listening to radio over the day, and P is transformed into a log of the odds for the purpose

of radio stations in a market would result in an increase in the number of programming formats. The increase in the number of programming formats, in turn, would have a positive impact on total radio listenership.[10] Consequently, increasing the number of radio stations would indirectly lead to increases in total listenership. The liberalization of the FM translator rules, by increasing the number of stations, would lead to an increase in the number of formats and therefore increase listenership.

As can be seen, the dependent variable in the format regression analysis is the (logarithm of the) number of formats present in an Arbitron-defined market. Included as independent variables in this regression are the number of stations in a market, the population in the radio market, and a group of other variables reflecting demographic characteristics that might affect the number of formats.

In conducting the regression analysis to estimate the formula for predicting the number of formats, our focus is upon the number of formats

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of optimal regression analysis. a_0, a_1, and a_2 are constants that reflect the impact of each independent variable on the dependent variable, and v is a residual. The regression coefficient for FOR, a_1, is positive as predicted.

[10] Our concept of the relevant listenership variable is different from that of NAB. Essentially we define listenership as the average over-the-day proportion of the population listening to the radio for any given time period. NAB's definition is the proportion of the population that listened to the radio at some time during the day. Since nearly all the population listen to the radio at some time during the day, it is almost impossible to increase the NAB listenership total. Nevertheless, any one person who listens at some point during the day could increase her listening time significantly thereby increasing the FTC staff listenership figure. If a person increases her listening in response to an increase in the available formats and/or stations resulting from increased flexibility in the FM translator rules, then, consumer welfare could very well have been increased. However, the proportion of the population having listened to the radio at some point during the day (the NAB listenership variable) may not have increased at all.

available to the average listener in a market area. We could have computed the number of formats by using all of the stations included in the TALO total, as the NAB suggests; however, it is not clear that all the stations in the TALO survey are available to the majority or even to a large plurality of the listeners in a given market area. Therefore, in our view, a better indicator of the number of formats is likely to be derived from the Arbitron-listed stations only -- that is, those having at least a minimally significant listener share as defined by Arbitron. Even though some listeners in a given market area may not receive all the Arbitron-listed stations, these stations as a whole have such a large share of the audience that we can plausibly infer that most listeners are able to receive all or nearly all of the formats offered by the listed stations.[11]

In determining the number of stations in a market area for purposes of the format regression analysis, there is a related reason to rely on the number of stations in the Arbitron list rather than the TALO number. The basic inquiry concerns not so much the number of stations in a particular market but rather the number of stations having an impact on the format decisions of the owners of the stations capable of reaching all or most of the listeners in the market. We have defined this set as the stations listed by Arbitron having at least a minimally significant listener share in the particular market. The NAB suggests that we expand this set to include the TALO stations -- that is, stations that were each heard by at least one survey respondent in the market, regardless of

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[11] As discussed in detail in footnote 12, the Arbitron-listed stations in our sample always have over 85 percent of the audience.

whether they attain a minimal listener share. Because many of the stations included in the TALO Survey are heard by very few members of the listening population in the particular Arbitron market, we believe that these stations would not have a significant impact on the station owner's format choice or at least would have less impact per station than the stations contained in the Arbitron list.[12] Thus, the exclusion of the TALO number does not appear to be a serious error in the statistical analysis.

B. Specification Error in the FTC Staff Model and its Meaning

Although not discussed by the NAB, there is yet another set of stations that arguably could be relevant to the analysis -- those stations that may or may not be heard in a particular Arbitron market but that compete with some of the Arbitron-listed stations in other markets. If a station listed by Arbitron in a particular market and included in NS can be heard in other Arbitron markets, then its format decisions depend in part on the number of competing stations in these other markets. For example, a clear channel AM station based in Chicago may be regularly heard in Charlotte, North Carolina, but no Charlotte station is regularly listened to in Chicago. The competition of Charlotte stations can attract listeners in Charlotte away from the Chicago station. Such audience shifts may induce the Chicago station to compete for listeners in all

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[12] To be sure, there are many markets in which the audience share of all the stations listed in an Arbitron market is substantially less than 100 percent. This indicates that much of the audience in these markets listens to stations that are outside of the Arbitron Market area. To reduce the errors associated with extensive listening of "outside" stations, the FTC staff's empirical analysis focused only on those markets in which the listed stations in a market accounted for at least 85 percent of the total listenership.

markets by changing its format. Therefore, even though they are not heard in Chicago, these competing Charlotte stations can affect the number of formats in Chicago.

The number of these competing stations outside the market (here called NC) should be included as a variable in the format equation. Because NC is not included in addition to NS in the FTC staff's format equation, our statistical analysis may be biased. Even though these outside stations may not be heard in our sample market, they may affect the format decision of the station owners in the sample market.[13] As discussed below, the bias was unavoidable given the available data, and in any event, we doubt that, had the data been available, it would have led us to conclude that the results we reported overstate the effect of the number of stations on format diversity and listenership.

Stations located outside a given market and not included on the Arbitron list for the area can play an important role in a given station's format decisions. Nevertheless, in the great bulk of the sample (87 out of a total 115 markets), this was not a problem because there were no stations with a significant market share in more than one market. In four of the remaining markets, the station overlap was with another market in the sample. In these markets, the overlap is only one station, and the market share of the station is very small in either one or both markets.

In the remaining 24 sample markets, there is an overlap with a market not in the sample. For each of these out-of-sample markets, the share of

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[13] We do not know whether NC would have the same effect on the number of formats in our sample market as NS. Had we accurate data on NC, we would have introduced NC and NS as distinct independent variables in the regression analysis and explicitly tested statistically whether the format impacts of both were identical.

listeners captured by the Arbitron-listed stations in those markets is less than 85 percent, our criterion for including a market in our sample. The failure of these out-of-sample markets to satisfy this criterion suggests that much of the listening in these markets is attributed to other unlisted stations. As a result, attempting to include these out-of-sample listed stations as NC in any regression analysis would likely result in a substantial nonsystematic under-measurement of that variable and thus lead to biases in the regression coefficients.

However, the exclusion of NC from the staff's regression model could also result in biased regression coefficients. One way of gauging the extent of this bias is to reestimate the format regression excluding from the sample the 28 markets with station overlaps. The results of this reestimation do not differ from those of the original staff analysis, suggesting that exclusion of NC did not lead us to conclude erroneously that increasing the number of stations (as a consequence of greater programming flexibility for FM translators) would increase listenership.[14]

Nonetheless, some might still contend that even for the remaining 87 sampled markets, there may be other competing stations outside the sampled markets that we have not considered. By not including these outside stations, our analysis may still be biased.

If an important and relevant factor is omitted from a regression analysis, the estimated effect of an included variable on the dependent variable is related to the effect of the omitted variable on the dependent

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[14] A statistical procedure called the Chow test indicates that the hypothesis that the regression model for the attenuated 87 observation regression sample is the same as that for the complete 115 observation sample can not be rejected. See J. Kmenta, Elements of Econometrics (1986), pp. 420-421.

variable.[15] Thus, the estimated impact of NS, an included variable, on the number of formats is related to the effect of NC, the omitted variable, on formats.[16] One can think of the estimated effect of NS on formats (and therefore listenership) as a weighted average of the "true" effect of NS on formats and the "true" effect of NC on formats. Whether the format effect that the staff has attributed to NS is magnified or reduced as a result of omitting NC depends on two factors. The first factor is the effect of NC on the number of formats in the market. The second factor is the correlation between NS and NC.[17] If both of these factors are positive or negative, the estimated effect of NS on the number of formats will be overstated. If one factor is positive and the other negative, the estimated format effect of NS will be understated.

We expect that the effect of increases in NC on the number of formats offered in the market would be positive. Other things equal, the presence of a greater number of competing stations inside (NS) and outside (NC) any particular Arbitron market would likely result in more formats being broadcast by the inside stations. The greater the number of competing stations, the smaller the potential audience that any station could expect

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[15] A complete discussion of the effects of omitting relevant variables can be found in J. Johnston, Econometric Methods (1984), pp. 260-261. For purposes of the discussion in the text, we have simplified the exposition but without any loss in generality.

[16] While we regard exclusion of the TALO stations as appropriate, their inclusion as part of NC would not affect our discussion of the understatement of the staff-estimated effect of NS on the number of formats offered in a particular Arbitron market. The TALO stations can be regarded as another component of NC.

[17] More precisely, the relationship between NC and NS is measured by the partial correlation coefficient, which holds other factors affecting the relationship (such as market population and demographics) constant.

to garner from more popular formats. Therefore, more stations will tend to choose specialized formats when the number of competing stations is larger (NS plus NC) than when the number of competing stations is smaller (NS).

In contrast, the correlation between NS and NC is likely to be negative: the higher is NC, the lower is NS likely to be. Other things being equal, increasing the number of outside stations competing with the stations inside the Arbitron market will reduce the number of inside stations that are financially viable because the total potential audience that can be garnered by the inside stations is reduced by the presence of greater outside competition. If some, or many, of the inside stations have significant audiences outside the sampled Arbitron market, then an increase in the competing outside stations will reduce the potential outside audience that the inside station could capture and therefore reduce the number of financially viable inside stations (most of which are licensed to communities in the Arbitron market).[18]

Thus, we expect that NC and the number of formats will be positively correlated while NC and NS will be negatively correlated. As a result, the "true" effect of an increase in the number of stations on formats (and

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[18] That is, the total number of economically viable full-power stations in such overlapping markets will be determined by the characteristics of the two markets (e.g., population and demographics) and the FCC's spectrum allocation policies for full-power stations. In markets in which the number of full-power stations is less than that permitted by the FCC's spectrum policies, another full-power station may not be profitable although an FM translator might be. Those markets in which the FCC constraint on the number of full-power stations is effective (and thus in which licensees are earning above-competitive returns) would not admit an additional full-power station (because of the FCC's spectrum allocation policies) but could financially support one or more FM translators.

listenership) is likely greater than the staff-estimated effect.[19] Our analysis, then, understates the format and listenership effect of the increase in the number of stations resulting from permitting FM translators greater programming flexibility.[20] The seriousness of this underestimate cannot be determined without accurate data on NC, which are unavailable. Nonetheless the staff estimate of the effects of NS on the number of formats and listenership can be considered a lower bound for the likely larger "true" effect of NS on these variables. Simply put, the staff estimate is likely to be conservative.

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[19] The discussion in the text of the bias from excluding NC would be strictly true only if our original format regression analysis had included as independent variables the population and demographics of the outside markets. Because these variables were omitted, our estimated impacts of NS on formats would contain an additional bias. It seems likely, however, that the effect of these additional omitted outside-market variables on the number of formats in the sampled market is smaller than that of the sampled market's own population and demographics. Further, the effect of the sampled market's own population and demographics on the number of formats in that market is itself small relative to the impact of NS. For example, a doubling of the number of stations in the sampled market (NS) has nearly twice the impact on the number of formats as a doubling of the sample market's population. Because the regression results for the sample excluding the outside-market overlaps are statistically identical to the regression results for all sample markets, the biases from these omitted variables are likely small. In the smaller sample, one would expect the effect of excluding the outside demographics to be minimal because of the lack of any obvious market overlaps. The lack of difference between the two regression analyses suggests that the impact of these variables is small in all markets. Thus, any additional bias is likely to be trivial.

[20] The format impact of NS in the regression analysis for the sample without the outside market overlaps is larger than that of NS in the regression analysis for the whole sample. The regression coefficient for NS in the attenuated model is 0.251, while the comparable coefficient for NS in the model with the whole sample is 0.196. This suggests that the bias is negative as our analysis indicates.

III. The FM Translator Audiences - High or Low Population Areas

The second position by the NAB which warrants further scrutiny is the claim that most of the proposals for new FM translators are not in low population areas where only a few radio stations exist but in high population areas where the NAB asserts too many radio stations already operate. To illustrate its point, the NAB presents in its Appendix B a list of the most recent applications for FM translators in addition to the population and TALO total number of stations for the counties in which the applicants plan to locate. An examination of this list, however, does not indicate that translator entrepreneurs are inclined to serve only highly populated, well-served markets. The bulk of the applicants (over 55 percent) plan to locate in counties with less than the average county population for the United States of 71,465 people. The Census Bureau categorizes counties by population size, and over 64 percent of the applications listed in NAB Appendix B were for location in counties with fewer than 100,000 people. According to the Census Bureau, only 28.6 percent of the population live in counties with fewer than 100,000 people.[21] Thus, contrary to the NAB position, most FM translators are targeted to areas with relatively small populations.[22]

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[21] For population totals, see U. S. Bureau of Census, **Statistical Abstract of the United States: 1988,** (108th Edition.) Washington D. C., 1987, p. xvii and p. 275.

[22] Part of the NAB argument is that the areas in the Appendix B sample are already well served by the present set of radio stations and therefore do not need FM translators. They list the number of stations in the TALO list for the counties in each of the areas; the TALO count averages 35 stations over the sample in Appendix B. However, as indicated above, it is clear that the TALO number does not reflect the number of stations that are available to the average listener. We do not

Even when FM translators are broadcasting to high population areas, however, they may be enhancing the benefits of radio service to consumers. In even the largest population areas, there may be audiences with specialized programming tastes that are ignored by full power radio stations. By providing service to these audiences, an FM translator can meet an unfilled need and thereby advance the interests of consumers.

IV. Will the Entry of FM Translators Decrease Social Welfare?

The third point in the Supplement that warrants attention is the NAB assertion that the addition of an FM translator will lower consumer welfare if it results in a full power radio station going out of business. The NAB scenario suggests that an FM translator enters the market and takes away a sufficiently large portion of the full power station's audience that the latter station is no longer profitable. When the full power station leaves the market, its old listeners who either cannot get the translator's signal or do not like the translator programming, are worse off than before. Thus, while those who listen to the translator gain (obviously because they prefer the translator over the other station), the other listeners lose.

There are two flaws with this analysis. First, when the full power radio station leaves the market, the listeners who are either not

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have available a more plausible indication of the number of stations heard by most listeners for all the counties in their sample. Since most of these areas are not included in the Arbitron market area sample, we have no information from which to make inferences on the number of stations available to the average listener in those areas. Thus, we do not directly address the question of the number of radio stations except to show that many translators are going into low population areas where there is not likely to be an excess of radio listening options.

attracted to or unable to get the new FM translator present an opportunity for other FM translator entrepreneurs. In many parts of the country, there seems to be enough spectrum for a number of new translators to enter.[23] Thus, the former listeners of the now defunct station may find a desirable alternative to the old station. Second, even where the spectrum is not available, welfare is not necessarily lessened by the demise of the full power station. It is quite possible that the gain to the translator listeners may be greater than the loss to the other listeners.

In view of the excess of spectrum in most areas, one would expect the case where welfare is lessened to be unusual. Thus in an environment with imperfect information and mobility of resources, the free unimpeded operation of the market will more likely achieve greater consumer satisfaction than an administrative allocation procedure. Giving the owners of FM translators an opportunity to sell their product with minimal restrictions will go far toward achieving this result by increasing the probability that more specialized formats will be offered, thereby increasing radio listenership.

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[23] FM translators are allocated the spectrum space between the points where full-service FM stations operate. Not all the FCC spectrum allotments for FM full service stations are being used; for instance, there are excess FM station allotments in 95 of the 115 areas in the sample used in our regression analysis. Appendix B of the NAB submission lists the most recent FM translator applications; if there was no spectrum space, these applications would not have been made. All these facts indicate that there are wide areas of the country where there is probably enough spectrum to accommodate more FM translators.

V. Conclusion

We do not believe that the NAB critique invalidates the FTC staff's estimates of the relationship between station numbers and audience size. The TALO Survey variable suggested by the NAB appears less appropriate than the Arbitron data relied upon by the original FTC staff comment. Further, when those sampled markets which may experience significant competition from stations in other markets are excluded from the regression analysis, the results are virtually identical to those in the original FTC staff analysis. This result suggests that any bias in our results from omitting a variable measuring this outside competition is trivial. To the extent that any bias remains from excluding competing stations outside the market from the original study, an analysis of the effect of this exclusion indicates that the impact of the number of stations on the format diversity and therefore on listenership may have been underestimated. The conclusion that the availability of additional stations would increase the number of formats and indirectly increase the total radio audience has not been refuted. Relaxation of the FCC's FM translator rules may thus provide benefits to consumers. Second, contrary to the NAB's position, most of the most recent translator applications were for locations in relatively low population counties. Finally, even if some full power radio stations exit the market due to the entry of an FM translator, this result generally would not be expected to reduce consumer benefits from radio service.