BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, DC 20554

In the Matter of	)	
	)	
Advanced Television Systems and Their Impact upon the Existing Television Broadcast Service	)	MM Docket No. 87-268

Comment of the Staff of The Bureau of Economics of the Federal Trade Commission*

January 31, 1992

* This comment represents the views of the staff of the Bureau of Economics of the Federal Trade Commission. They are not necessarily the views of the Commission or those of any individual Commissioner. Inquiries regarding this comment should be directed to David Reiffen (202-326-2027) of the FTC's Bureau of Economics.

Executive Summary

This comment of the staff of the FTC's Bureau of Economics addresses some of the issues raised by the FCC's Notice of Proposed Rulemaking (NPRM) related to the introduction of advanced television (ATV). The comment analyzes these issues from the standpoint of economic efficiency, competition, and the enforcement of the antitrust laws. It does not discuss other policy considerations raised in the NPRM or in statements submitted by respondents to the NPRM.

ATV represents a technological improvement over conventional television (NTSC). At this time, however, there is no way to know whether the benefits from these improvements will exceed their costs, which include the opportunity costs of the spectrum allocated to ATV. Because this is uncertain, economic efficiency might be served by regulations and regulatory actions regarding spectrum use that consider market forces. In particular, economic efficiency might be served by retaining at least a portion of the current NTSC band for NTSC use.

We also suggest that the FCC allow broadcasters more time for facility construction and greater flexibility in simulcasting. The proposed rules, which make the award of a license contingent on constructing ATV facilities within two years of receiving a permit to construct, would encourage construction but may result in excessively rapid or inappropriate construction. We suggest that the FCC consider lengthening this period, because the prospects for ATV broadcasting are uncertain. Mandating simulcasting of ATV and

NTSC programs or establishing a date after which NTSC broadcasting will terminate may not produce an economically efficient result. Rather, economic efficiency would likely be promoted by allowing broadcasters to determine the mix of ATV and NTSC broadcasts.

Finally, efficiency considerations suggest that the FCC allocate ATV licenses in a way that minimizes the cost of doing so. Allocations based on financial qualifications or expected viewership may not minimize cost because these criteria tend to encourage firms to spend significant real resources in pursuit of licenses. Unless the process of transferring authorizations is costly, it is likely that broadcast licenses within a given region of spectrum will ultimately come to be owned by those who value them most highly, regardless of the initial allocation.

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I. Introduction

The staff of the Bureau of Economics of the Federal Trade Commission (FTC) appreciates this opportunity to submit a comment in response to the Federal Communications Commission's (FCC's) Notice of Proposed Rulemaking (NPRM) on regulatory policies for the introduction of advanced television (ATV). This NPRM is the fourth in a series of FCC actions intended to articulate a regulatory approach to ATV. Specifically, this NPRM seeks information that will assist the FCC in developing policies related to the initial allocation of ATV spectrum and the regulation of the transition from conventional broadcasting (NTSC) to ATV.

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Our analysis, which is based on economic efficiency considerations, suggests that the FCC consider

1) Whether the interests of viewers might be served by allowing market forces more latitude to guide new ATV permittees' decisions regarding facility construction and ATV/NTSC simulcasting.

2) Whether the interests of consumers might be served by regulations and regulatory actions regarding spectrum use that consider market forces. In particular, economic efficiency might be served by retaining at least a portion of the current NTSC band for NTSC use.

3) Whether using comparative hearings to award permits initially may be unnecessarily costly.

The basis for these suggestions is discussed in the following sections. This comment does not discuss other policy issues and considerations raised in the NPRM.

II. Expertise of the Staff of the Federal Trade Commission

The FTC is an independent regulatory agency responsible for maintaining competition and safeguarding the interests of consumers.[1] In response to requests by federal, state, and local government bodies, the staff of the FTC often analyzes regulatory or legislative proposals that may affect competition or the efficiency of the economy. In the course of this work, as well as

[1] 15 U.S.C. sections 41-59.

in antitrust and consumer protection research, nonpublic investigations, and litigation, the staff applies established principles and recent developments in economic theory to competition and consumer protection issues. The FTC staff has previously submitted comments to the FCC on matters concerning the allocation of spectrum in general, and on ATV in particular.[2]

III. Background on Advanced Television and the NPRM

According to the NPRM, ATV refers to any television technology that provides improved audio and video quality. Six ATV systems are currently under consideration by the Advisory Committee on Advanced Television. The goal of the Advisory Committee is to recommend one of the six as the standard for ATV. With one possible exception, the six systems will not be compatible with

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[2] See Comments of the Staff of the Bureau of Economics of the Federal Trade Commission, Advanced Television Systems and Their Impact on the Existing Television Broadcast Service, Review of Technical and Operational Requirements: Part 73-E, Television Broadcast Stations, Reevaluation of the UHF Television Channel and Distance Separation Requirements of Part 73 of the Commission's Rules, MM Docket No. 87-268 (September 1, 1988). See also Comments of the Staff of the Bureau of Economics and San Francisco Regional Office of the Federal Trade Commission, Amendment of the Commission's Rules With Regard to the Establishment and Regulation of New Digital Audio Radio Service, GEN Docket No. 90-357 (January 25, 1991); Comments of the Staff of the Bureau of Economics of the Federal Trade Commission, Amendment of Part 74 of the Commission's Rules Concerning FM Translator Stations, Docket No. 88-140 (August 15, 1988); Reply Comments of the Staff of the Bureau of Economics of the Federal Trade Commission, Revision of Radio Rules and Policies, MM Docket No. 91-140 (September 5, 1991).

existing televisions.[3] Because NTSC and ATV cannot be broadcast on the same channel, to encourage ATV broadcasting the FCC has tentatively determined that it will allocate a portion of spectrum so that ATV broadcasts can be transmitted on 6 Mhz channels. For the purposes of our analysis, we assume that the FCC will choose one of these six systems to be the industry standard and allocate spectrum for ATV.[4]

The issues dealt with in the NPRM primarily relate to the initial allocation of ATV channels and permits and the transition from NTSC to ATV broadcasting. With regard to the initial award of ATV permits, the FCC proposes to limit the initial pool of ATV permittees to current NTSC broadcasters and those with permits or pending NTSC permit applications. The ATV permits would be awarded in addition to current NTSC licenses.[5] At the same time, the FCC proposes to suspend application of the television multiple ownership rule, so that a broadcaster could temporarily hold an NTSC and an ATV permit or license in the same broadcast area.[6] To

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[3] In what follows, we assume the chosen system is not compatible with NTSC televisions.

[4] In previous comments, FTC staff has pointed out that market-based approaches to standard selection may serve consumers' interests better than administrative decisions. See, e.g., Comment, Digital Audio Radio Service, op. cit. note 2, or our previous Comment regarding ATV, op. cit. n. 2.

[5] The proposed rules would prohibit a party that holds both an NTSC and an ATV license from transferring one without the other. See NPRM at 7.

[6] Specifically, 47 CFR section 73.3555 prohibits the award of licenses for TV broadcast stations that result in two stations with overlapping grade B contours. This section also limits the number of licenses that one owner can control nationally.

the extent that additional ATV frequencies could technically be allotted after awards to all eligible broadcasters have been made, the FCC proposes to allow other firms to apply for ATV permits. After three years, incumbents would lose their advantage in applying for permits. In addition, the FCC proposes to allow two years between the issuance of a construction permit and the completion of construction, after which the ATV license would be forfeited.[7]

It is anticipated that for most broadcast areas, there will be enough ATV frequencies to designate one frequency for each eligible licensee. In some areas, however, there may not be enough frequencies for all eligible licensees. Even if sufficient spectrum is available certain frequencies may be preferred by some applicants, because frequencies are not homogenous.[8] For either reason, there must be some mechanism to award permits, and the NPRM proposes some alternatives. These alternatives include lotteries, first-come/first served, and administrative reviews of financial qualifications or expected viewership.

With regard to the transition from NTSC to ATV, the FCC envisions that ATV broadcasts, if successful, will eventually replace NTSC broadcasts. The FCC envisions requiring NTSC

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[7] This two-year period is the same as the FCC applies generally.

[8] For example VHF frequencies may be preferred to UHF frequencies, and lower VHF frequencies may be preferred to higher ones.

licensees to surrender their authorizations at some date.[9] As no new NTSC licenses will be issued once the assignment of ATV licenses is complete, it would thus appear that NTSC broadcasting will completely cease after some date. The FCC seeks comment on how to choose the date for surrender. Proposed alternatives include standards based on ATV penetration rates (either market-by-market or national) and a fixed date.

During the transition period, most broadcasters will operate an NTSC station and an ATV station in the same market. The FCC proposes mandating that a minimum percentage of the programming on a broadcaster's ATV channel also be simulcast on its NTSC channel. It also would consider mandating a minimum amount of ATV broadcasting.

IV. Initial Allocation of ATV Licenses

A. Issues Related to the Initial Allocation of Licenses

According to the NPRM, the FCC plans to provide the spectrum for ATV broadcasting by utilizing more intensively the spectrum currently dedicated to VHF and UHF. Some of the additional available spectrum would be obtained by using frequencies currently set aside because of so-called UHF taboos.[10] In addition, some of

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[9] If the NTSC licensee did not already have an ATV license, it would be permitted to apply for one at that time - assuming there are some unallotted frequencies.

[10] UHF taboos are restrictions about the use of frequencies within close geographic proximity. For example, if UHF stations (continued...)

the new frequencies will be made available by reducing co-channel separation (geographic distance between stations on the same frequency). The reduction in co-channel separation, and to a lesser extent the use of UHF taboo channels, will be made possible by using more sophisticated and expensive broadcasting and receiving equipment.

Although the precise number of additional stations in each market has not yet been determined, FCC feasibility studies suggest that the majority of NTSC broadcasters will be eligible to obtain ATV permits.[11] In some areas, particularly the northeast, there may be more existing NTSC broadcasters than new ATV permits, while in others the number of ATV permits available will exceed the number of eligible broadcasters.

The NPRM raises several questions in regard to the initial award of ATV permits:

(1) How should ATV permits be awarded in cases where there are fewer new stations than eligible licensees?[12]

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[10](...continued)
located within 75 miles of one another are 15 channels apart, there tends to be some picture image interference between them. Hence the FCC requires a minimum separation of 75 miles for frequencies 15 channels apart. Other taboos require minimum 20 mile separation for facilities 2,3,4,5 or 8 channels apart, and 60 mile minimum separation for facilities 7 or 14 channels apart. See OET Technical Memorandum, FCC/OET TM88-1 (August, 1988).

[11] OET Technical Memorandum, FCC/OET TM89-1 (December, 1989) at 6, 10-11.

[12] NPRM at 13.

(2) In cases where there are more ATV frequencies than initially-eligible licensees, how should the remaining ATV permits be awarded?[13]

(3) How should specific frequencies be designated among the class of eligible applicants?[14]

(4) What limits should be placed on the time given eligible firms to apply for ATV permits and to construct facilities?[15]

B. Principles of Efficient Allocation of Initial Permits

Economic theory predicts that if valuable items are to be awarded, individuals will make expenditures in pursuit of them.[16] These expenditures can take the form of payments that are purely economic transfers (such as application fees), and those that involve expenditures of real resources for goods and services (such as attorneys and consultants, advertisements in trade publications, and reduced productivity of individuals while seeking permits). In the former case, there is no social loss since the loss to one party is exactly equal to the gain to the other, while in the latter case there is a social cost,because real resources are expended. Only in the latter case are goods and services provided in exchange for the expenditure; thus, the gain (profit) to the

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[13] NPRM at 7 and 13.

[14] NPRM at 9.

[15] NPRM at 8.

[16] For a general discussion of these issues see Gordon Tullock "The Welfare Costs of Tariffs, Monopolies, and Theft," 5 Western Economic Journal, p. 224, (1967).

recipient is less than the loss (total payment) to the party making the payment.[17]

There are three implications of this principle. First, economic efficiency is advanced when the amount of real resources used to obtain the initial award of a permit is minimized. Second, whatever methods are used to award permits initially, if transfers are permitted, then efficiency considerations also require minimizing the cost of transferring authorizations.[18] Third, licenses should be well-defined, giving licensees the incentive to act in ways that maximize the value of their authorizations.[19]

The NPRM's proposal to designate new ATV permits to existing NTSC broadcasters, permit holders and applicants would appear to have the potential for minimizing social cost. As explained above, excess social cost occurs when firms spend real resources in an attempt to increase their chances of obtaining a permit. The incentive to spend resources for this purpose appears limited

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[17] Previous FTC staff Comments to the FCC have noted that economic efficiency is promoted when permits are awarded in a way that minimizes the social cost associated with allocating them to their highest valued use. For example, see Comments cited in note 2, particularly Comment, Digital Broadcast Radio Service, pp. 12-18.

[18] If channels are initially allocated to their highest-valued use, transferring authorizations will not be an issue, unless use-values change.

[19] The idea of establishing a transferrable property right to a portion of spectrum dates back at least to Coase (R. H. Coase "The Federal Communications Commission" Journal of Law and Economics, 2 (1959), p.1). We have noted in previous staff comments that an auction for licenses would be one way to create such a property right at minimum social cost. We recognize that the FCC lacks statutory authority to grant ownership interests in, or conduct auctions of, unallocated spectrum.

because the only way to increase one's chances of obtaining a permit is to get one from an existing licensee (or permit holder or pending applicant). Since obtaining an existing license primarily involves an economic transfer, rather than an expenditure of real resources, the proposed allocation scheme may tend to minimize social cost.[20] Further, as long as ATV authorizations may be transferred, they should ultimately be obtained by the highest-valued users.

A proposal to award ATV permits to all existing NTSC broadcasters does not completely determine the initial allocation of ATV permits when there are more eligible licensees than ATV channels, or more channels than eligible licensees. When the number of eligible applicants exceeds the number of channels, a lottery among these firms would appear to minimize the extent to which firms can expend resources to improve their chances of winning. Given the small number of eligible applicants in each market, a lottery would appear to pose limited administrative costs.

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[20] Obtaining an existing NTSC license with the ultimate goal of obtaining an ATV permit can be viewed as a transfer of the ATV permit. As such, any resource cost associated with the transfer should perhaps be viewed as a cost of permit transfer rather than a cost of the initial allocation. The NPRM proposes to cease issuing new NTSC authorizations since those authorizations would have to be linked to ATV permits, and hence require a portion of the ATV spectrum. The implication of our analysis is that such a policy may well serve the beneficial goal of minimizing the amount of resources devoted to obtaining new ATV authorizations. That is, the policy prevents firms from spending real resources to obtain an ATV permit indirectly (through first obtaining an NTSC license). Once all of the available ATV licenses were allocated, however, this particular rationale for not issuing new NTSC licenses would appear to become obsolete.

By contrast, choosing among eligible firms on the basis of financial qualifications or projected viewership may involve significant costs. If permits are awarded on these criteria, firms may be encouraged to hire attorneys and consultants, commission studies, and incur other expenses, in the hope of surpassing rivals or in meeting selection criteria. Further, significant FCC resources could be expended in distinguishing among these applications.[21]

This is not to say that criteria such as expected viewership or financial viability are irrelevant to the interest of insuring the ATV frequencies are used most efficiently. Rather, we believe that these considerations will directly affect the amount a firm would willingly pay to acquire an ATV license. We recognize that the FCC's rules would prohibit a broadcaster from profiting from the transfer of a broadcast construction permit. That prohibition means that one of the usual market incentives for transfer to a higher valued use would not operate when transfering a permit.[22] But after a license is issued, a transfer at a profit becomes

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[21] An example of the potential resource costs of administrative allocation of licenses can be found in the discussion of the case of Alexander S. Klein, 86 FCC 2d 423 (1981), in Notice of Proposed Rulemaking, Commission's Rule to Allow the Selection From Among Competing Applicants for New AM, FM, and Television Stations by Random Selection (Lottery), 4 FCC Rec. 2256 (1989).

[22] A permit holder who decided that the prospects did not justify further investment could transfer to someone else without loss, but could not choose the transferee who valued it most highly, as measured by willingness to pay, if that amount was greater than the costs that the permittee has incurred. The permit holder might conceivably complete construction and obtain a license, then look to profit from a sale.

possible, so marketplace incentives would become important. As long as the costs of transferring licenses are kept low, ATV authorizations will tend to be acquired by those firms with the highest expected viewership and financial stability. If a firm has financial problems or low expected viewership it would not be able to earn much from broadcasting. Self-interest would appear to dictate transferring the license to a firm that places a higher value on the license because it expects significant viewership.

Similar logic would apply in cases where the number of eligible applicants is smaller than the number of ATV channels. Here again there must be some allocation mechanism (assuming license fees are not set at market-determined prices) for distributing licenses. For the reasons discussed above, we believe that administratively-chosen selection criteria may be an unnecessarily costly means of accomplishing this allocation. But here a lottery may not represent a significant improvement over these administrative criteria. If the entry fee is small, a large number of firms will enter,[23] making the administrative costs unacceptably high. This suggests that if a lottery is used to award permits when the number of ATV channels exceeds the number of existing NTSC broadcasters, the filing fee should be significant relative to the estimated value of the authorization.[24]

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[23] Evan Kwerel and Alex D. Felker, "Using Auctions to Select FCC Licenses," FCC Office of Plans and Policy Working Paper No. 16 (May 1985) report that 20,000 applicants applied for Low Power Television Licenses when auctions were held.

[24] We recognize that the fees charged are limited by statute.

C. The Timing of Facility Construction

The NPRM proposes adopting for ATV the same time limits for constructing facilities as apply now to NTSC (two years after a permit is issued). If application and construction is not completed within this deadline, the NTSC licensee would forfeit its right to obtain an ATV authorization. Assuming that the time limit does have an impact, there remains the question of whether the construction deadline chosen serves the goal of economic efficiency.[25] This Comment will first discuss potential welfare-decreasing reasons for delaying construction, and then discuss potential welfare-increasing motivations for delaying construction.

One motivation for delaying construction is the standard antitrust concern that firms with market power have an incentive to restrict output. Just as it is economically efficient (other things being equal) to increase a monopolist's output, so too it may be efficient to prevent license-holders from restricting output (and increasing advertising rates) by delaying the introduction of ATV broadcasts.[26] Note, however, that a broadcaster holding only one authorization in a geographic area does not have this incentive, because a licensee that chooses not to broadcast cannot reap any of the benefit from the higher advertising rates. Antitrust considerations imply therefore that construction time

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[25] Whether other policy goals are served by these limits is not addressed in this comment.

[26] This is one justification from the standpoint of economic efficiency for the current restriction on ownership of multiple stations within a market.

limits could be longer for ATV permittees that do not also hold an NTSC license in the same geographic area.

If the award of ATV permits occurs in the manner envisioned by the NPRM, some ATV permittees will also own NTSC licenses, at least temporarily. The NPRM specifically proposes waiving the multiple ownership rule, allowing a licensee to operate NTSC and ATV stations in the same geographic area. While multiple ownership poses a potential for an anticompetitive delay in construction of ATV broadcast facilities, such a delay is by no means inevitable. Just as not every horizontal merger reduces output, multiple ownership would not necessarily lead to construction delays. In the case of mergers, problems are likely to emerge when the merging parties produce similar products, and there are relatively few firms producing, or capable of producing, competing products. Similarly, multiple ownership may lead to problems when there are relatively few broadcasters in a geographic area and cable penetration is low, but would become less of an issue as the number of broadcasters grows and the extent of cable penetration rises.[27]

When multiple ownership leads to an incentive to restrict output, the restriction can take many forms. For example, in lieu of delaying construction, a broadcaster could simply reduce the number of commercial minutes available or reduce its expenditures on programming. Thus, rules that expedite construction may not

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[27] In our study of radio, this type of analysis led to the conclusion that multiple ownership within a geographic area would often not present antitrust problems. See Reply Comment, Revision of Radio Rules and Policies (op. cit. note 2), pp. 15-16.

prevent a broadcaster from employing alternative means of restricting output. A more direct method of eliminating concerns is to retain rules against ownership of multiple stations, particularly in markets with relatively few broadcasters.[28] Of course, the potential gain from such an approach must be weighed against the benefits resulting from the potential efficiencies associated with the same broadcasters operating both an NTSC and an ATV station.[29]

A second efficiency-related reason for mandating facility construction is to mitigate the potential for coordination failures. Coordination failures might arise because early adopters of a new technology (e.g., purchasers of ATV sets) risk being "stranded." They might be stranded permanently, because the supply of a complementary good is never forthcoming (e.g., ATV broadcasting never becomes viable), or temporarily, because the availability or price of the complement is less favorable than the buyer planned (e.g., ATV broadcasting is delayed). Alternatively, owners of the equipment used for the old technology (e.g., NTSC television owners) might be stranded by the adoption of ATV.

To avoid the risk of purchasing the new technology and then being stranded, many potential users may defer adopting the technology until the complementary good becomes available. If a

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[28] This would entail allowing licensees to transfer their NTSC and ATV licenses independently.

[29] As noted in our Reply Comment, Revision of Radio Rules and Policies (op. cit. note 2, pp. 13-15), such efficiencies may be substantial.

large enough number of consumers act in this manner, the innovation may be delayed or never achieve consumer acceptance, despite the fact that consumers in total would be better off with its prompt adoption. Indeed, economic theory has shown that markets could be characterized by this type of "excess inertia."[30] This is not the only outcome consistent with economic theory however. This literature also shows that unrestricted markets may lead to timing of innovation that is economically efficient, or that is characterized by excessively rapid innovation or "excess momentum."[31] Excess momentum would mean that adoption is too rapid, in that the harm to owners of equipment used with the existing technology exceeds the gain to sellers and purchasers of the new technology.

If the potential market failures identified in these models were thought likely to occur for television broadcast services, a deadline for constructing facilities (or a minimum amount of ATV broadcasting) might alert consumers about the availability of ATV broadcasts, thus providing consumers with increased certainty about the value of the equipment. In this way, a maximum time limit on

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[30] See Joseph Farrell and Garth Saloner, "Installed Base and Compatibility: Innovation, Product Preannouncements, and Predation" American Economic Review 76 (1986) pp. 940-955, and "Standardization, Compatibility, and Innovation," Rand Journal of Economics 16 (1985) pp. 70-83. These papers, and indeed virtually all of the economic literature on compatibility and innovation, make the simplifying assumption that economic efficiency is served by having only one technology survive. As we noted in our Comment, Digital Broadcast Radio Service (page 29), dual standards may be economically efficient. Whether a single standard is economically efficient for television is by no means apparent.

[31] For example, see ibid., Farrell and Saloner (1986) at 947.

construction might solve the problem of "excess inertia". However, there are alternative means of achieving this coordination. For example, the firm(s) whose ATV system is chosen as the standard will have the incentive to coordinate the exchange of information among consumers. These firms could enter licensing agreements with producers of broadcasting equipment (or integrate into production) so as to encourage broadcasting under the new standard. Similarly the selected firms might offer low prices for equipment to consumers (by licensing agreement or integration) who opt to buy sets at an early date (earning profits from later units).

It is not known whether, in real situations, specific innovations would be characterized by excess inertia in the absence of rules affecting timing. If adoption of the new technology would be approximately correct, or even too rapid in the absence of such rules, time limits on construction that are too short create or exacerbate the problem.[32] There is no reason to anticipate a bias in one direction in general. It would be difficult to apply these theories to distinguish excess inertia from a properly functioning market or from excess momentum in any particular context. For instance, Farrell and Saloner[33] have an example where excess momentum occurs when there is a large installed base of the old technology and the new technology is less expensive than the old.

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[32] Similarly, private incentives to coordinate consumer behavior may lead to excessively rapid adoption. See Michael Katz and Carl Shapiro, "Technology Adoption in the Presence of Network Externalities," Journal of Political Economy 94 (1986), pp. 822-841.

[33] (1986) op. cit. note 30, p. 947.

(Conversely, in the example, excess inertia tends to occur when the installed base is small, and the new technology is more expensive than the old.) Since television technology is characterized by a large installed base and a lower-priced older technology, the theoretical example offers little guidance.[34] While the existence of a market failure such as excess inertia is a necessary condition for construction time limits to increase efficiency, it is difficult for policy-makers to determine if these problems are likely to arise in a particular context. Finally, even if it is determined that excess inertia is likely in a specific case, it does not follow that the government-mandated timing will yield a superior outcome (i.e., mandated timing could over-compensate for the market imperfection).[35]

Thus, although construction delays could be economically inefficient (because of output restrictions or coordination failures), delaying construction beyond two years could be economically efficient. But, faced with the alternative of losing its license, the licensee may undertake inappropriate or premature

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[34] It is difficult to know how frequently, if ever the market failures identified by the theoretical models have actually occurred. Indeed, it would be difficult to even devise a test to make such a determination.

[35] This is an application of a broader issue, which has been raised by Demsetz (Harold Demsetz "Information and Efficiency: Another Viewpoint," Journal of Law and Economics 12 (1969), pp. 1-22), among others. Demsetz pointed out that the relevant policy comparison is not between the performance of an unconstrained market and an omniscient policy-maker, but rather between alternative imperfect institutions. The same type of information failures that cause markets to fail to produce efficient outcomes can undermine the efficacy of regulatory decisions.

investments to retain its ATV permit.[36] For example, recall that to a large extent the frequencies to be awarded are made possible by reducing co-channel separation. This reduction may require more sophisticated transmission equipment to achieve higher ratios of desired to undesired signal.[37] There may well be cost savings associated with learning-by-doing. If so, allowing firms to experiment with alternative methods would allow firms to learn which methods of improving the signal are lowest cost. These methods can then be used in subsequent construction. Requiring all licensees to complete construction within the time period contemplated by the proposed time limits may reduce the potential for learning-by-doing.

A related problem is that in the short run it may not be clear which investments are appropriate. To illustrate, suppose that in the early days of color television, the FCC had given separate licenses to broadcast color television, and that these licenses would be forfeited if facilities were not constructed within two years. Since the FCC initially chose the CBS system as the standard for color transmission, broadcasters would have invested in facilities to broadcast under that standard. Later, the RCA system came to be regarded as superior. Had facilities for the CBS system been constructed, either the construction would have been

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[36] For a discussion of the relationship between premature innovation and the establishment of property rights, see Yoram Barzel "The Optimal Timing of Innovation," 50 Review of Economics and Statistics, p. 348 (1968).

[37] See OET Technical Memorandum, FCC/OET TM89-1 (December, 1989) at 5.

wasteful, since conversion became necessary, or the RCA system would never have been adopted, and the apparently inferior CBS technology would have remained the standard.[38]

In the case of ATV, the Advisory Commission may well select an appropriate (i.e., economically efficient) standard. Nonetheless, it is conceivable that technology will change, and a standard other than the one chosen will become preferred. It is also possible that consumers will never buy a substantial amount of ATV equipment, so that construction will never be warranted from an efficiency standpoint. Even if the chosen standard is appropriate, permittees should be in the best position to determine the timing of construction that maximizes the value of the authorization. We recommend, therefore, that licenses be awarded with a minimum of ancillary conditions on their use, and in particular that time limits placed on construction be relatively long.

V. Future Use of Spectrum for Broadcast Television

A. Alternative Uses of the Broadcast Spectrum

The NPRM envisions two distinct phases of ATV broadcasting. Initially, there will be a transition period in which broadcasters will operate both NTSC and ATV stations. During this period, it is

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[38] In fact, the primary reason that facilities to broadcast under the CBS standard were not constructed is that color television sales were banned during the Korean War. See Leland L. Johnson and Stanley M. Besen, Compatibility Standards, Competition, and Innovation in the Broadcast Industry, RAND Publication No. R-3453-NSF (November 1986).

proposed that there be some mandated minimum amount of ATV/NTSC simulcasting, and possibly a minimum amount of ATV broadcasting. At some date, however, firms would be required to "'convert' entirely to ATV -- i.e., broadcast only in ATV".[39] After this date, NTSC broadcasts would only be permitted in "special circumstances".[40]

Providing spectrum for ATV implicitly results in spectrum not being allocated to some other use.[41] Thus, the decision to reserve spectrum solely for the transmission of ATV broadcasts is a decision not to allocate spectrum to alternative uses. Economic efficiency concerns would suggest that the allocation should be guided by market signals, assigning spectrum to those individuals, firms and government agencies who value it most highly.[42] The amount of spectrum allocated to competing uses could expand or contract in response to changes in consumers' valuations of the different outputs that can be produced with that portion of spectrum.

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[39] NPRM at 19.

[40] Once ATV licenses have been awarded, no new NTSC licenses will be issued. Broadcasters holding only NTSC licenses would be permitted to apply for any vacant ATV license at that time.

[41] Although the spectrum to be allotted to ATV is not currently used, it could be used for other purposes.

[42] We recognize the current statutory framework requires that radio spectrum be allocated to specific, identified uses.

B. The Use of Spectrum for ATV

The degree to which ATV will become successful is not yet known. The primary drawback to ATV is that it is, and will likely remain, quite expensive for consumers.[43] Similarly, the broadcast equipment necessary to provide ATV broadcasts appears to be rather expensive.[44] Other emerging systems, such as some of the enhanced definition television systems (EDTV) not under consideration, offer a different price/performance mix than the ATV systems under consideration. Some versions of EDTV can be broadcast over NTSC frequencies and involve much smaller outlays for both consumers and broadcasters than ATV.[45]

This does not mean that ATV will not be successful with consumers. High-quality, high-cost technologies have succeeded, for example, in the home audio industry. Compact disks (CDs) represent 47 percent of album-length recorded medium unit sales,

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[43] The current Japanese version sells for $30,000-35,000 per unit (Washington Post, 11/26/91). Although the price will probably fall as production increases, it is difficult to know what the prevailing price will be ten or fifteen years from now. In addition to the higher cost per set, buying ATV may entail other switching costs (e.g., current VCRs and tape libraries may be obsolete).

[44] Five of the six systems under consideration are high definition television (HDTV) systems. Studies by CBS and PBS indicate that it would cost $1.5 - $2 million for a local station to convert its operations to be able to transmit an HDTV network signal (Communications Daily, October 5, 1990). The additional cost to convert production facilities to HDTV would be $10-12 million.

[45] One EDTV system would require receivers which sell for about $300 more than NTSC receivers, while the cost to broadcasters would be in the range of $10,000. (Communications Daily, September 12, 1990).

despite the facts that CD prices are 50 percent higher than cassette tape prices and more than double vinyl album prices[46] and that fewer than one-third of households with home audio systems have CD players.[47] The point is that the future value of ATV is uncertain, so it is not clear that a market-guided outcome would involve only ATV broadcasting.

C. The Future of NTSC Broadcasting

Even if ATV broadcasts become a highly-valued use of spectrum, it does not follow that the spectrum allocated to NTSC broadcasts should be reassigned to other uses. The value of NTSC broadcasts to the remaining consumers may be more than sufficient to support continued NTSC broadcasts, even if many consumers opt to buy ATV receivers. Discontinuing NTSC broadcasts forces individuals to buy ATV receivers in order to receive television broadcasts. Even households that buy ATV receivers may still value NTSC broadcasting. Since the average U.S. household currently has two televisions,[48] many purchasers of ATV receivers will likely have multiple sets. If NTSC broadcasting continues, some of these viewers may wish to have one NTSC receiver (particularly in the early years of ATV broadcasting when many NTSC televisions will be in working order).

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[46] Recording Industry of America, Market Research Committee. Figures represent sales between January and June of 1991.

[47] Consumer Electronics U.S. Sales, Electronic Industry Association, Consumer Electronic Group, June 1991, p. 25.

[48] Nielsen Media Research.

The proposal that NTSC broadcasts terminate at some future date would be consistent with economic efficiency if it were known that other uses of spectrum generate more value to consumers than NTSC broadcasting. Whether this will be true at the specified future date will depend on what alternatives exist at that future date, and not necessarily on ATV penetration. That is, efficiency considerations imply that the proper allocation be based on the value to consumers of the alternative potential uses of the spectrum. A good way to reveal these values is through an auction, whereby spectrum is allocated to users willing to pay the most. While not a perfect measure of consumer value,[49] the willingness-to-pay of various users represents a good approximation of the value to society of using spectrum in that use. We recognize, however, that the FCC lacks the statutory authority to conduct auctions. To achieve economic efficiency, the regulatory mechanism chosen for awarding permits should be based on the same principles (i.e., allocating spectrum to the highest-valued uses). In addition, the allocation across uses should be flexible enough to adjust to changes in consumers' valuations of the different outputs produced by using the spectrum. A flexible approach could accommodate the continued survival of NTSC broadcasting, perhaps at a diminished level, if consumers valued such broadcasts sufficiently.[50]

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[49] See our discussion of the potential discrepancies between total value of a license and willingness-to-pay in our Comment, Digital Audio Radio Services, pp. 9-11.

[50] In a recent proceeding, the FCC proposed to allow market-based mechanisms to allocate spectrum across uses, by allowing (continued...)

D. Mandatory Simulcasting

While the NPRM proposes eliminating NTSC broadcasts after some date, it also proposes to protect the value of existing NTSC equipment up to that date. In part, the NPRM proposes to mandate a certain percentage of simulcasting during the transition period.

Requiring simulcasting could be justified on efficiency grounds if broadcasters have an incentive to undersupply certain types of programs for NTSC broadcasts. That is, absent mandatory simulcasting, consumers would be ill-served as broadcasters choose to offer "excess diversity" (compared to the economically-efficient amount of diversity).

It is true that ATV and NTSC have technological differences, and without mandatory simulcasting broadcasters may tend to produce programming which takes advantage of the comparative strengths of each technology. Such specialization has come to characterize radio programming. Because FM radio has superior sound quality, FM stations have tended to specialize in music programming, while AM stations have tended toward news/talk formats. If all FM broadcasters owned AM stations and simulcasting was mandatory, they would be faced with a choice of either broadcasting programming ill-suited to one band or the other, or, in trying to produce programming suitable for both, wind up with a product not ideally suited for either.

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[50](...continued)
licensees to compensate other licensees for changing frequencies. See Amendment of Section 2.106 of the Commission's Rules to Allocate Technology Bands for Future Requirements, ET Docket 92-9 (January 16, 1992).

In the case of television, the technological features of the two standards may mean that certain programs (e.g., sporting events and feature-length films) are well-suited to ATV, while other programs (such as news shows) would be better-suited to NTSC. Separate programming could allow broadcasters to take advantage of the comparative strengths of both types of broadcasting, potentially providing increased choice to viewers.

If broadcasters produce specialized programming in this manner, some viewers without ATV receivers will be unable to watch certain programming. On the other hand, mandating simulcasts, by reducing programming diversity, prevents others from watching other programs. Relative to the amount of simulcasting that maximizes consumer welfare, broadcasters have no obvious bias in favor of supplying too much or too little simulcasting.[51] It is clear that the larger the number of the viewers without ATV, the smaller are the rewards from broadcasting different programs on the two formats. Hence, when ATV penetration is small, we would expect to see broadcasters simulcasting even in the absence of mandatory minimum amounts of simulcasting. As ATV penetration increases, diversity becomes more valuable, and broadcasters will tend to reduce the amount of simulcasting. A mandated amount of

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[51] The analysis in this Comment is based on economic efficiency. Under this approach, if the loss to consumers who prefer separate programming exceeds the gain to those without ATV who prefer simulcasting, mandatory simulcasting should not be imposed. We recognize that the FCC's concern in mandating a minimum amount of simulcasting may include considerations other than this type of efficiency consideration. For example, minimum simulcasting regulations may prevent certain consumers (those without ATV) from being 'shut-out' of certain types of programming.

simulcasting may prevent broadcasters from providing viewers the variety of broadcasts they would prefer.

VII. Conclusion

While ATV offers many technical improvements over NTSC, there is no way to know whether these improvements will be cost justified for most consumers. Given this uncertainty, the FCC may wish to consider adopting more flexible rules regarding the introduction of ATV than those proposed in the NPRM. Specifically, efficiency considerations suggest that spectrum should be allocated to the highest-valued users. It follows that a regulatory approach that serves to allocate spectrum based on the value to different end uses will tend to maximize consumer welfare.

Just as it is not clear how much spectrum to allocate to ATV, so too it is unclear that NTSC broadcasts should be terminated by some specified future date. NTSC broadcasting may remain an efficient user of spectrum even after ATV gains considerable acceptance.

Efficiency considerations also suggest that the FCC allow broadcasters more flexibility in regard to facility construction and simulcasting. Rules that make holding a license contingent on constructing ATV facilities will encourage construction, but may result in excessively rapid or inappropriate construction if the deadline is too short. Additionally, efficiency considerations would not necessarily require simulcasting of ATV programs. The

incentives of the viewing public and dual license broadcasters appear to be sufficiently aligned to ensure the provision of the mix valued most highly by consumers.

Finally, a consumer welfare standard implies that the allocation of ATV licenses be made in a way which minimizes the cost of doing so. Allocations based on financial qualifications or expected viewership may not accomplish this, as they tend to encourage firms to spend significant real resources, as well to absorb as the resources of the FCC. Unless the process of transferring authorizations is costly, it is likely that broadcast licenses within a given region of spectrum will ultimately come to be held by those who value them most highly, regardless of the initial allocation.