UNITED STATES OF AMERICA

FEDERAL COMMUNICATIONS COMMISSION

COMMISSION AUTHORIZED

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

August 15, 1988

COMMENTS OF THE STAFF OF THE BUREAU OF ECONOMICS OF

THE UNITED STATES FEDERAL TRADE COMMISSION

I. Introduction and Summary

In a Notice of Inquiry (NOI) released on June 2, 1988, the Federal Communications Commission (FCC) solicits comment on its regulations governing the use and licensing of low-power FM commercial translators (translators).[1] In these comments, the staff of the Bureau of Economics of the Federal Trade Commission suggests that granting increased flexibility in the use of translators may benefit consumers by permitting greater competition for the patronage of listeners and the development of additional listening options for consumers.[2] We also suggest that the FCC weigh these benefits against two potential costs of greater flexibility: the possible inefficient use of the spectrum by translators and the current absence of public interest obligations on translator licensees.[3]

Additionally, regardless of whether it decides to permit greater flexibility in translator use, the FCC also solicits comments on whether licenses for translators should be awarded via a lottery. In contrast to lengthy comparative hearings to resolve mutually exclusive license applications, a lottery may result in a more rapid delivery of translator services to consumers, and we, therefore, suggest that a lottery may advance the interests of consumers. To ensure that each license goes to its highest

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[1] 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).

[2] 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 Rogers at (202) 326-3382 should you have any questions regarding our comments.

[3] In these comments, we do not estimate whether these costs outweigh the benefits of greater flexibility of translator use.

valued use under either assignment method, we also suggest that translator licenses be transferable within a short time after receipt.

The remainder of this comment is organized as follows. Section II describes the interest and relevant experience of the FTC staff. Section III outlines the development of current FCC translator policy and the adoption of the NOI. Against that background, Section IV considers the kinds of consumer benefits that may flow from permitting flexibility in the uses of translators. Section V considers some of the costs the FCC perceives may flow from this flexibility. Section VI discusses the possible consumer advantages of a lottery as the mechanism to assign translator licenses. Finally, Section VII summarizes our comments.

II. Interest and Experience of the FTC

The staff of the Federal Trade Commission, upon request by federal, state, and local governmental bodies, comments on regulatory proposals that may affect competition and increase costs without providing countervailing benefits to consumers. The Federal Trade Commission staff has recently examined the competitive and other consumer effects of various aspects of the FCC scheme for regulating the broadcast and cable industry. Among the aspects we have examined are ones that, like the question of flexibility in the use of translators, offer the potential to increase consumer satisfaction by increasing the array of programming available to radio listeners.[4]

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[4] See the comments of the Bureaus of Competition, Consumer Protection, and Economics of the Federal Trade Commission before the Federal Communications Commission In the Matter of Selection of Initial Licenses Using Random Selection or Lotteries Instead of Comparative Hearings, Docket No. 81-768, December 30, 1981; In the Matter of Amendment of Section 73.3597 of the Commission's Rules on Applications for Voluntary Assignments or Transfers of Control, BC Docket No. 81-897, March 1, 1982; In the Matter of Amendment of Part 76, Subpart J, Section 76.501

III. Development of Current Translator Policy and Notice of Inquiry

In 1970, the FCC first authorized the use of FM translators to facilitate radio service to geographic locales and populations unable to receive adequate radio service due to distance or terrain.[5] While recognizing the benefits that might flow from additional radio service to these areas and populations, the FCC also expressed concern regarding the potential adverse economic impact of translators on existing and potential full-power FM stations.[6] In addition, the Commission concluded that the spectrally efficient manner of providing FM service is via full-power stations.[7] For these reasons, the FCC adopted rules to ensure that FM translators remain supplemental to, and not substitute for, full-power stations. Among the rules to implement this policy are those which prohibit virtually all program

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of the Commission's Rules and Regulations Relative to Elimination of the Prohibition on Common Ownership of Cable Television Systems and National Television Networks, CT Docket No. 82-434, December 8, 1982; In the Matter of Domestic Fixed Satellite Transponder Sales, CC Docket No. 82-45, April 16, 1982; In the Matter of Amendment of 47 C.F.R. Section 73.658(j) on The Syndication and Financial Interest Rule, BC Docket No. 82-345, January 31, 1983; Reply Comments In the Matter of Amendment of 47 C.F.R. Section 73.658 (j) on The Syndication and Financial Interest Rule, BC Docket No. 82-345, April 26, 1983; In the Matter of The Processing of New Domestic Satellite Applications, Report No. DS-265, May 7, 1984; In the Matter of Amendment of Part 76 of the Commission's Rules Concerning Carriage of Television Broadcast Signals by Cable Television Systems, MM Docket No. 85-349, February 25, 1986; In the Matter of Amendment of Section 73.3555 of the Commission's Rules on Broadcast Multiple Ownership Rules, MM Docket No. 87-7, July 15, 1987. Copies of these comments are available from the Federal Trade Commission's Office of Public Reference. We also note that in December of 1923, the Report of the FTC on the Radio Industry contributed to the passage of the Radio Act of 1927 and the succeeding Communications Act of 1934.

5   NOI at 2.

6   Id.

7   Id. at 15.

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origination by a commercial translator, any program reception by the translator that is not off-air,[8] and the use of translators merely to relay distant programming from one market to another.[9] In addition, the FCC will not license a translator to an existing full-power FM station if the retransmitted signal would extend beyond the station's predicted reception area and would lie within the reception area of an FM station licensed to another community.[10]

As urged by a number of rulemaking petitions, the FCC seeks comment "on the value, need, and desirability of expanding FM translator authority...."[11] The FCC recognizes that greater flexibility in the use of translators can result in consumer benefits that must be weighed against the costs of a less restrictive regulatory environment.[12] In particular, while expressing concern that a substantial increase in the number of translators "could pose significant and difficult new monitoring and enforcement requirements for the Commission,"[13] the FCC also observes that such an increase "may result in programming tailored to small audiences with

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[8] That is, the translator must be in the line-of-sight of the facility transmitting the programming to be retransmitted by the translator.

[9] Id. at 2-4.

[10] Id. at 4. However, any other licensee may use a translator to retransmit the station's signal in these circumstances. The FCC prohibits initiation of any "joint venture" between the translator licensee and such a station until the translator is operational. Finally any payment made by the retransmitted station to the translator licensee must be limited to maintenance and operational expenses. The payments are not allowed to compensate the licensee for the costs of obtaining the license or tower construction costs. Id.

[11] Id. at 24.

[12] Id. at 12-13.

[13] Id. at 23.

4

specialized tastes rather than to a least common denominator mass audience," particularly in rural areas.[14]

However, the FCC notes that, according to the National Association of Broadcasters (NAB), translator licensees may have undermined the FCC's intent that translators remain a service secondary to full-power FM stations.[15] In particular, according to the NAB, the translator importation of large, major market radio signals into the reception area of other full-power FM stations may have resulted in "unfair competition" in that it "disrupt[s] the balance of competition among, and drain[s] critical revenues from, local stations, particularly in medium and small markets."[16] To remedy these perceived abuses, the NAB contends that in general translators should only be licensed to fill in a full-power station's reception gaps attributable to terrain or other obstacles within the predicted coverage area of that station and to provide service to areas not served by any full-power FM station.[17]

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[14] Id. at 24.

[15] Id. at 5. The NAB asserts that, among other abuses, many translators are used solely to relay the signal of a distant FM station into a target geographic market for the purpose of expanding the coverage area of that distant station. Id. at 6.

[16] Id.

[17] Id. at 6-7. This proposal is in contrast to the current rules which permit a translator to import a distant full-power FM station into a market beyond the station's predicted coverage area and into the coverage area of another full-power station, subject to the restrictions described in note 10. The NAB proposal would also permit AM stations to use translators in their markets to rebroadcast their signals on the higher quality (in terms of propagation and audio characteristics) FM band, although the NAB expresses the concern that implementation of this proposal could lead to a diminution of AM listenership. Id. at 7.

In reviewing the NAB's arguments, the FCC solicits comment in particular on two issues with regard to the "unfair competition" that may be posed by translators. First, the FCC expresses concern that any relaxation of the translator rules would lead to "spectrum inefficiency," because the amount of spectrum required for multiple translators to duplicate the coverage area and the signal quality of a full-power FM station exceeds that required for the full-power station. Moreover, the added competition arising from the licensing of new translators may financially harm or displace spectrally-efficient full-power stations as well as impede the licensing of new full-power stations.[18]

Second, the FCC solicits comment on whether translator licensees should bear the same public interest responsibilities as full-power stations.[19] Full-power stations are required to maintain a studio origination capability and to provide programming responsive to issues of local concern.[20] The FCC notes that because of the costs such requirements impose on full-power licensees, prospective licensees may have incentives to construct translators rather than full-power stations.[21]

IV. Potential Benefits from Relaxation of the Translator Rules

As the FCC observes, one potentially significant consumer benefit from relaxation of the rules governing translator use is the additional number of listening options that translators may provide. Current rules prohibit translators from originating programs and full-power FM stations from

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[18] Id. at 15-18.

[19] Id. at 16-17.

[20] Id. at 17.

[21] Id.

obtaining translator licenses when the translator would compete with another full-power FM station. These rules may restrict the ability of translator licensees to offer the most profitable programming and thereby artificially reduce the number of translators and thus the number of listening options available.[22]

Moreover, some program formats that are highly valued by consumers may not be aired under the current rules. As economic analysts and the FCC itself have observed, the array of programming offered by advertiser supported broadcast stations--measured in terms of the variety of program formats and the number of stations offering any particular type of format-- will not necessarily be that which best satisfies consumers.[23] Advertisers

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[22] Some translators may be financially viable only if the FCC permits program origination or permits ownership of the translator by the full-power FM station (or a joint venture between the station and the licensee). For example, a translator may not be profitable unless the licensee can offer highly specialized programming which may not be available from an existing full-power FM station.

Ownership of the translator by a full-power FM station (or a joint venture between the translator licensee and the FM station) may enable the station to assume all (or part) of the financial risk in applying for a translator license and in constructing and operating the translator. An independent licensee may be willing to assume this risk only at a higher expected return than that required by the station licensee. Because ownership or joint ventures may provide a more assured source of revenue for the translator licensee, each of these options may lower the cost of applying for, constructing and operating a translator.

Further, by restricting program reception by the translator to off-air sources, translator licensees may be unable to utilize the most cost-efficient techniques (e.g., satellites) for program delivery. The FCC's rules restricting program reception by a translator to off-air sources, thus precluding the use of satellites to relay the signal to the translator, may be an incentive for using translators to relay signals from one market to another.

[23] See, for example, Samuelson, The Pure Theory of Public Expenditure, 36 Review of Economics and Statistics at 387-389 (1954); Steiner, Program Patterns and Preferences in Radio Broadcasting, 46 Quarterly Journal of Economics at 194-223 (1954); Spence and Owen, Television Programming, Monopolistic Competition, and Welfare, 91 Quarterly Journal of Economics at 103-126 (1977); Federal Communications Commission,

(and therefore station owners) seek to maximize audience size for any given amount of programming and station costs rather than match formats with the intensity of consumer preferences for specific formats.

Relaxation of the translator rules may remedy some of these deficiencies. First, an increase in the number of listening options may raise the probability that highly valued but less popular formats will be aired.[24] For example, translators operate at substantially lower power and lower cost than full-power stations. Consequently, in a more relaxed regulatory environment, translators may be more likely to offer specialized programming by locating in those areas in which listeners who prefer a distinct format are concentrated geographically.

Second, increasing the number of stations can raise the level of consumer satisfaction by increasing the variety of options within a format.[25] Moreover, an increase in the number of stations can increase the extent of competition for the patronage of listeners and as a result, may raise the level of expenditures on programming. To the extent that the existing

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Report and Order In the Matter of Deregulation of Radio, BC Docket No.79-219, February 24, 1981 and references therein.

[24] This increase may occur even in those local markets in which the FCC's allocation of FM radio spectrum precludes the operation of additional full-power FM stations. To prevent interference among full-power FM stations, the FCC requires that stations be separated from each other on the FM band. Because of their lower power, translators may be able to operate within these separations without causing noticeable interference to the full-power stations. Thus, translators may be able to utilize spectrum that might otherwise lie fallow. Further, as noted immediately below in the text, translator licensees may have greater incentives to offer specialized programming than do full-power stations.

[25] For example, if two jazz stations permitted a greater variety of jazz recordings than would be possible with a single jazz station, listenership (used as a proxy for consumer satisfaction) might increase.

number of local radio stations is less than that required to reduce profits to a competitive level, the introduction of additional stations may increase station rivalry for listeners and may create incentives for stations to devote some of their excess profits to increased programming expenditures.[26] Higher programming expenditures may indicate a higher quality of radio service (e.g., compact discs instead of vinyl records, more entertaining or informative on-air personalities, better audio characteristics).

In conclusion, an increase in the number of listening options may increase consumer satisfaction by increasing the number of formats, the within-format variety, and the quality of the programming. To test this hypothesis, two economists in the FTC's Bureau of Economics conducted a statistical analysis relating the daily average percentage of the population listening to radio to (among other factors) the number of formats in various radio markets.[27] While any rise in listenership is a highly imperfect indicator of an increase in consumer satisfaction,[28] the results suggest that an increase in the number of stations has a statistically significant effect on increasing the number of formats and that an increase in the number of formats has a statistically significant effect on increasing the percentage of

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[26] For a discussion of this possibility with empirical support from television broadcasting, see Fournier, Nonprice Competition and the Dissipation of Rents From Television Regulation, 51 Southern Economic Journal at 754-65 (1985). Excess profits may result from the restrictions on radio station entry arising from the FCC's allocation of spectrum to radio and not necessarily from overt or tacit collusion among radio stations in a particular market.

[27] The details of this analysis are provided in the attached appendix by John R. Woodbury and Robert P. Rogers.

[28] Even if (in the extreme case) total listenership did not increase with the rise in the number of stations or formats, it would not necessarily mean that consumers did not place a higher dollar value on the new array of programming.

the population listening to the radio.[29] These effects exist regardless of the number of stations and formats currently provided. While small in magnitude, the listenership effect is relatively larger for markets in which there are fewer stations and fewer formats available. This empirical analysis, therefore, provides some support for the possibility that an increase in the number of stations provides consumer benefits by enhancing the variety of formats available.

We are not suggesting that translator licensees be limited to those entities offering original programming or importing distant FM signals into local markets. The use of translators by existing FM stations to fill in the gaps in their predicted coverage area also offers benefits to consumers by enabling consumers residing in the gaps to receive an additional listening option. Similarly, translator use by AM stations may alter the programming of the AM station in ways (e.g., changes in the programming format or increased expenditures on programming) that may benefit consumers. We only suggest that employing translators for program origination or for importing distant FM signals into a local market (regardless of the identity of the translator licensee) also has the potential to benefit consumers.

V. The Perceived Costs of Relaxing the Rules

As noted in Section III, the FCC perceives two costs that may result from rule relaxation: a possible inefficient use of the spectrum and an artificial incentive to use translators instead of full-power stations because

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[29] By "statistically significant," we mean that these effects are unlikely to have occurred by chance.

10

of the current absence of public interest obligations for translators.[30] While we do not offer any definitive conclusion on these potential costs, we offer some observations that may be useful in considering the role of translators in the provision of radio services.

A. Inefficient spectrum use

We suggest that the appropriate standard for judging the alternative uses of the spectrum allocated to radio is the effect different allocations have on consumers, rather than simply on how much spectrum is allocated to each use. The amount of spectrum used by a number of translators to attain the coverage and audio quality of a full-power station is likely to be greater than that required by a full-power station, but if the translators offer some programming that differs from that of a full-power station, consumers may be better off with the translators even if they require more spectrum.

Against that background, the competition afforded by a group of translators may economically displace an existing AM or FM station.[31] Such an outcome may benefit consumers by providing them with listening options they value more. Because consumers do not pay directly for radio services, whether or not consumers will in fact benefit from any particular displacement is unknown.[32]

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[30] The FCC also expresses concern regarding a possible increase in the agency's monitoring and enforcement costs should the translator rules be relaxed.

[31] The limited range of a single translator makes displacement of a full-power station less likely.

[32] In particular, the kind and amount of information required to know the mix of programming that best satisfies consumers is unlikely to be available. A general discussion of these information requirements can be found in Federal Communications Commission, Report and Order In the Matter of Deregulation of Radio, BC Docket No.79-219, February 24, 1981.

The FCC itself, however, has concluded that consumers in general would experience greater benefits from a policy that relies not on regulation, but on the interaction of advertisers and radio station owners to determine the kind and amount of programming provided listeners.[33] While advertiser-supported radio may reflect only imperfectly the programming preferences of listeners, the resulting programming may match those preferences more closely than a regulatory determination of the programming to be offered. Such a determination would likely be based on information less complete than that available to licensees responding to the profit incentives created by the demands of both listeners and advertisers.

For these reasons, a policy that permits the market to determine the mix of both full-power stations and translators as well as the mix of

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Specifically, allocation of radio station licenses between translators and full-power stations in a manner that best satisfies the interests of consumers requires that the regulatory authorities be able to know the type of programming listeners want, know how much of each type of programming they want, and balance these demands against the cost of producing the programming. Thus, regulators must possess an extraordinary amount of information regarding current consumer valuations and the production costs associated with the characteristics of various programming arrays that might be offered consumers in different geographic areas. These characteristics include the audio quality of the transmission, the type of on-air personalities used, the composition of the programming in terms of music, news, weather, and commercials, and the specific scheduling of individual musical pieces during the day in addition to the general kind of music offered. Further, regulators must not only have information on current consumer valuations and costs of these characteristics, they must also be able to mimic the speed with which a well-functioning real-world market would recognize and respond to changes in these valuations and costs and to mimic the extent to which market participants would engage in risky programming and other innovations. Finally, regulators must possess information on the current value of and changes in the value of the spectrum allocated to radio in comparison to the value of the same spectrum in other uses, increasing or decreasing the amount of spectrum allocated to radio appropriately.

[33] See Federal Communications Commission, Report and Order In the Matter of Deregulation of Radio, BC Docket No.79-219, February 24, 1981.

program formats may yield greater consumer benefits than one which protects full-power stations from economic harm. In addition, the latter policy may be inconsistent with the market-oriented approach generally articulated by the FCC.[34]

Finally, the FCC has noted that the future licensing of full-power stations could be impeded if translators are allowed to occupy a significant part of the spectrum required by prospective full-power stations. Once again, this raises the issue whether consumers would prefer the program offerings of the translators or the full-power station. Assuming consumers may prefer the programming of some of these prospective full-power stations, there are at least two alternatives that are less restrictive than limiting the permitted uses of translators in deference to the possible licensing of new full-power stations. First, the FCC could require the prospective full-power licensee to purchase the translator facilities. If the full-power station is likely to be more profitable than the group of translators in question, the prospective full-power licensee should be able to buy some or all of the translators occupying the spectrum space it desires. If the full-power station is successful, the translator licenses would be voided by the FCC in return for the award of a full-power license.[35] This

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[34] In this regard, the FCC may wish to consider clarifying its policy basis for distinguishing between the economic harm inflicted on a full-power station by a translator (e.g.) importing a distant FM signal and that inflicted on the same station by another local full-power station using the translator to fill in the station's coverage gaps. If the programming offered by each translator were equally attractive to listeners, the adversely affected full-power station would experience a loss in listeners and therefore advertising revenue in either case. And in either case, the adversely affected station might become unprofitable.

[35] It is possible that in attempting to purchase a group of translators, the full-power station may confront a translator licensee who is willing to

solution would be consistent with the FCC's market-oriented approach to radio regulation and would not require the FCC to choose what kind of station best serves consumers.[36]

Second and alternatively, the FCC could condition each translator license on the requirement that the translator license becomes void if a license for a full-power station requires that the translator's operations discontinue. Although this approach would be superior to restrictions on the type of uses allowed for translators, the additional risk borne by translator licensees would be likely to reduce the number of translators available to listeners.

B. Public interest responsibilities

Currently, translator licensees are not required to bear two public interest responsibilities borne by full-power stations: maintaining a studio

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sell its facilities only at a price that captures all the additional profits that would be earned if the full-power station were to replace the group of translators. In the event of such a "hold-up," the FCC may have to act as a court of last resort. "Hold-up" problems may be more likely to occur if the full-power station can only become operational by acquiring all the translators and if the ownership of the licenses within the group of translators is dispersed.

But because of the lower power and the lower coverage area of any individual translator, the full-power station may become operational even if the entire group of translators is not acquired. The full-power station may be able to use equipment to prevent the station's signal from interfering with that of the recalcitrant translator licensee. To the extent that a full-power station can become operational without having to acquire the entire translator group, the incentives for a "hold-up" may be reduced.

[36] Indeed, in a proceeding that ultimately led to the adoption of lotteries for the assignment of low-power television licenses, the FCC noted that "it may be exceedingly difficult for the Commission to select the applicant that will best serve the desires of consumers." See Federal Communications Commission, Notice of Proposed Rulemaking In the Matter of Selection of Initial Licenses Using Random Selection or Lotteries Instead of Comparative Hearings, FCC General Docket No. 81-768, November 5, 1981, at 3.

origination capability and providing issue-responsive programming. As the
FCC observes, these requirements impose costs on full-power stations, and
the absence of similar requirements for translators may artificially encourage
prospective station owners to operate translators rather than a full-power
station.

On the one hand, a full-power station may be more efficient than
translators, in terms of minimizing production costs and satisfying
consumers.[37] Imposing symmetric public interest obligations on translators
would eliminate any incentive for licensees to select translators instead of
full-power stations simply for the purpose of evading the costs resulting
from these obligations.

On the other hand, imposing public interest requirements on translators
is likely to reduce the number of translators, thereby reducing the number
of listening options and therefore the extent of program variety available to
listeners. In deciding whether to impose on translators the same public
interest obligations borne by full-power stations, the FCC might wish to
weigh the loss in program variety against the gains in eliminating the
artificial incentive to select translator technology. The significance of these
gains will depend upon the magnitude of this incentive[38] and the value to
consumers of the public interest requirements.

VII. The Manner in which Licenses Are Assigned

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[37] Operating a large enough group of translators to duplicate the
reception area of a full-power station may result in higher production costs
(e.g., maintenance or engineering) than those for a full-power station. But
these additional costs may be less than those resulting from compliance with
the FCC's public interest requirements for full-power stations.

[38] This incentive results from both the direct production cost savings
and the amount of increased revenue generated as public interest programs
are displaced by programs that advertisers are willing to sponsor.

15

The FCC also solicits comment on whether mutually exclusive
applications for translator licenses should be resolved by a lottery procedure
rather than by comparative hearings. In a different context, the FCC
previously concluded that resolving mutually exclusive license applications
through administrative hearings is unlikely to yield sufficient information to
identify those prospective licensees that will best serve consumers.[39]
License assignment by lottery would reward entities that are lucky rather
than efficient.[40] Thus, in either administrative assignment method, we
believe that resale should be permitted so that the initial licensee could
transfer the translator license to the entity that places the greatest value on
the use of the translator.[41]

The primary advantage of lotteries over comparative hearings may be a
more rapid license assignment, thus enabling consumers to benefit from
translator services at an earlier date.[42] Because of the time required to

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[39] Federal Communications Commission, Notice of Proposed Rulemaking
In the Matter of Selection of Initial Licenses Using Random Selection or
Lotteries Instead of Comparative Hearings, FCC General Docket No. 81-768,
November 5, 1981, at 3; see also Letter from David T. Scheffman, Director,
Bureau of Economics, Federal Trade Commission, to Mark S. Fowler,
Chairman, Federal Communications Commission, October 29, 1986, at 3.

[40] Scheffman, supra note 39, at 3.

[41] For a general discussion of this point, see the comments of the
Bureaus of Competition, Consumer Protection, and Economics of the Federal
Trade Commission before the Federal Communications Commission In the
Matter of Selection of Initial Licenses Using Random Selection or Lotteries
Instead of Comparative Hearings, FCC General Docket No. 81-768, December
30, 1981, at 5-6.

[42] For example, the duration of streamlined comparative hearings for
the allocation of cellular radio licenses in the top 30 markets averaged 18
months. The use of lotteries for markets 91-120 was predicted to result in
an average delay of 12 months in the initial award of the license. See
Kwerel and Felker, Using Auctions to Select FCC Licensees, FCC Office of
Plans and Policy Working Paper No. 16, May 1985, at 12.

complete the proceedings, comparative hearings may considerably delay the introduction of translator services to consumers. For some contemplated uses of translators in some markets, this delay may render those uses unprofitable.

We recognize that lotteries in conjunction with resale could result in a deluge of lottery players and render the lottery costly and cumbersome to administer.[43] This potential deluge can be reduced by, for example, restricting the time during which applications may be filed, establishing minimum financial or technical qualifications for the applicants, establishing a sufficiently large application fee, and prohibiting resale for a more extended period of time following the award of the translator license. These options can maintain the number of applications at manageable levels and reduce the direct government costs of awarding the license. However, the restriction of resale is the option most likely to harm consumer interests because there is still no guarantee that the "winner" from the more limited applicant pool is the entity that could use the translator most profitably. Therefore, the kind of lottery that is most likely to serve consumers is one that places as few restrictions on resale as is practical and consistent with FCC policy.

VII. Summary

We conclude that there may be significant consumer benefits if the FCC were to relax the current restrictions on the permissible broadcast uses of translators. In particular, permitting program origination or distant signal importation by translators (regardless of the licensee's identity) is likely to

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[43] The administrative delay occurs because the FCC must log and prescreen each application. Id.

advance the interests of consumers by increasing the number of listening options available. Although listenership is only an imperfect indicator of the value consumers place on additional options, the empirical analysis by two of the Bureau of Economics staff indicates that additional listening options may increase listenership. In addition, by permitting the translators to receive their programming in the most cost-effective manner, the market-determined number of translators may be greater than would be the case if the only allowed mode of signal reception were off-air.

With regard to the costs of relaxing the rules, we suggest that the policy touchstone for determining whether spectrum allocated to radio is being efficiently utilized may not be merely how much spectrum translators will use in comparison to full-power stations. Whether the use of spectrum by translators will serve consumers to a greater extent than use by a comparable full-power station may be at least as important. In particular, if the translators offer some programming that differs from the comparable full-power station (thus offering consumers greater variety), consumers may be better off with the translators even if they utilize more spectrum. Thus, a regulatory determination that full-power stations should be protected from financial harm caused by translators may harm consumers and may be inconsistent with the FCC's policy that the interaction of advertisers and station owners should determine the array of programming provided to consumers.

If the licensing of translators limits the FCC's ability to authorize new full-power stations, we suggest two possible resolutions of this impediment that are less restrictive than prohibiting certain broadcast uses of translators. We also suggest the kinds of concerns that the FCC may wish

18

to consider in deciding whether it should impose on translator licensees the same public interest obligations of full-power stations.

Finally, as an alternative to comparative hearings, a lottery offers the potential for a more rapid resolution of mutually exclusive license applications for translators. The FCC may have to limit the number of applications for such a lottery, but there are a number of ways to do this. One way, proscribing resale for an extended period of time after the award of the license, would diminish the consumer benefits from this license assignment mechanism.

STATISTICAL APPENDIX[1]

John Woodbury and Robert Rogers

In this Appendix, we investigate in a preliminary way the relationship between the number of radio stations and listenership. We do this indirectly by first estimating the relationship between the number of formats in a market and the number of stations. We then estimate the relationship between the percentage of the market population listening to the radio and the number of formats. Together, both equations permit us to estimate the effects of increasing the number of stations on listenership.

As discussed in the text of the comment, an increase in the number of radio stations may increase the number of programming formats offered and the greater number of formats may increase listenership. We can model the general relationship among the proportion of people listening to the radio, the number of stations and the number of formats as two equations; one relating the radio listenership to the number of formats and one relating the number of formats to the number of stations. These relationships can be generally depicted as follows:

$$P \quad = \quad F(FOR, X_1, v) \tag{1}$$

$$FOR = \quad F(NS, POP, X_1, u) \tag{2}$$

where FOR equals the number of formats, NS equals the number of stations in a market, and P equals the proportion of population listening (called listenership below). POP is the population in the radio market. X_1 is a vector of other market characteristics that might affect listenership and the number of formats respectively, and u and v are residuals.[2]

We include POP in equation (2) because the number of formats in a given market may be influenced by population. One would expect a greater market population to increase the number of formats because such markets may have more people with diverse tastes and may generate sufficient advertising revenues to support differing formats. Consequently, stations offering more specialized formats in such markets may be more profitable than in markets with smaller populations.

The X_1 vector consists of variables that may affect the distribution of programming tastes across any given population and their use of radio as an entertainment medium. As such, X_1 may affect both P and FOR, although we do not have any priors on whether the coefficients of the components of X_1 in either equation should be positive or negative. The components of X_1 are median income (Income), the population proportion of Blacks (Black) in the market, the population proportion of Hispanics (Spanish), and the proportion of the population over 34 years old (Age).

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[2] Because NS is determined by FCC allocation procedures, we treat NS as exogenous, although the regulatory decision process that gives rise to that allocation may depend on POP and X_1 among other variables. In addition, the number of formats may depend upon expected listenership. To the extent that actual listenership is correlated with expected listenership, endogeneity issues arise and should be considered in a more complete analysis.

For the sample, we examined the 259 Arbitron radio markets for which industry data are collected. To insure that our data points closely correspond to real markets, we confined our sample to the 115 markets where the local stations have a market share of over 85 per cent. We used data for the spring of 1987.[3]

Since it is likely that (for example) the absolute effect of the number of stations on format is dependent on the size of the population in the market, we estimate equations (1) and (2) in double log form:

$$\ln FOR = \ln b_0 + b_1 \ln NS + b2 \ln Pop + b_3 \ln Income$$
$$+ b_4 \ln Black + b_5 \ln Spanish + b_6 \ln Age + u \qquad (1a)$$

$$\ln [P/ (1 - P)] = \ln a_0 + a_1 \ln FOR + a_3 \ln Income + a_4 \ln Black$$
$$+ a_5 \ln Spanish + a_6 \ln Age + v \qquad (2a)$$

In the listenership equation (2a) we transform P to represent the log of the odds in order to constrain the predicted P to the zero-one interval. We therefore use the minimum logit chi square method in estimating equation (2a).[4] Since P and $P/(1 - P)$ are proportions, they have a range of from zero to one and P has a binomial distribution with a variance of $P(1 - P)$, and $\ln[P/ (1 - P)]$ has a variance of $1/ [n_i (1 - P)P]$ where n_i is the number of people in the Arbitron sample for market "i." Thus the error term v is heteroskedastic. To correct for this problem, we use a weighted least squares technique with the following weight: $[n_i (1 - P)P]^{1/2}$.[5]

It would seem logical to substitute the FOR equation into the logit equation in order to evaluate the impact of NS on P directly. However, this creates the potential for a serious multicollinearity problem. Substitution of (1a) into (2a) will result in ln POP being an additional weighted independent variable which will be highly correlated with other weighted variables in 2(a) because of the correlation (.9008) between ln POP and the Arbitron sample size n_i. Such multicollinearity can lead to large variances for the parameter estimators thereby reducing the precision of our estimates and increasing the probability of accepting the hypothesis that the coefficients are not

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[3] Most data are from Broadcast Investment Analysts, Inc., <u>Investing in Radio, 1988.</u> 'We express our appreciation to Tom Buono and Gregg Welsh of Broadcast Investment Analysts for their permission to use the data. Listenership data are from the market-by-market ratings publications of Arbitron.

[4] A discussion of this method can be found in G. S. Maddala, <u>Limited Dependent and Qualitative Variables in Econometrics,</u> 28-32 (1983).

[5] The basis for using these weights can be found in Maddala, <u>id.</u>

significantly different from zero when in fact the null hypothesis should be rejected.[6] In fact, the correlation coefficients between the weighted ln POP and three of the other weighted variables (ln NS, ln Income, and ln Age) are 0.9935, 0.9974, and -0.9511 respectively.[7] Consequently, rather than substitute equation (1a) into equation (2a) and estimate a single equation, we estimate each equation and evaluate the impact of NS on P by making that substitution after the two equations have been estimated.

One could argue that since POP is implicit in the FOR equation it still has not been eliminated as a source of multicollinearity when we use FOR only in the P equation. However, there are several other variables in the format equation, and the impact of population on the number of formats, while statistically significant, is not large (the regression coefficient being about 0.10). Thus its contribution to any multicollinearity problem through its effect on FOR is likely small. The multicollinearity is probably less of a problem in the FOR equation because we do not use the weighted OLS. For instance while the weighted ln NS and ln POP variables have a correlation coefficient of (0.9935), the correlation between the unweighted variables, while high (0.9122), is lower than the weighted versions of the variables.

Thus estimating the FOR equation for the relationship between the number of formats and the number of stations may enable us to obtain more precise estimates of the effect of station numbers on listenership. The method used here is one of the solutions to the multicollinearity problem recommended by Kennedy. In particular, he suggests that "formaliz[ing the] relationships among regressors" in the same manner as described above may reduce the degree of multicollinearity.[8]

Table A1 reports the results for the estimation of equations (1a) and

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[6] See H. Theil, Principles of Econometrics 147-155 (1971).

[7] There are also high correlation coefficients between some of the other variables, but they are all required in the listenership equation for theoretical reasons. To exclude these relevant variables would lead to estimators that are biased.

[8] P. Kennedy, A Guide to Econometrics, 151 (1985).

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(2a) for two estimating methods; one is an independent estimation of each equation where the above-described weighted method (minimum logit chi square) is used to estimate the listenership model and an ordinary least squares (OLS) approach is used for the format equation. The other method takes into account the possibility of correlation between the residuals of the two equations. It is a seemingly unrelated equations (SURE) method whereby the two equations are estimated jointly (the variables in the listenership ratio equation being properly weighted as in a single equation minimum logit chi square estimate.[9])

In the format equation, all the variables except Income and Age are significantly different from zero at a 5 percent level for both estimating techniques. The positive coefficient for NS is as predicted by theory: an increase in the number of stations is associated with a greater number of formats. The coefficient being considerably less than one supports the contention of Steiner and others on the tendency of advertiser supported radio to weight their program offerings toward "common-denominator" programming.

The positive coefficients for the proportion of Black and Spanish people suggests that the programming tastes of these groups contribute to format diversity. The insignificant results for Income and Age are not particularly alarming because they are not inconsistent with economic theory. Nothing in the literature states that differences in age and income would necessarily lead to more diversified tastes in radio programming, other things equal.

In the listenership equation, the coefficient of the number of formats is positive and significantly different from zero at the 5 percent level. The proportion of Hispanics in the population is also significantly different from zero. For neither method are the other demographic variables significantly different from zero on a two tail test. [Since economic theory has no prediction as to the direction of either coefficient, we rely on the two tail test.] Again these insignificant results are not particularly alarming because economic theory only predicts a possible effect for these variables.

As a whole, both equations are statistically significant; the log likelihood ratio for the seemingly unrelated equation estimation is 200.56 which is significant at the 1 percent level. For the independent estimation procedure, the log-likelihood ratios are 47.45 for listenership equation and 172.88 for the format model, both with significance levels of 1 percent.

The implications of this model for FCC policies about the use of FM translators are as follows. The fact that increasing the number of formats increases listenership implies that the marginal listener values additional alternative types of radio programming. Thus consumers may benefit if given radio markets had more formats. To the degree that FM translators increase the number of formats in given market areas, a flexible policy

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[9] For a discussion of SURE, see J. Johnston, Econometric Methods, 238-241 (1972).

towards FM translators will raise consumer satisfaction with the array of programming offered.

Our model also suggests that by increasing the number of stations, a more flexible policy toward translators will indirectly lead to increased listenership because of the effect of the number of stations on the number of formats. By multiplying the coefficient for NS in the format equation by the coefficient for FOR in the listenership equation, we can calculate the impact of a change in the number of stations on the proportion of the population listening to the radio. For the single equation model, this product is 0.139 times 0.196 or 0.027, and for the SURE estimation, it is 0.209 times 0.188 or 0.039. Asymptotically normal variances can be calculated for these two products as:[10]

$$\text{Var } (b_1{}^*a_1) = b_1{}^2 \text{ Var } (a_1) + a_1{}^2 \text{ Var } (b_1) + 2 \ b_1{}^*a_1 \text{ Cov } (b_1, a_1).$$

For the single equation model, the square root of this variance equals 0.0158 and for the SURE estimation, it equals 0.0177. This gives t values of 1.71 for single equation estimation and of 2.20 for the SURE equation; thus the product of the two coefficients is significantly greater than zero at the 5 percent level for both models.

Thus, adding radio stations will increase the percentage of listeners in the population by way of increasing the number of formats or at least the expected number of formats present in a market. To illustrate how this model works, consider a market with a listener percentage of 0.1653, 22 stations, and 6 formats (all these being roughly the averages for the sample). Using the SURE estimates, we calculate that adding one more format would raise the listening share of population by 0.0048 to 0.1701 (or by 2.9 per cent of the original number of listeners). Adding one more station will increase the listener share by 0.0002 raising it to 0.1655 (or by 0.1 per cent of the original audience). If one were to increase the number of formats by only increasing the number of stations, one would have to add almost twenty stations, the derivative of FOR with respect to NS being 0.051 in this average market.

For the smaller markets, the relative changes tend to be larger. For instance for a market with 13 stations and 5 formats, the percentage increase in listenership from the addition of one format is 3.5, and from the addition of one station it is 0.3. For a market with eight stations and four formats, the percentage increase in listenership from the addition of one format is 4.5, and from the addition of one station it is 0.4.

While these calculations do not indicate that increasing the number of stations will greatly enlarge listenership, they do imply that the consumers

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[10]   G. C. Chow, Econometrics 182-184 (1983). In order for this formula to apply, the estimators, a_1 and b_1, must be asymptotically consistent. If NS is endogenous, contrary to our assumption in footnote 2, b_1 might be inconsistent in which case the application of this formula would be inappropriate.

would value more listening options -- especially stations with different formats.

Table A1
The Relationship between the Proportion of Population Listening to the Radio (Listenership Ratio) and the Number of Formats and the Relationship between the Number of Formats and the Number of Stations[11]

The Model for the Number of Formats

Variables	Coefficients for OLS	Coefficients for SURE
Constant	0.279	0.248
Number of Stations	0.196 (2.99)	0.188 (2.99)
Population	0.098 (3.24)	0.101 (3.52)
Income	-0.013 (-0.11)	-0.015 (-0.13)
Black	0.024 (2.43)	0.023 (2.41)
Spanish	0.041 (3.46)	0.040 (3.55)
Age	-0.042 (-0.23)	-0.062 (-0.36)
Log Likelihood Ratio	172.88	200.72

The Model for Listenership[12]

Variables	Coefficients for OLS	Coefficients for SURE
Constant	-0.771	-0.512
Number of Formats	0.139 (2.05)	0.209 (3.17)
Income	-0.074 (-0.87)	-0.120 (-1.46)
Black	0.015 (1.49)	0.010 (1.05)
Spanish	0.026 (2.67)	0.019 (2.01)
Age	0.246 (1.85)	0.193 (1.48)
Log Likelihood Ratio	47.45	200.56

[11] "t-statistics" are in parentheses.

[12] For both the single equation (OLS) and the Seemingly Unrelated Equations (SURE) approaches, this equation is estimated by a weighted minimum logit chi square method.

7