BOOK REVIEW

THE INVISIBLE RESOURCE: USE AND REGULATION OF THE RADIO SPECTRUM. By Harvey J. Levin. Baltimore: The Johns Hopkins Press, 1971. Pp. XX, 432. $12.00.

Professor Levin has written a long and thorough book on spectrum usage in the United States. The existence of 45 tables, 7 charts and over 390 footnotes gives some indication of Levin's thoroughness. In the preface Levin mentions that he first began the project which eventually resulted in this book in 1964; this is an indication of the amount of time and effort he has spent on the book.

One of the virtues of this book is that it is written for an audience far broader than just professional economists. Levin has obviously tried to use as little economist's jargon as possible. For that reason, lawyers, engineers and other persons interested in spectrum management should find this book an excellent and readable reference source.

The book is divided into four parts. Chapters 1-3 review the basic technical characteristics of the spectrum and the existing institutional arrangements for its management in the United States. Chapters 4-7 describe a number of proposals for changing and improving the efficiency of spectrum usage. Chapters 8 and 9 discuss various aspects of the growth of spectrum use and the part the federal government has played in spectrum development. Chapters 10-13 discuss various specific regulatory problems related to spectrum usage such as competition among common carriers, new entry in the common carrier field, and allocations and licensing of broadcasting stations. Finally, there is a brief concluding chapter which reviews the findings of the previous chapters. In addition, there are 4 appendices with further information on problems, sources, and statistical methods used in the body of the text. There is also a glossary of terms, an index, and even a detachable diagram in a pocket at the end of the book which shows the entire United States radio spectrum allocation plan.

Much of the first two sections of the book represents a review of current regulation of spectrum usage by the Federal Communications Commission and the old Department of Telecommunications Management, and proposals for improving that regulation; and much of that

material is based on work which Levin[1] and others[2] have done previously. Indeed, the first three chapters will be most useful to persons who are not familiar with spectrum management in the United States.

Nevertheless, Levin emphasizes many important points which will not be obvious to new readers of this subject. He points out several times that maximum economic efficiency does not necessarily mean maximum use; there are always substitutes for spectrum use," much existing radio licensing is done on a first come first serve basis, which is not necessarily efficient. The cost of using spectrum is the value of benefits forgone by next best excluded users, which may greatly exceed radio equipment costs.

The second section of the book (Chapters 4-7) is probably the most important, even though much of it is still a review of earlier work. Here Levin discusses the various proposals for changing and improving the spectrum allocation process. Chapter 4 reviews the case for developing a market for freely transferable spectrum rights which could be bought and sold just like land or any other commodity. Levin notes many of the difficulties with using a free market for spectrum such as the problem of externalities (interference or congestion), the difficulty of establishing a market when there are many buyers and sellers, and the problem that a free market might lead to overly concentrated ownership. While Levin does not seem to be convinced by any of these arguments, his basic position appears to be that we need to seek less "radical" changes in the system of spectrum usage, because we can not expect current licensees, regulators or Congressmen to accept such a change. Even if Levin is correct in his analysis of political reality, he gives up too easily on the possibility of trying the free market solution, at least on an experimental basis for some part of the spectrum.

In Chapter 5, Levin considers the possibility of retaining government licensing and regulation of spectrum use, but with more emphasis on price incentives. His suggestions for establishing rental fees or auctions for spectrum (possibly similar to those used for the rental of government land) seem reasonable and practical.[3] However, his suggestion for using

1. Levin, *The Radio Spectrum Resource*, 11 J. LAW & ECON. 433 (1968); Levin, *New Techonology and the Old Regulation in Radio Spectrum Management*, 56 AM. ECON. REV., PAPERS AND PROCEEDINGS 339 (1966); Levin, *There Is Always a Substitute for Spectrum*, 36 TELECOMMUNICATIONS J. 33 (1969).

2. Meckling, *Management of the Frequency Spectrum*, 1968 WASH. U.L.Q. 26; Coare, *The Federal Communications Commission*, 2 J. LAW & ECON. 1 (1959).

3. On this subject see my own paper: Webbink, *FCC License Fees According to Frequency Spectrum Utilization: A Suggestion*, BC-17 INSTITUTE OF ELECTRICAL & ELECTRONIC ENGINEERS, TRANSACTIONS ON BROADCASTING 64 (1971).

shadow prices (imaginary numbers which are supposed to correspond to real market prices) is much less convincing. He does give some interesting numerical examples of how shadow prices might be calculated for satellites and land mobile systems. He also makes the interesting proposal that if shadow prices could be calculated, then existing users could be given the choice of allowing the new firms to enter, or else paying rental charges equal to the costs imposed on the existing applicants by being excluded from the market. However, he does not explain how regulators will be able to obtain the expertise to make such calculations which by their very nature contain many arbitrary assumptions, nor how such calculations could be of any use in insulating regulators from the political pressures in specific cases which obviously exist under the current regulatory system and presumably would continue to exist.

Chapter 6 suggests additional frequency coordination and clearance and justification, presumably ideas with which everyone concerned with spectrum use can agree in principle. Chapter 7 discusses broadening the use of secondary spectrum rights. In other words, persons would be allowed to use certain frequencies with the understanding that they could be pushed out by primary users in the future. This is an important idea because the Federal Communication Commission could do more of this with no change in existing laws and little or no change in existing rules. The trouble with such a plan, as Levin points out, is that temporary users often become permanent by exerting political pressure. Since the FCC is aware of this problem, it has been reluctant to grant temporary or secondary licenses. While Levin illustrates this problem with several examples, he offers no solutions to the problem of preventing temporary or secondary grants from becoming permanent.

Section 3 (Chapters 8 and 9) provides information on the growth in demand for various kinds of radio use and describes some of the actions which the FCC has taken to deal with the problem. In Chapter 8, Levin uses a series of regressions for different kinds of mobile radio users to show that demand for mobile radio use rises rapidly with city population. He also points out in this chapter and its appendix that while there have been incentives to use land mobile spectrum more intensively (and indeed the FCC has split land mobile band widths several times), such incentives have not existed for radio and TV broadcasting. In fact, the appendix to Chapter 8 suggests that many more TV stations could be allocated on the VHF band, and presumably the same is true for the

UHF band. Levin points out in this chapter, as he did in an earlier article[4] that because the FCC has limited the number of TV channels in some areas, high economic profits or rents have been earned.

Chapter 9 describes the growth of spectrum demand in the United States. It also estimates the extent to which federal government direct and indirect expenditures have stimulated the development of new radio equipment and therefore more extensive and intensive use of the spectrum.

The fourth and final section of the book (Chapters 10-13) presents some interesting regulatory problems related to spectrum use. While there is much that is significant in this section, it is only indirectly related to the rest of the book.

In Chapters 10 and 11 Levin discusses entry and competition in the satellite and microwave part of the common carrier industry. He describes some of the central regulatory problems in this industry such as determining the existence of internal cross subsidies, the possibility of cream skimming existing because of those cross subsidies, the tendency of firms to overinvest, etc. However, these problems exist principally because of the structure of the industry and the way it is regulated, not because it uses radio spectrum. Indeed, these problems exist even in cases where the use of over-the-air spectrum is not involved. The only reason why these questions are related to spectrum use is that these new rapidly growing spectrum uses demand a great deal of spectrum and they do not pay for the spectrum used.

In Chapters 12-13 Levin discusses broadcast licensing and particularly the fact that FCC allocation priorities often do not fit the economic realities of the market, so that it has under or over allocated commercial or educational channels in different cases. He points out how ridiculous it is to save hundreds of millions of dollars worth of valuable television spectrum for educational TV, but still be unwilling to spend the money necessary to finance stations in order to put that spectrum to use. He also points out that it is not even clear that higher station profits lead to higher quality programs, even though this has been a major FCC argument for limiting entry of stations (and, he might have added, CATV).

In Levin's concluding chapter he makes several significant points. He

4. Levin, *Economic Aspects of Broadcast Licensing*, 72 J. OF POL. ECON. 151 (1964).

argues that potential entrants ought to have equal standing before the regulatory agencies as existing licensees with no presumption that existing users are entitled to special protection, something which is obviously not true at present. He also argues the importance of articulating opportunity costs in order to force decision makers to realize the true costs of excluding any potential user in favor of some other actual or potential user. Clearly he holds out the hope that if decision makers were made more aware of the true costs and benefits of their actions, they would act in more efficient and "reasonable" ways. Whether he is correct in that view remains to be proven.

In summary, Levin's book contains a great deal of important and useful information, of which only a small fraction has been mentioned in this review. This is both the book's greatest strength and biggest weakness. As a reference book, it undoubtedly lists more sources than any other work on the topic. At the same time, because of the many different topics and ideas covered, it is sometimes hard to tell what is most important and what are the central ideas of the book. In some ways the organization of the book is also confusing. Perhaps section 3 on the development of spectrum use should have gone *before* section 2 on improving spectrum efficiency. The book might have also been improved if a few of the chapters in the fourth section had been deleted. Chapter summaries and the final concluding chapter might have brought out more sharply the most significant ideas. Finally, because this book will be used as a reference work, and because it contains so many footnotes, a bibliography would have been very helpful.

Despite these problems, it is a book which should be of important use to people interested in spectrum problems, and one that people working at or with the Federal Communications Commission, Office of Telecommunications Policy and Interdepartment Radio Advisory Committee will find desirable to obtain.

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