Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of:	)	
Amendment of Section 73.3555 of the Commission's Rules, the Broadcast Multiple Ownership Rules	)	MM Docket No. 87-7

REPLY COMMENTS OF THE BUREAUS OF COMPETITION, CONSUMER PROTECTION AND ECONOMICS OF THE FEDERAL TRADE COMMISSION

July 15, 1987

The Federal Trade Commission ("FTC") staff is pleased to respond to the notice of proposed rulemaking ("Notice") in the above-captioned matter.[1] The Notice solicits comments on proposals to relax current prohibitions on (1) the ownership of multiple radio stations in the same service (AM or FM) in the same market, and (2) the cross-ownership of certain radio and television stations located in the same market.

In this submission, we will provide empirical support for the position that easing the ownership rules can generate substantial cost savings and other benefits. These efficiencies may encourage the entry of new broadcast stations and a subsequent expansion in program diversity. We also suggest that any antitrust concerns, arising as a result of the consolidation of stations in the same market, are most appropriately appraised on a case-by-case basis. These considerations support adoption of the FCC proposal.

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[1] These Reply Comments represent the views of the FTC's Bureaus of Competition, Consumer Protection and Economics, and not necessarily those of the Commission itself or any individual Commissioner. The Commission has, however, voted to authorize us to submit these Reply Comments for the FCC's consideration. Inquiries regarding these Reply Comments should be directed to Keith Anderson, Bureau of Economics (202-326-3428).

There is one issue in this proceeding that we do not address. That is the question of diversity in editorial viewpoints, and the significance of any reduction in that diversity caused by common ownership. This subject is beyond our institutional expertise and so our conclusions must be appropriately qualified.

Our comments are divided into four main sections. Section I summarizes the current FCC ownership rules and the changes proposed in those rules. Section II discusses how these changes are likely to foster technical and managerial efficiencies. Section III briefly explores some of the other issues involved in this proceeding. Section IV then presents our conclusions.

I. THE FCC'S CURRENT AND PROPOSED RULES

The FCC's current "duopoly" rule prohibits any entity from owning two or more commercial stations in the same service (AM, FM, or television) that serve the same local area.[2] Thus, no one entity can own two AM stations or two FM stations or two television stations in the same broadcast market. Combinations of different broadcast modes are permitted but are restricted.[3] With some exceptions, a single entity is allowed to own only one AM-FM combination, one AM station, one FM station, one television station, or one daily newspaper in a given local market. In general, owners of radio stations cannot own television stations in the same market or vice versa.[4]

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[2] See 47 C.F.R. Section 73.3555.

[3] Id.

[4] Upon an appropriate showing, the FCC will permit AM-UHF television, FM-UHF television, and AM-FM-UHF television combinations. The FCC does not permit any new AM-VHF television, FM-VHF television, or

The recent increase in the number of conventional broadcast (radio and television) stations has been substantial, rising from 8,127 such stations in 1970 to 12,612 in 1986.[5] The growth in the number of broadcast outlets has been accompanied by an expansion in the number of non-broadcast methods of electronic transmission including cable television and videocassette recorders.[6] In light of this growth, the FCC is now proposing to permit the common ownership of multiple AM and FM stations in the same market.[7] The FCC is also proposing to permit, without a special showing, AM-VHF, AM-UHF, and AM-FM-UHF combinations in the same market.[8] Finally, the Commission has solicited comment as to whether FM-television station combinations should be permitted on the same basis as AM-television station combinations[9] and whether the ownership rules should vary by size of market.[10]

AM-FM-VHF television combinations. (For a complete discussion of the current one-to-a-market rule, see the Notice at paragraphs 8-11.)

[5] See Notice at note 26.

[6] See Notice at paragraph 15.

[7] See Notice at paragraph 26.

[8] See Notice at paragraph 24.

[9] See Notice at note 48.

[10] See Notice at paragraphs 24-26.

II. THE ECONOMIC EFFICIENCIES FROM COMMON OWNERSHIP

In competitive markets, a move from a state of highly restrictive regulation of ownership patterns to a less restrictive regime (such as that proposed by the FCC) can generate substantial consumer benefits. In unregulated markets, the profit incentive tends to result in the displacement of less efficient ownership patterns by more efficient, and therefore more profitable, configurations. If common ownership of an FM radio station and a television station is more efficient than separate ownership, such facilities will tend to be commonly owned in the absence of regulatory restrictions. Greater efficiency can result from more cost effective use of labor, capital, and other inputs to produce the same goods and services. Alternatively, some ownership patterns may be more conducive to innovation in the kinds of goods or services provided to consumers. As compared to a rigid regulatory regime, markets have an advantage in generating these kinds of benefits.

The National Association of Broadcasters ("NAB") and other commenters have described the kinds of cost savings that may flow from common ownership of same-market stations.[11] These include savings in administrative or overhead costs, promotional costs, equipment costs, and programming costs. For example, the engineering staff required for two commonly-owned broadcast stations may be smaller than the sum of the staffs required if the stations are separately owned. Based on a comparison between the reported

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[11] See Appendix A to Comments of the National Association of Broadcasters In the Matter of Provision of Improvements and Benefits to the AM Radio Broadcast Service, August 1, 1986. See in this proceeding, the Comments of the National Association of Broadcasters at Appendix C (hereafter "NAB"); Comments of CBS, Inc. at 9-12 (hereafter "CBS"); Comments of Capital Cities/ABC, Inc. at Appendix C (hereafter, "ABC").

costs of operating AM-FM radio station combinations and the sum of the reported costs of AM and FM stations operating on a stand-alone basis, the NAB suggests that these cost savings can be substantial -- savings of up to 35 percent on salary expenses and up to 18 percent on technical equipment costs.[12] The fact that nearly 60 percent of all radio stations are accounted for by AM-FM combinations lends even more credence to the contention that common ownership results in efficiencies.[13]

The cost savings generated by common ownership efficiencies may produce significant benefits to consumers. Some of the cost savings may be invested to produce higher quality programming.[14] In addition, the cost savings accompanying common ownership may encourage the construction of new broadcast facilities, if this is permitted by the FCC's spectrum allocation policies. As we discuss below, this new entry may enhance the degree of program diversity in the market.

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[12] See Appendix A to Comments of the National Association of Broadcasters, In the Matter of Provision of Improvements and Benefits to the AM Radio Broadcast Service, August 1, 1986. If two stations are assumed to simulcast the same programming, equipment cost savings are estimated to be as great as 35 percent.

[13] The actual percentage is 57.3, calculated with permission from Investing in Radio, 1987. The fact that a substantial percentage of stations operate as stand-alones, even though the station owners could form AM-FM combinations, suggests that stand-alone operation is more profitable than combined operation for stations with some characteristics even though the reverse is true for stations with other characteristics. This suggests that if owners are free to combine stations, they will tend to sort out the unprofitable combinations from the profitable combinations.

[14] Some commenters have expressed deep misgivings regarding the FCC's expectation that greater efficiencies may result in higher quality programming. In particular, see the Comments of the Consumer Federation of America at 10-12 (hereafter, " CFA "). However, for evidence that competition among broadcast outlets results in greater expenditures on programming, see Fournier, " Nonprice Competition and the Dissipation of Rents From Television Regulation," *Southern Economic Journal* (January 1985).

However, the evidence provided by the NAB on the magnitude of these efficiencies is susceptible to some criticism. In assessing the magnitude of these efficiencies, the NAB should have compared the costs of an AM-FM combination to the sum of the costs of those same stations if they were operated as stand-alones. Instead, the NAB, using broad averages of station costs across different stations and different markets, compared the costs of AM and FM stations that are jointly owned to the sum of the costs of different AM and FM stations that are operated as stand-alones.[15] However, the stations that are jointly owned and operated may possess some combination of characteristics (for example, transmitter power and antenna height) that enable them to attain a lower stand-alone cost than stations that are actually operated as stand-alones. If so, then the NAB's cost savings estimates attributed to joint ownership may be exaggerated or non-existent.[16] Thus, the question of whether the stations comprising a combination would have costs lower than the sum of the stand-alone costs of those particular stations remains unanswered.

To remedy this deficiency, the FTC staff conducted a statistical study of the efficiencies associated with common ownership of AM-FM combinations in the same market. We focused on the price that would be paid for an AM-FM combination and the sum of the prices that would be

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[15] See the source cited in note 11 for a discussion of the NAB methodology.

[16] For example, two stations that are jointly owned may have costs of $100 while the sum of the costs of two stations that have different characteristics and operate as stand-alones may be $150. The NAB would have concluded that joint operation leads to cost savings of $50. However if the two jointly owned stations were operated as stand-alones, the characteristics of those stations may be such that the sum of their stand-alone costs would be only $110. The NAB in this example would have overstated the cost savings by $40.

paid for the same stations if they were independently owned and operated. If efficiencies result from combined operation, we would expect the value of the stations to be greater when sold as a combination than when sold (and when expected to remain operated) as stand-alones.[17] If there are no such efficiencies, we would expect the price of the stations as a combination to be the same or lower than the sum of the prices of the stations sold as stand-alones.

The staff analysis described in the appendix finds that the average price paid for an existing AM-FM combination exceeds by about 30 percent the price that would be paid for the same stations if those stations were operated (and were expected to continue to operate) on a stand-alone basis.[18] This difference is statistically significant.[19] Our analysis therefore suggests that the joint ownership of an AM and an FM station in the same local market has resulted in substantial efficiencies. This does not mean that

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[17] The price of an AM-FM combination might be higher than the sum of the stand-alone prices if the presence of combinations was accompanied by market power in the local advertising market. As noted below, however, this possibility appears remote. Furthermore, one of the factors we hold constant in our analysis is the level of concentration of local radio markets. Therefore, to the extent that concentration can be regarded as a proxy (albeit, an imperfect one) for market power, our results are not explained by differences in market power.

[18] This estimate is based on a comparison of prices paid for existing combinations and the prices paid for stand-alone stations. To insure that the price differences are not the result of differences other than combination versus stand-alone ownership, we conducted a regression analysis to control for other differences. The regression analysis is similar to that performed in Brown, "Statistical Determinants of Radio Stations' Revenues and Trading Prices," Working Paper No. 9, Federal Communications Commission, Office of Plans and Policy (August 1982) and in a number of television studies. See, *e.g.*, Fournier, "The Determinants of Economic Rents in Television Broadcasting," *Antitrust Bulletin* (Winter 1986).

[19] The t-statistic for the difference between the estimated ratio of combination to stand-alone prices, 1.31, and a ratio of 1, which would exist if the prices were equal, is 2.42. This is significant at a five percent level.

all stand-alone stations could achieve these economies if combined with other stations. Some stations may be more efficiently operated as stand-alones while other stations may be more efficient when under common ownership. Our results do suggest, however, that in a market environment that permits common ownership, the profit incentives of station owners will generate combinations of stations that are more efficient than if those same stations were compelled by regulation to operate as stand-alones.

Of course, these results apply directly only to the combination of an AM and an FM station in a local market. Since other combinations are not presently permitted on any widespread basis, it is not possible to empirically determine whether there are significant efficiencies to be expected from them. The efficiencies in such cases may turn out to be different from those estimated for AM-FM combinations. For example, if a second AM station is acquired by an existing owner of an AM-FM combination, the additional efficiency gains may be smaller or larger than those from the combination of a single AM station with an FM station. We expect, however, that there would be efficiencies from at least some of these other types of combinations as well. Our analysis suggests that when station owners are free to combine stations, station owners organize ownership patterns in a way consistent with efficient resource utilization.

III. OTHER ISSUES

1. Market Power

Concern has been expressed by some commenters that common ownership of same-market broadcast facilities would lead to the acquisition

of market power in the local advertising market.[20] We think these concerns are somewhat unjustified. As the FCC indicates in its Notice, and as other commenters have discussed, there has been a substantial increase in the number of media outlets in the recent past.[21] This should substantially reduce concerns about concentration resulting from common ownership.[22]

We also disagree with those commenters who argue that the FCC needs to adopt a different set of rules for common ownership depending upon the size of the market or the number of commercial stations in the market.[23] These kinds of alternative proposals would prohibit common ownership in some subset of markets without any further analysis of the particular economic context in which the common ownership may arise. While a prophylactic rule would provide policy certainty to market participants, it is likely to prevent some ownership configurations that may promote efficiency without generating market power difficulties. The benefits of such a rule appear small because, at worst, only 13.5 percent of the nation's radio

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[20] See the Comments of CFA at 13-14.

[21] See the discussion supra at 3.

[22] The NAB notes in its comments in this proceeding that 47.9 percent of local broadcasting markets have Herfindahl indexes below 1000, based on a market definition that includes only radio stations. The Department of Justice Merger Guidelines define such markets as being unconcentrated. An additional 38.6 percent of local markets have Herfindahl indexes below 1,800, *i.e.*, markets that would be characterized as "moderately concentrated" under the Merger Guidelines. (See "An Updated Examination of Market Concentration in Radio Markets," filed as Appendix E to the Comments of the NAB.) The NAB also notes that there are a variety of other media serving local markets and that in many cases the number of such outlets is considerable. (See "An Analysis of Media Outlets by Market", filed as Appendix B to the Comments of the NAB.)

[23] For example, ABC argues that any relaxation of the ownership rules should be confined to the top fifty radio markets. See Comments of ABC at 36-37.

markets could be categorized as highly concentrated.[24] It is only in these few markets that the prospect of market power arising from common ownership is likely to be of concern to the FCC.

Precisely because the "problem" markets are likely to be few in number, however, (about 35 out of 259 markets) the administrative cost of case-by-case monitoring should not be burdensome. Furthermore, even these concentration calculations are likely to overstate the potential for antitrust problems. The calculations presume that the services provided by radio stations constitute a relevant economic market whereas there may in fact be good substitutes for these services (for example, those provided by broadcast television and newspapers). The calculations also fail to consider the extent to which new radio station entry could be authorized by the FCC and therefore they ignore the constraining influence of this potential entry on any attempted exercise of market power. We therefore believe that a case-by-case approach at the time the FCC must approve a license transfer is most likely to be the appropriate, welfare-maximizing policy.

2. Relaxation of Rules Governing FM Stations

The FTC staff also disagrees with some commenters who suggest that the FCC should limit its proposed relaxation of the radio-television station ownership rules to AM and AM-FM combinations.[25] We see no reason to believe that the economies resulting from common ownership of two or more broadcast stations will exist only when an AM or an AM-FM combination is

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[24] See note 22 supra.

[25] See, for example, Comments of the NAB at 28.

one of the entities involved. Common ownership of an FM station and a VHF or UHF television station is likely to generate efficiencies similar to those that result from common ownership of an AM station and a VHF or a UHF television station.

While the FCC has endorsed the proposed change in the radio-television ownership rules with respect to AM and AM-FM combinations and television stations, it is apparently not yet willing to do the same with regard to FM-television station combinations. To the extent that the FCC perceives that the gains from AM-television station combinations outweigh any losses in viewpoint diversity, we fail to see how the FCC could reach a different conclusion with respect to FM-television station combinations. We would urge the FCC to consider expanding its endorsement to FM-television station combinations as well.[26,27]

We are particularly concerned that a rule excluding FM-television station combinations may artificially encourage AM-FM-television

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[26] The NAB argues that a relaxation of the ownership regulations should be confined only to AM stations in order to enhance the faltering financial fortunes of AM radio. See the Comments of the NAB at 23-26. If, in fact, FM stations are prospering while AM stations are suffering because consumers prefer to listen to FM stations, we believe the FCC should consider changing the amount of spectrum allocated to FM stations, if that is feasible. Consumer welfare may be enhanced if more spectrum was allocated to FM broadcasting and less to AM.

[27] The FCC does not propose to permit, nor does the Notice discuss, the ownership of radio stations by newspapers in the same market. While the evidence provided in the Appendix to these Reply Comments does not bear directly on any efficiencies that may be attained through newspaper-radio cross-ownership in the same market, the evidence nonetheless is consistent with the observation that media combinations may create efficiencies. The possibility that common ownership of radio and newspapers in the same market would engender market power can be policed by the case-by-case application of conventional antitrust tools. We would therefore urge the FCC to consider commencing a rulemaking proceeding to reassess the rule prohibiting newspaper ownership of co-located radio stations.

combinations. That is, if FM-television station combinations generated substantial efficiencies, an entrepreneur desiring to capture those efficiencies would have to acquire an AM station in addition to the FM and television stations. For any given level of broadcast services, the total cost of operating the three stations combined may be higher than the sum of the costs for operating the FM-television station combination only, plus the costs of the AM station in its most efficient use. If so, the FCC will have encouraged ownership configurations that are less efficient than could be attained with a less restrictive rule.

3. Programming Variety

Some commenters have expressed concern regarding the impact of common ownership on program (or format) diversity.[28] It is well known that advertiser-supported programming may not result in the mix of programming that would best satisfy consumer preferences.[29] This is because advertisers care only about how many people watch a program rather than the value (as measured by willingness to pay) consumers place on the program. The divergence between the mix of programs preferred by advertisers and those preferred by consumers depends on (among other things) the structure of consumer preferences and the number of stations in the market. However,

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[28] See, for example, the Comments of CFA at 7-13. By "format," we mean the kinds of programs offered by a radio station, such as easy listening, classical rock, or rhythm and blues. We are not addressing the issue of viewpoint diversity.

[29] See Samuelson, "The Pure Theory of Public Expenditure," *Review of Economics and Statistics* (1954).

as the number of stations in the market increases, it is more likely that minority tastes will be satisfied via an increase in program variety.[30]

The FCC and other commenters have noted that in the recent past there has been a considerable increase in the number of radio stations and other media outlets.[31] As a consequence of this growth, it seems likely that any gap between the mix of programs that consumers are willing to pay for and the mix actually broadcast is far less significant today than at the time the FCC adopted the rules in the 1940's. Further, if relaxation of the common ownership rules permits the attainment of greater efficiencies, and if this in turn encourages the construction of additional radio and television stations, it could enhance the FCC's ability to satisfy the twin goals of program diversity and competition.[32]

IV. CONCLUSION

The FTC staff and other commenters have provided the FCC with evidence that relaxation of these restrictions will produce increased efficiencies in the provision of broadcast services. In particular, the FTC staff analysis suggests that, when station owners are free to combine stations, they tend to do so when that is the most efficient use of the stations. However, where there appear to be no gains to joint operation, stations continue to operate on a stand-alone basis. The fact that station

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[30] See Steiner, "Program Patterns and Preferences and the Workability of Competition in Radio Broadcasting," *Quarterly Journal of Economics* (May 1954).

[31] See note 22 and the discussion at 3, supra.

[32] The discussion here is analogous to that in Network Inquiry Special Staff, *Final Report, Volume I* (1980) at 475-505.

ownership is organized in a way consistent with efficient resource utilization is further evidence that the market, rather than governmental rules, can be relied upon to maximize consumer welfare. Relaxation of the FCC's rules would permit these economies to be achieved, and such an action could benefit consumers.[33]

We do not believe that the FCC should condition a more permissive policy on the size of the local market or on the number of commercial radio stations in that market. Rather, we would urge the FCC to apply conventional antitrust tools to investigate any apparent market power problems on a case-by-case basis. Finally, if the FCC chooses to relax the ownership rules with respect to AM-television station combinations, we would also urge the FCC to consider including FM-television station combinations within its proposed rule relaxation.

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[33] As noted above, we have not considered all the issues raised in this proceeding. In particular, we have not considered claims that a relaxation in the common ownership rules will result in an unacceptable decline in viewpoint diversity. Our support for the proposed action of the FCC must be qualified accordingly.

Appendix

Efficiencies in the Joint Ownership of Radio Stations

by
Keith B. Anderson and John R. Woodbury*

In this appendix, we report on an empirical analysis of possible efficiencies from owning more than one radio station within the same local market. That is, we seek to determine whether the costs of providing radio services are reduced if stations are jointly owned and operated. We will also consider whether joint operation of radio stations always leads to increased efficiency or whether in some cases stand-alone stations are as efficient or more efficient than combinations.

The analysis focuses on the prices paid for radio stations. For some set of radio stations, the expected future costs of operating a radio station may be lower if a station is part of a joint operation. If so, then the operating profits of the station will be greater than if the station were forced by regulation to be independently owned and operated. As a result, a buyer will be willing to pay more for such a station that is part of a combination than would be the case if the station were compelled to be a stand-alone. Since the Federal Communications Commission currently prohibits all common ownership within the same local market except for a combination of one AM and one FM station,[1] we compare the price paid for pairs of AM and FM stations that are operated as combinations with the prices paid for the same AM and FM stations operated as separate entities.

Our statistical analysis shows that when stations are in fact operated as AM-FM combinations, the price of the stations as a combination exceeds the price that would have been received if the stations had been sold and operated independently. This result is statistically significant at the five percent level. For those stations that are operated as stand-alones, we find that the price these stations could command as part of an AM-FM combination is statistically no different from the stand-alone prices.

We therefore conclude that there are in some cases efficiencies associated with joint ownership of an AM and an FM station in the same market. In other cases, there appear to be no economies and no diseconomies from joint operation. While these results do not demonstrate that there are economies associated with the joint ownership of multiple AM or multiple FM stations in the same market or with the common ownership of

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* We would like to thank Alan Mathios, Paul Pautler, Dan Sherman, and Douglas Webbink for helpful comments on earlier versions of this paper, Tom Buono of Broadcast Investment Analysts, Inc., for permission to use the data from *Investing in Radio (1987)*, The Arbitron Company for permission to use their market share data, and Delores Munson and David Eaton for research assistance.

[1] See 47 CFR 73.3555(a).

co-located radio and television stations, they suggest that such efficiencies may well be present.

I. Efficiencies and the Prices of Radio Stations

There are several ways in which any efficiencies associated with joint operation of an AM and an FM radio station could manifest themselves. If there are efficiencies from joint operation, the cost of operating both an AM and an FM station would be less than the sum of the costs of operating an AM station and the costs of operating an FM station. That is, there may be economies of scope resulting from the joint operation of more than one station.[2] The attainment of such economies could result in lower costs and in higher revenues.

Theoretically, AM-FM combinations could always be more efficient than stand-alone operations or they could always be less efficient. However, we observe that large numbers of stations operate as combinations at the same time that large numbers operate as stand-alones.[3] This suggests that it is unlikely that AM-FM combinations are always more efficient or are always less efficient than stand-alone operation. Rather, it is likely that if efficiencies exist, they are found only for a subset of stations, *e.g.*, those with particular characteristics or those located in markets with particular characteristics. However, there are still a number of possibilities. Combinations could be more efficient than stand-alones in some cases and less efficient in others. Combinations could be more efficient in some cases and equally efficient in others; or they could be equally efficient in some cases and less efficient in others. Finally, combinations and stand-alones could be equally efficient in all cases. We will attempt to determine which of these possibilities is consistent with the data.

There are a variety of ways in which the costs of operating a radio station could be reduced as a result of joint ownership. For example, there may be economies in selling advertising. A firm operating both an AM and an FM station in the same local market may be able to utilize the same sales force for both of its stations. Since it would not be necessary to have a separate salesman representing each station call on each potential advertiser, the sales force required for the combined stations may be smaller than

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[2] Economies of scope are said to exist if the cost of providing a given level of output of two or more products is greater if the products are supplied by separate firms than if a single firm produces both products in common. (See Baumol, Panzer, and Willig (1982), p. 72) In the current context, broadcasting on multiple frequencies can be thought of as the provision of different products.

[3] As of the end of 1986, approximately 60 percent of stations were operated as part of AM-FM combinations and roughly 40 percent operated as stand-alones. (Derived from data in *Investing in Radio (1987).*)

the total number that would be required if the stations operated separately.[4]

Economies may also be present in the provision of services that can be utilized by both stations. For example, the FCC notes in its Notice that there may be economies in the provision of news services since the same news gathering and production staff could produce news broadcasts for several stations under common ownership.[5] Similar economies may exist in the production of other program material that can be used on two or more stations. In addition, common ownership, particularly if both stations operate from the same location, may permit more efficient utilization of personnel and capital equipment.[6]

If there are cost savings resulting from common ownership, these savings will be reflected in the price that a potential buyer will be willing to pay for a set of stations.[7] A buyer will be willing to pay a price equal to the discounted value of the future profit stream generated by the station.[8] Since profits in any period of time are simply the difference between the revenues received from the sale of advertising and the costs incurred in operating the station, a reduction in the costs of operation will increase the price a buyer is willing to pay.

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[4] Because a visit to a customer may take somewhat longer if the sales person is representing more than one station, the sales force may be somewhat larger than that which would be employed by any one of the stations if it were operated separately. However, there are scope economies in the sale of advertising provided that the sales force of the combined operation is less than the sum of those that would be employed by the various stations if they operated independently.

[5] See Federal Communications Commission, Amendment of Section 73.3555 of the Commission's Rules, the Broadcast Multiple Ownership Rules, Notice of Proposed Rulemaking (MM Docket No. 87-7), Adopted January 15, 1987, paragraph 22.

[6] See Appendix A to Comments of the National Association of Broadcasters, In the Matter of Provision of Improvements and Benefits to the AM Radio Broadcast Service, August 1, 1986.

[7] This will be true provided there is a limited number of stations for which combination operation is more efficient. The FCC's allocation of broadcast spectrum of course limits the number of radio stations that may exist in any locality. Further, our results suggest that combination operation may be more efficient than operating stations separately only for some subset of the stations in operation.

[8] The prospective purchaser will also consider the price for which he can sell the station at some point in the future. However, that price will simply reflect the future profit stream from the time of that sale.

A buyer would also be willing to pay a higher price the greater the revenues he expects to receive. The efficiencies resulting from joint operation of radio stations could lead to increased station revenues by increasing the number of listener minutes of advertising it is profitable for the station to carry.[9] For example, if a station that is part of a joint operation is able to attract more listeners, *e.g.*, because it provides better news service, the revenues received for each minute of advertising sold will increase. Similarly, if the marginal cost of selling an additional minute of advertising is lowered because of increased efficiency in the sale of advertising, the station may sell additional advertising time and thus earn greater revenues.

Station profits would also increase if the price of advertising rose with common ownership. That is, profits would rise if common ownership led to the creation of market power in the local advertising market. If increased advertising rates resulting from the exercise of market power were the cause of increased profits and therefore increased sales prices, the higher sales prices could not be taken as evidence that there were necessarily efficiencies resulting from combinations. However, if we can eliminate the possibility that increases in sales prices are the result of increased market power, evidence of higher prices being paid for combinations would provide evidence of the increased efficiency from joint operation.

If, on average, the price paid for existing combinations is greater than the price that would have been paid for the same stations if they had been sold separately and forced to operate independently, this indicates the presence of economies associated with common ownership of stations within the same market. An average combination price lower than the sum of the single station prices would suggest that common ownership is less efficient.[10] Finally, if the two prices are the same, there would appear to be no efficiencies or inefficiencies. Below we compare the prices of stations that are part of a combination to the prices that these same stations would command if operated on a stand-alone basis.

II. The Price of Radio Stations: A Regression Analysis

Our approach requires that we have estimates of the price for AM-FM combinations if those stations had been sold and operated as stand-alones and of the price of stand-alone stations if those stations had been sold and operated as combinations. We use the prices we observe for stations that were indeed sold and continue to operate as stand-alones or as combinations, respectively, to infer these prices. However, in order to isolate the effect

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[9] This will result in higher revenues for the station even though advertising rates, measured in price per listener minute, are unchanged.

[10] One would expect to find such a result only for stations that are in fact operated on a stand-alone basis. We would not expect to see stations operated as combinations if stations were more efficiently operated on a stand-alone basis.

of joint operation, it is necessary to estimate the prices of stations that are alike in all other ways.

The price of a radio station will depend on many factors other than just whether or not the station is part of a combination. Stations in large markets are apt to sell for more, *ceteris paribus*, than stations located in small markets since they will reach more listeners. Similarly, station prices should be higher where future growth is expected to be high. Stations with better technical characteristics, *e.g.*, more power, should sell for more because they reach more listeners, though this advantage is likely to be reduced if competing stations are also very powerful. In addition, stations located in markets where radio station ownership is more concentrated may bring higher prices, if the high concentration allows stations to collusively raise the price of advertising.

Finally, a station that has a low market share prior to sale is apt to sell for a relatively low price, even if it has good technical characteristics. While the presence of good technical properties should indicate the potential to attract a large audience and thereby generate large revenues, a low current market share would indicate that the station is not currently realizing its potential. Further, it is likely to take some period of time before a new management can achieve that potential. Thus, the revenues of a station that is not well managed may remain low for some period of time after a transfer of ownership. In addition, costs, particularly for station promotion, are likely to be high as the new management seeks to attract more listeners and more advertising dollars.[11] Thus, profits will remain below their potential for a period after the station is sold; and this will lower the price a buyer will pay.

In order to adjust observed prices for differences other than combination operation, a regression analysis was performed in which station prices were regressed on variables posited to affect sales price. Separate regressions were run for pairs of stations that were in fact sold as combinations and for stations that were sold on a stand-alone basis.[12] The effects of combination operation were then inferred by comparing the predicted prices of a pair of stations with a certain set of characteristics from the

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[11] For example, WLUP-AM in Chicago recently launched a two-month, $1 million advertising campaign to introduce a new format. ("Riding Gain," *Broadcasting*, May 11, 1987.)

[12] Because the regressions were run in a log-log form (see the discussion on page 11, below.), statistical hypothesis testing required the use of the price of "pseudo-combinations," which were the combination of an AM station and an FM station both of which were sold on a stand-alone basis, as the dependent variable in the stand-alone regression.

combination equation with the predicted price of the same pair of stations from the stand-alone equation.[13]

The price regressions were run in a log-log form -- that is the variables used in the regressions are the logarithms of the sales price and of the various factors that affect price. Such a form seems preferable to a linear one in which price is regressed on the actual value of the various independent variables because the independent variables in our equation should have the implied multiplicative effect on the price paid for radio stations. For example, the benefit of higher power should be greater in a large market than in a small one. Similarly, the effect of a high future growth rate should be greater in large markets than in small. Using a logarithmic form of the regression permits us to obtain this multiplicative effect; a linear regression would not.[14]

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[13] This technique is very similar to one that has been used in estimating the extent of discrimination in wage markets. (See Blinder (1973), Malkiel and Malkiel (1973), and Oaxaca (1973).)

In the context of discrimination analysis, it has been suggested that the technique may provide biased estimates of discrimination as a result of the need to use proxies for productivity and the inability to include all relevant variables in the regression equations. For example, Conway and Roberts state:

> "In regression studies of discrimination, not all pertinent job qualifications are available to the statistician. Indeed, the job qualifications actually available typically comprise a very incomplete listing of pertinent qualifications for any job. Rarely is any measure of performance included among available qualifications. ... One may therefore ask whether there are other legitimate job qualifications, not captured in the available [independent] variables, that ought to be used in statistical adjustment." (Conway and Roberts (1983), p. 78)

While we have included all of the measures for which we have data that should affect the price of a station, the possibility remains that we may have omitted one or more relevant variables.

[14] Beyond suggesting that a linear form is not appropriate, theory does not suggest much about the correct functional form. Therefore, we also experimented with other functional forms of the regression equation, although these experiments were not performed using precisely the approach described in this appendix. For example, in one early specification the independent variables were multiplied by market size. We ultimately chose the log-log specification because it was most successful in explaining prices. (For example, with the specification involving multiplication by market size described above, our equation was unable to explain a significant amount of the variation in the prices of AM stand-alone stations -- the F-statistic for that equation was 1.43. For an explanation of why we did not use separate equations to explain the prices of AM stand-alones and the prices of FM

(continued...)

A. The Variables Used in the Analysis

The following independent variables are included in the price regressions:[15] To control for market size and future growth, we used:

LRET = the log of 1985 retail sales in the local market[16]; and
GROW = the projected rate of growth in local market retail sales over the period 1985 to 1990.

Larger local retail sales and higher anticipated future growth should lead to increases in the price of a radio station. Therefore, the coefficients on both LRET and GROW should be positive.[17]

As measures of a station's technical characteristics, the following variables were included:

LAMF = the log of the frequency of an AM station;
LAMD = the log of the power with which an AM station broadcasts during daylight hours;
LAMN = the log of the power with which an AM station broadcasts at night;
LFMP = the log of the power with which an FM station broadcasts; and

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[14](...continued)
stand-alones, see the discussion below in the text.) The specification finally decided upon also parallels that of other studies of broadcast prices. See note 16 in the text. Our results might, of course, have been somewhat different if we had used a different functional form.

There is one difficulty in using the double-log specification. While it seems reasonable to assume, for example, that the benefits of higher power depend upon the size of the market, the costs of attaining higher power levels is not likely to be dependent on market size. To account for this possibility would have required entering some of the variables (such as power) both linearly and multiplicatively. (Even here, the correct specification of the equation could be far more complex than this. While the cost effect of higher power may be linearly related to a station's sales price, it is not likely to be linearly related to the log of the price.) Because there were relatively few observations on AM stand-alones and FM stand-alones sold in the same market, we would not have been able to so specify the equations estimated without an unacceptable loss in degrees of freedom.

[15] All data are from *Investing in Radio (1987)*, unless otherwise noted.

[16] Local market definitions are those used in *Investing in Radio.*

[17] The variable GROW is not entered in a logarithmic form since it is already expressed as a percentage and we expect that a one percent increase in growth should have the same effect on price independent of the level from which the increase occurs.

LHAAT = the log of the height of an FM station's antenna above the surrounding terrain.

Each of these variables measures an aspect of a station's power. The greater a station's power, the more potential listeners a station is able to reach, and hence the higher the station's potential revenues.

Many AM stations are required to operate at reduced power during nighttime hours in order to avoid interfering with other stations. As a result, it is necessary to include two measures of an AM station's power. In addition, a given level of AM daytime power allows a station's signal to be received over a greater distance if the station is located in the low frequency end of the AM broadcast band. Thus, frequency is another measure of an AM station's power.[18]

FM stations broadcast at the same level of power throughout the day. However, since FM signals can be received only within the line of sight of the transmitter, the height of the antenna may be an important determinant of a station's potential audience. We therefore expect the coefficient on LAMF to be negative, while LAMD, LAMN, LFMP, and LHAAT should each have a positive effect on the price of a station.

To control for the "quality" of the competition faced by a station, we included as variables the average value of each of our technical characteristics variables for all stations in the market. These variables are LAMFMN, LAMDMN, LAMNMN, LFMPMN, and LHAATMN.[19] Since an increase in the power of a station's competitors should reduce the value of that station, we expect a positive sign on the coefficient on LAMFMN, and negative coefficients on the other variables.

Two other variables were also included to reflect the amount of competition faced by a station:

LHERF = the log of the Herfindahl index of concentration based on radio listenership in the local market;[20] and

PFM = the percent of the stations in a market that operate on the FM band.[21]

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[18] See Brown (1982), p. 12.

[19] Each variable is the logarithm of the average across all AM or FM stations located in the local market, depending on the characteristic. Thus, LAMFMN is the log of the average frequency for AM stations located in the local market, while LFMPMN is the log of the average power of FM stations in the market.

[20] The Herfindahl index is equal to the sum of the squares of the market shares of firms owning radio stations in a local market.

[21] Again, PFM is not included in a logarithmic form as it is already a percentage.

If an increase in the concentration of radio station ownership leads to an increase in the price of advertising charged to local advertisers, the coefficient on LHERF would be expected to be positive. PFM is included because another AM station may be a closer competitor for an AM station than another FM station. Thus, *ceteris paribus*, we would expect the price of an FM station to fall with an increase in PFM and would expect the price of an AM station to rise. For a combination of an AM and an FM station, the coefficient on PFM will represent the sum of the effect on the price of the AM station and the effect on the FM price. We do not have a clear expectation for the sign of this net effect.

Two variables were included in the regression model to proxy costs incurred by station owners:

LWAGE = the log of an index of local clerical wage rates;[22] and
RATE = the prime rate of interest at the time the station was sold.[23]

Higher local wage rates reflect higher costs of operating a radio station and therefore, *ceteris paribus*, lower profits. Higher interest rates at the time of sale indicates greater expenses in financing the purchase, which may cut the price a buyer is willing to pay. Thus, we expect the signs on both of these variables to be negative.

Finally, the market share of the stations being sold was included. This variable is denoted LMRKSH and is equal to the logarithm of the sum of the market shares of the included AM and FM stations during the last spring rating period prior to the sale. Since a low market share indicates reduced revenues and increased costs during the first years under new ownership, we expect this variable to have a positive sign.

B. The Data Used

We estimate this equation for combination sales using data on 39 sales of AM and FM combinations. To estimate the price relationship for stations sold and operated on a stand-alone basis, a sample was constructed by

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[22] The index comes from the Bureau of Labor Statistics, "Wage Differences Among Metropolitan Areas, 1985," Summary 86-5, May 1986, and "Wage Differences Among Selected Areas, 1985," Summary 86-6, May 1986. Where the index was not available for a particular market, a value was extrapolated from the values for other markets in the same state.

[23] This variable is taken from *The Economic Report of the President 1987*, p. 325. For this analysis, we used the nominal rate of interest, which is appropriate if expectations of future inflation are relatively constant. To the extent that this is not the case, the interest rate used should have been the nominal rate less the expected inflation rate, that is, the real interest rate. Time did not permit us to estimate the expected rate of inflation, although the high explanatory power of the equations suggests that our results would not have been too different had we used the real interest rate.

combining AM stations that continued to be operated separately after their sale with FM stand-alone stations. The sample constructed in this way contained 34 observations.

Both samples were limited to sales that occurred during the 19 month period between June 1, 1985, and December 31, 1986.[24] There were two reasons for doing this. First, using a sample of sales that occurred during a short time period allows us to avoid adjusting for inflation. Second, we can avoid the effects of other regulatory changes which may have affected the value of radio stations. In particular, in May 1985, the Federal Communications Commission relaxed its rules concerning ownership of multiple stations located in different markets, permitting one firm to own 12 AM, 12 FM, and 12 television stations as opposed to the previous limit of seven of each type of facility.[25]

Our samples were also limited to sales in markets for which the stations located in that market account for at least 75 percent of total listeners in the area. This was done in order to insure that the market average characteristics and the Herfindahl index of concentration are reasonably accurate measures of the actual conditions in the market. If only half of all listeners, for example, listen to local stations, it is clear that stations in that market are likely competing with many other stations located in other communities in addition to those in the identified market. While our 75 percent criterion appears reasonable, it obviously will still not provide a completely accurate measure of market concentration.

It is not difficult to generate a sample of sales of AM-FM combinations. Between June 1985 and December 1986, ownership of more than 200 pre-existing AM-FM combinations located in the 259 largest local radio markets changed hands.[26] Approximately 150 of these transfers involved a single pair of stations; and we began with a one-third random sample of

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[24] Because our sample of stations is drawn solely from those stations sold between June 1985 and December 1986 (rather than all stations, sold or not), we do not have a random sample of radio stations. This lack of randomness can introduce biases into the results (see Heckman (1979)), although a study similar to the one here suggests that the bias is not large (see Brown (1982)). The sample of sold AM-FM combinations is random, while the sample of paired stand-alone AM and FM sales represents virtually the universe of all stand-alone sales for those markets in which both an AM station and an FM station were sold as stand-alones during the 18 month period. While we have no reason to believe that the stand-alone sample is not representative, it is obviously not a random sample of stand-alone sales because there were some markets in which no stand-alone stations of each type (AM or FM) were sold.

[25] See Memorandum Opinion and Order in General Docket No. 83-1009, 100 FCC 2d (1985).

[26] See *Investing in Radio (1987).*

these transactions.[27] After deleting sales that did not satisfy the 75 percent market coverage criterion discussed above and deleting three observations for which sales prices could not be verified[28], we had a final sample of 39 sales.

Developing a sample of stand-alone sales was a bit more difficult. In order to estimate a stand-alone price equation in the logarithmic form and to be able to compare the prices from this equation with those from the combination equation, it is necessary to estimate the prices for pairs of stations that were not sold as combinations. One could, of course, estimate a price equation for AM stand-alone stations and another equation for FM stand-alones. However, given the logarithmic form in which we are estimating the equation, the statistical properties of the sum of the predicted prices would be unknown; and we would be unable to determine whether any differences in predicted prices was statistically significant. By estimating the sum of the prices for a stand-alone AM and a stand-alone FM station in one equation, we were able to perform statistical tests on the ratio of the price of a combination and the sum of the prices of the stations sold independently.

Since we have several variables representing market characteristics in our regression equations, we needed both an AM and an FM station in the same local market. Further, in order to have a sample of stations whose apparent best use was as stand-alones, we eliminated stations that became

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[27] The other 50 transfers were parts of group sales where stations located in a number of markets were sold in a single transaction. As a result we have only a single sales price for all of the stations involved in the transaction. In order to use a combination that was part of one of these group sales, we would have had to estimate a sales price for that pair of stations alone. We chose not to make such estimates and simply deleted such stations from our sample.

[28] Sales prices for influential observations were confirmed in telephone conversations with Mr. Dave Schutz of ComCapital, Inc. In two cases (WMSQ/WCPQ in Havelock, North Carolina, and KOOZ/KQDI in Great Falls, Montana), observations were deleted because we were informed that the sale involved a sale of the firm's stock rather than a sale of the firm's assets. Since a stock sale can involve the acquisition of a firm's liabilities in addition to its radio facilities, such transfers may not reflect the future discounted value of radio station profits. In a third case (KFRE/KFRE in Fresno, California), our two sources disagreed on the sales price by $1 million.

We sought to verify sales prices for observations that appeared to be highly influential in determining the price regression. We considered an observation to be influential if it had a strong effect on predicted values. The statistic used to identify influential observations was the DFFITS statistic discussed by Belsley, Kuh, and Welsch (1980). Since we did not confirm the prices of all observations, it is possible that there are problems with other observations, in particular observations that lie close to the fitted regression equation. Consequently, it is possible that the estimated standard errors are biased downwards.

part of a combination after they were sold. There were numerous sales involving AM or FM stations which continued to operate on a stand-alone basis after they were sold. Between June 1985 and December 1986, 148 stand-alone AM stations were sold that continued to be independently operated as of December 1986. During the same time period, 158 FM stations were sold and continued to operate on a stand-alone basis.[29] However, in only 34 cases could an AM stand-alone station be combined with an FM stand-alone in the same market.[30] These 34 observations make up the data set used to estimate the non-combination price equation.

C. Regression Results

Using these two data sets, the price of combination and stand-alone stations was estimated using the regression equation described above. The regression results are listed in Table 1. Table 2 provides a summary identification of the variables included in the regressions. In terms of overall explanatory power, our price regressions worked very well. The R^2's are in excess of 0.9 in each case; and the F-statistics for overall explanatory power are significant at the 0.1 percent level.

1. Combination Results

Looking at the individual coefficients in the combination equation, four of the five measures of station power have the correct sign. The exception is FM antenna height (LHAAT) which has a negative sign that is not significantly different from zero. Three of the coefficients -- LAMF, LAMN, and LFMP -- are significantly different from zero at the one percent level.

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[29] *Investing in Radio (1987).* An additional 28 AM stations and 49 FM stations were sold to parties who combined them with another station they already owned or subsequently acquired to form a combination. Since our data source does not show purchases after the end of 1986, it is possible that some stations that were independently operated as of December 31, 1986, have become combinations through the acquisition of other stations since that date.

There also were 8 AM and 27 FM stand-alone stations that were transferred as part of a sale involving stations in more than one local market. As noted above, these sales could not be used in our analysis.

[30] In those few markets in which there were multiple sales of both AM and FM stand-alones, observations were created by randomly combining AM stand-alone stations and FM stand-alone stations in the same market that had been sold between June 1985 and December 1986 that continued to operate independently.

As with the combination data set, we checked the prices of influential observations with Mr. Dave Schutz. In the case of the non-combination sales, only one price -- that for WLEQ an AM station located in Ft. Meyers, Florida -- could not be verified. Another AM station in Ft. Meyers-- WWWQ -- was substituted for WLEQ in our data set.

Table 1
Regression Results: The Price of Radio Stations[31]

	Combination Sales	Stand-alone Sales	Expected Sign
Constant	6.347 (0.47)	28.392 (1.23)	?
Market Size Variables			
LRET	0.298 (1.60)	0.985 (3.54) ***	+
GROW	26.769 (2.76) **	36.715 (2.77) **	+
Station Power Variables			
LAMF	-1.184 (-3.53) ***	0.354 (0.60)	-
LAMD	0.0069 (0.06)	0.138 (1.39)	+
LAMN	0.249 (3.42) ***	0.0382 (0.44)	+
LFMP	0.290 (3.61) ***	0.251 (2.93) **	+
LHAAT	-0.087 (-0.86)	0.0018 (0.01)	+
Competitive Conditions Variables			
LHERF	-1.068 (-2.63) **	0.981 (1.40)	+
LAMFMN	2.137 (1.47)	-4.114 (-1.44)	+
LAMDMN	-0.456 (-1.24)	1.219 (3.00) ***	-

[31] The dependent variable in the regressions is the log of price. Figures in parentheses are t-ratios. * denotes a t-ratio that is significant at the 10 percent level; ** significant t-ratio at the 5 percent level; *** significant at 1 percent.

Table 1 (continued)

	Combination Sales	Stand-alone Sales	Expected Sign
LAMNMN	0.458 (1.86) *	-0.366 (-1.35)	-
LFMPMN	-0.330 (-1.73) *	-1.310 (-3.90) ***	-
LHAATMN	0.060 (0.26)	-0.612 (-1.60)	-
PFM	3.870 (2.19) **	-4.400 (-1.50)	?
Station Cost Variables			
LWAGE	-0.795 (-0.60)	-1.111 (-0.85)	-
RATE	0.146 (0.01)	12.194 (0.52)	-
Marketshare Variable			
LMRKSH	0.176 (2.50) **	0.346 (3.76) ***	+
R^2	0.938	0.926	
F - Statistic	18.631 ***	11.794 ***	
	n = 39	n = 34	

Table 2

Variables in Price Equations

LPRICE	the log of the stations' combined sales prices
LRET	the log of retail sales in the local market in which the stations are located in 1985
GROW	the predicted growth rate of retail sales between 1985 and 1990
LAMF	the log of the frequency at which an AM station operates
LAMD	the log of the daytime power of an AM station
LAMN	the log of the nighttime power of an AM station
LFMP	the log of the power of an FM station
LHAAT	the log of the antenna height for an FM station
LHERF	the log of the Herfindahl measure of listener concentration in the local market
LAMFMN	the log of the average value of AM frequency for stations in the local market
LAMDMN	the log of average daytime power of AM stations in the local market
LAMNMN	the log of average nighttime power for AM stations in the local market
LFMPMN	the log of average power for FM stations in the local market
LHAATMN	the log of the average antenna height for FM stations in the local market
PFM	the percent of local stations that are FM stations
LWAGE	the log of the wage index for the local market
RATE	the prime interest rate at the time the stations were sold
LMRKSH	the log of the market share of the stations

The market share variable (LMRKSH) has a positive and significant coefficient as expected. The measures of market size -- retail sales (LRET) and projected future growth (GROW) both have positive signs as expected, though only GROW is statistically significant.

The variables representing the competition faced by a station do not perform particularly well. The Herfindahl measure of concentration has a surprising negative and significant coefficient.[32] Of the variables measuring average power of stations in the market, only the average level of FM power (LFMPMN) is statistically significant with the correct sign. The coefficients on LAMFMN and LAMDMN have the predicted signs, but are not statistically significant. Finally, neither the interest rate variable (RATE) nor the wage variable is significantly different from zero.

2. Stand-alone Results

In the stand-alone price equation, both measures of market size-- LRET and GROW -- have positive coefficients that are significant at the one and five percent levels respectively. The measures of individual station power do not work as well as in the combination equation. While all except LAMF have the correct sign, only LFMP is significant. As with the combination equation, market share has a significant positive coefficient.

The Herfindahl index has a positive, though insignificant, sign in this equation. Three of the market average power variables -- LAMNMN, LFMPMN, and LHAATMN -- have the expected negative signs. However, only the coefficient on LFMPMN is significantly different from zero. While the coefficient of LAMDMN is also significant, it is unexpectedly positive. Finally, the coefficients on LWAGE and RATE are not statistically significant.

At least in part, the lack of statistical significance of some of the individual coefficients may be the result of a high degree of collinearity among variables in both our combination and stand-alone data sets.[33] It is

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[32] In part this may be the result of the high degree of collinearity between market size and market concentration. Given current restrictions on the common ownership of more than one AM and one FM station in a market, concentration will be high only in small markets where the number of stations is small. As a result, the negative sign on LHERF may be partially proxying the higher sales price effect of larger markets.

It is also possible that our definition of the relevant market, *i.e.*, including only radio stations, is too narrow; and this may contribute to the unexpected behavior of the coefficient. We note that similar unexpected signs on concentration indexes were found by Fournier and Martin in their study of television advertising rates. (See Fournier and Martin (1983). As we have, Fournier and Martin used a media specific market definition.)

[33] Belsley, Kuh, and Welsch (1980) suggest a statistic they call a condition index as a measure of the degree of collinearity in a data set. (continued...)

well known that high collinearity can reduce the significance of particular coefficients. However, collinearity problems should not pose a problem for predictions based on all of the coefficients in a model.[34] Since comparison of the predicted prices from our two equations is the main goal of our study, we proceed to a discussion of those results.

III. A Comparison of Combination and Stand-alone Prices

Using the regression results discussed above, we can predict the log of the price that would have been received if the stations that make up an AM-FM combination had been sold and operated as stand-alone stations. This value together with the predicted log of the price from the combination equation provides an estimate of the log of the ratio of the combination and non-combination prices for these stations.[35] We can also estimate the variance of this statistic.[36] The average of this ratio for the 39 combination observations in our data set provides an estimate of the effect of combination operation on sales price.[37] The average ratio for the 34 stand-

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[33](...continued)
They further suggest that potentially significant collinearity problems exist any time a condition index has a value greater than 30 (p. 157). In our data set of combination sales, 10 of 18 condition indexes have values in excess of 30. The largest is 900. With the stand-alone data, 11 of 18 condition indexes exceed 30, and one has a value of almost 1600.

[34] See Theil (1971), pp. 147-154.

[35] For each pair of stations, the values of the independent variables in the regression analysis were used in the stand-alone equation to estimate the expected value of the log of the sum of the prices that would have been paid for these stations if they had been sold and operated as separate stand-alone stations. The predicted value of the log of the price of the stations as a combination was obtained by using the same values in the combination equation. Extrapolation beyond the observed range of the independent variables in the either equation was not a serious problem because the ranges of the variables in the combination equation substantially overlapped with the ranges of the variables in the stand-alone equation.

We use the *predicted* (log of the) combination price rather than (the log of) the observed price in order to avoid ascribing the unexplained portion of the price to the fact that the stations are indeed part of a combination.

[36] We assume that the two estimates are uncorrelated and therefore the variance of the difference in the logs is merely the sum of the variances of the two mean predictions.

[37] Because we take the average of the differences in the log of predicted prices, we have a geometric mean of the ratio of the prices. We believe that a geometric mean is the correct statistic to use in this case for two reasons. First, given the form of our regression equations, we are only able to perform a test for statistical significance if a geometric mean is
(continued...)

alone or non-combination observations in our sample provides a measure of the difference between stand-alone and combination sale prices for the sample of stations that are, in fact, operated as stand-alones.

We estimate that, on average, the prices paid for AM-FM combinations were 31.7 percent greater than they would have been if the stations had been sold separately. A 95 percent confidence interval on this estimate runs between 3.6 percent and 65.4 percent.[38]

Thus, we have evidence that operating as an AM-FM combination results in lower operating costs and/or larger revenues for those stations that are combinations. Lower operating costs are clearly evidence of efficiencies from combination operation. Further, increased revenues are, as we noted earlier, also evidence of efficiencies unless they result from increased market power. Since we have controlled for the level of concentration in the market in our regression equations, our results suggest that any price premium paid for stations as part of combinations as compared to the stand-alone value of those stations is the result of increased efficiencies, not the profits that may flow from increased market power. As a result, our analysis provides evidence that ownership of a combination of an AM and an FM station in the same local market can generate increased efficiencies.

The average price ratio for stations that continued to operate as stand-alones is 0.955. That is, the predicted value of the sum of the prices of an AM and an FM station as stand-alones exceeds the predicted price if the stations had been sold as a combination. This result would be expected if stations that continue to operate as stand-alones are more efficient when

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[37](...continued)
used. Secondly, a geometric mean appears to be a better measure of central tendency for a ratio that cannot take on negative values. (See Croxton and Cowden (1955), 198-203.)

We note that this technique assumes that the expected value of the ratio of prices is the same for all observations. That is, it assumes that the value of the ratio is not systematically larger or smaller where, for example, the stations are located in larger markets. We see no reason to believe that this assumption is incorrect. While it is possible to test this assumption, we have not attempted to do so because of the limited degrees of freedom in our regressions. (While it would have been possible to increase the number of observations in our combination data set, it was not possible to increase the size of the data set used to estimate the stand-alone equation since we had already included all possible pairs of stations.)

[38] This is an approximate five percent confidence interval obtained by exponentiating the upper and lower values of the five percent confidence interval on the average log of the price ratio.

A t-test on the ratio of the prices confirms that the mean estimate is significantly different from one. The t-statistic for the difference between the estimated value of 1.31 and a ratio of 1 is 2.42, which is statistically significant at a five percent level.

used in that way. However, the difference between this ratio and one is not statistically significant.[39] Thus, we cannot reject the hypothesis that stations that operate as stand-alones are, on average, neither more efficient nor less efficient than they would be if operated as part of a combination.[40]

IV. Conclusion

This appendix has described an empirical analysis of possible efficiencies in group ownership of radio stations. If such efficiencies are present, we expect them to be reflected in the sales prices of stations. Examining the prices paid for combinations of an AM and an FM station located in the same market -- the only type of co-located common ownership currently permitted by the Federal Communications Commission, we find that, on average, the prices paid exceed the prices that would have been paid if the stations had been sold separately and operated as stand-alones by approximately 30 percent.[41] This difference is statistically significant, suggesting that there are economies associated with joint ownership of combinations in those cases where joint ownership is observed.

It is interesting to note that our results suggest that, where station owners are free to combine stations together, they tend to do so when that is the most efficient use of the stations. However, where there appear to be no gains to combination operation, stations continue to operate on a stand-alone basis. That station owners organize station ownership in the most efficient way is further evidence that the market rather than governmental rules can be relied on to maximize consumer welfare.

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[39] The t-ratio for the significance of the difference in the logs is -0.60. The approximate 95 percent confidence interval for the ratio of the prices is from 0.802 to 1.130.

[40] It is, of course, possible that there are substantial economies resulting from stand-alone operation for some subset of the stations operating as stand-alones but that these effects are being lost in our estimation because they are combined with other stations for which there is no significant difference between combination and stand-alone operation.

[41] This estimate is, of course, based on the particular regressions we ran. We believe that the regressions used are the best that could be done with the data we had available. However, as we discussed above (see, in particular, notes 13 and 14), it is possible that the results would differ somewhat with a different sample, with different variables, or with a different functional form. In addition, the 30 percent figure is only a statistical estimate. As noted previously, the 95 percent confidence interval on this estimate runs from 3.6 percent to 65.4 percent.

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