The media and advertising: a tale of two-sided markets

Simon P. Anderson*and Jean J. Gabszewicz†

This version August 2005.
COMMENTS WELCOME
Prepared for: Handbook of Cultural Economics; eds. Victor Ginsburgh and David Throsby, Elsevier Science, forthcoming

Abstract

Media industries are important drivers of popular culture. A large fraction of leisure time is devoted to radio, magazines, newspapers, the Internet, and television (the illustrative example henceforth). Most advertising expenditures are incurred for these media. They are also mainly supported by advertising revenue. Early work stressed possible market failures in program duplication and catering to the Lowest Common Denominator, indicating lack of cultural diversity and quality. The business model for most media industries is underscored by advertisers' demand to reach prospective customers. This business model has important implications for performance in the market since viewer sovereignty is indirect. Viewers are attracted by programming, though they dislike the ads it carries, and advertisers want viewers as potential consumers. The two sides are coordinated by broadcasters (or "platforms") that choose ad levels and program types, and advertising finances the programming. Competition for viewers of the demographics most desired by advertisers implies that programming choices will be biased towards the tastes of those with such demographics. The

*Department of Economics, University of Virginia, PO Box 400182, Charlottesville VA 22904-4128, USA. sa9w@virginia.edu

†CORE, 34 Voie du Roman Pays, B-1348 Louvain-la-Neuve, Belgium. gabszewicz@core.ucl.ac.be

ability to use subscription pricing may help improve performance by catering to the tastes of those otherwise under-represented, though higher full prices tend to favor broadcasters at the expense of viewers and advertisers. If advertising demand is weak, program equilibrium program selection may be too extreme as broadcasters strive to avoid ruinous subscription price competition, but strong advertising demand may lead to strong competition for viewers and hence minumum differentiation ("la pensee unique"). Markets (such as newspapers) with a high proportion of ad-lovers may be served only by monopoly due to a circulation spiral: advertisers want to place ads in the paper with most readers, but readers want to buy the paper with more ads.

Keywords: advertising finance, two-sided markets, platform competition, pensee unique, circulation spiral

JEL Numbers: D43, L13, L82, M37, Z11

1 Introduction

Sociologists, political scientists, lawyers, historians, and philosophers all have their views about the media. The wide scientific interest in media reflects the growing importance of entertainment and communication in today's information society. Citizens in developed countries devote the lion's share of their leisure time to consuming mass media such as television and newspapers. It may not be too large a stretch of the imagination to say that leisure time use (job satisfaction aside and ignoring eating pleasure in those cultures with fine cuisine) determines much of the quality of life: by extension, the quality of life for many people is thus underpinned by the quality of the media![1] In this respect the media industries, and the broadcasting industry in particular, take on an overall importance to the national well-being far beyond the dollar or euro magnitude of the sector in the national accounts.[2]

Much of today's popular culture derives from television programming. Children at school copy the actions and characters of their heroes seen on TV the evening before, adults retell jokes and rehash story lines, and the hairstyle of the leading lady in *Friends* becomes a topic of national debate. Media are also the source of news of current affairs and political actions. The way the news are presented can also shape public opinion and, by influencing citizens' voting behavior, can even establish or depose governments and presidents.

Surprisingly enough, the media were long ignored by economists, despite the fact that media content cannot exist without some physical medium (TV sets, newspapers, magazines) that is produced and exchanged in a market. Yet the media are not traditional products like butter, gasoline, or sugar. First, media firms (in most cases) produce and distribute a *public good:* one person's consumption of a media product does not diminish the ability of another to consume it (non-rivalrousness).[3] Second, media prod-

[1] The average American watches over four hours of TV per day. In Japan, the figure is three hours and thirty minutes, and in Europe only slightly more. Subtracting hours of sleep, hours worked, hours commuting, and hours eating from the daily total of 24 hours we conclude that leisure time is mostly devoted to watching TV.

[2] The intrusion of American cultural values and icons into European homes through the television screen is one reason why many countries (such as France with the "exception culturelle") restrict non-local content of programming.

[3] Some media products also share the other property common to public goods, non-excludability, like free newspapers or television broadcasting. Other media products, like cable broadcasting or magazines, are excludable, see Samuelson (1964) for further discussion.

ucts in many countries are viewed as *merit goods*, a category of goods where the state makes a paternalistic judgment that consumption is "good." Such consumption is often encouraged by public spending (whereas "merit bads" are discouraged by taxes or regulations and restrictions). With merit goods, "public" evaluation is seen as different from the private one, so rejecting a purely individualistic view of consumer benefits. This stance derives from the fact that media constitute a powerful instrument of education whose nature and diversity considerably shape the collective values of society. Finally, most media companies finance their activities (at least partially) by *advertising*. Media firms need advertisers to make the production of media content worthwhile, while advertisers need media firms to make their products known to potential consumers.[4] Consequently, the media industry sells a joint product to two different categories of buyers: the medium itself to advertisers, and the medium *content* to media consumers (readers, TV-watchers, web-surfers, etc.).

Media firms thereby operate in two different industries and get their profits from both. From this two-sided interest, the cultural content offered to media consumers is shaped by the desire to offer advertisers a vehicle that reaches as many prospective consumers as possible: "when news sell 'eyeballs' to advertisers, the question becomes what content can attract readers or viewers rather than what value will consumers place on content" (Hamilton, 2004). This potential bias in the type of programming or reading content offered may bias popular culture as well. The ads themselves are the subject of cult followings, and characters in ads may lead fashions and fads. The dollar amount spent on ads is the tip of a larger economic iceberg: insofar as new product introduction needs or is facilitated by advertising, product turnover and product generation is determined by ads. Some might say tastes too are influenced by ads. Ads can certainly create hype and fashions. Advertising also forms and reflects popular culture. It is important economically not only because of the fraction of GDP that it represents directly (around 2%) but also because it may facilitate the introduction of new products to market and so underscore a larger fraction of GDP.

Competition for advertising revenues therefore governs market performance; commercial television needs advertising revenue to survive (subscrip-

[4] The degree of advertising in media financing varies across media and countries. Public broadcasting services financed only by public subscription exist in England or Japan, while other media are fully financed by ads, like free newspapers and commercial TV broadcasting.

tion pricing aside). Competition for advertising revenues therefore governs market performance. The willingness to pay of advertisers to contact viewers of particular demographics thus determines the type and range of programmes offered in a free market system. This is very different from a traditional market structure where the principle of consumer sovereignty governs the type and range of products offered on the market. In conventional economic markets, consumers "vote" with their dollar purchasing power for the products they want, and firms, seeking profits, have the incentive to provide what consumers want. In the commercial television context, viewer sovereignty is filtered and muted. Viewers "vote" with their eyeballs for the programs they want to watch, and broadcasters need to deliver eyeballs to advertisers. However, different eyeballs get different vote weights in the sense that advertisers care about the type of viewers who are delivered - those most inclined to change their purchase behavior and buy copious quantities of the product on display are those of most interest to the advertiser. In addition to this type of distortion (whose consequences we elaborate upon below), media market performance can be sub-optimal for more subtle reasons even when all viewers are equally weighted by advertisers. The reason stems from the particular market interaction inherent in the commercial television market, which forms a leading example of a "two-sided market" with network externalities.[5] In a two-sided market, two groups interact through an intermediary, or platform, that accounts for the externalities between the groups. In the media context, the platform is the broadcast company (or companies) and the two interacting groups are advertisers and viewers. Advertisers like more viewers to receive their messages. Viewers though find advertising a nuisance insofar as it detracts from time available to watch a program. The more advertisements are carried, the more the viewers are disappointed, so the former impart a negative externality on the latter. However, the viewers do not pay a direct price for the entertainment that they receive.

A similar structure governs commercial radio. Many Internet sites are also financed solely by advertising revenues from click-throughs and pop-up ads, which are also frequently a nuisance to surfers (at least, those who do not click through!) Magazines and newspapers are founded on a similar business model, and derive much of their revenue from the advertisements they carry.

[5] Although most two-sided markets studied in the literature involve bilateral positive externalities, broadcasting instead typically involves negative externalities to viewers from advertisers and positive externalities on advertisers from the number of viewers.

However, they also typically charge a direct price to their readers. This is true now for pay-per-view television, and for premium television shows too. Cable television, which involves a local service provider bundling together selections of channels, is an intermediary type of structure insofar as it typically carries to the household many programs that do carry ads themselves. The ability to price programming alters the market outcome by drawing in some direct competition for viewers.

The business model for newspapers and magazines has similar elements, although arguably advertisements are not as much of a nuisance as they are with television, radio, or web-pages.[6] Readers can skip past the ads without having to pay much attention to them, while they interrupt and postpone a television program. Readers may even find a positive net benefit from ads. This is especially true for classified ads in newspapers, and for products displayed in specialist magazines (motorcycles, golf, sailing, etc.). If readers do get positive net benefits, then the market interaction may be fundamentally different. If a medium attracts more readers or viewers, the more are advertisers willing to pay to get their messages across (this is true regardless of whether the readers or viewers are attracted to the messages per se). When readers want to get ad exposure ("ad-loving" behavior), then the market may loosely be described in terms of a "positive spiral".[7] That is, the more readers there are, the more advertisers want to advertise in the paper or magazine, but then the more readers want to subscribe to it. This reinforcing effect may mean that only a monopoly can survive in the market. This conclusion though ought to be tempered if there is product differentiation (so that several different types of magazine can survive, offering different specialities, or newspapers may provide different political viewpoints). Another caveat here concerns whether advertisers can reach readers through different media, and whether advertisers tout their wares in several papers or magazines. These issues are discussed further below.

In what follows we shall refer to the television context, and speak for the most part of viewers who watch broadcasts on channels. Differences for other media are pointed out where pertinent.

[6] The existence of "Informercials" on television indicates that advertising is not a nuisance to all viewers, too.

[7] Modeling this can be quite intricate. Caillaud and Jullien (2001) note that they "attempt to capture a fundamentally dynamic process by way of a static model, hence some imperfection."

2 Background

We first present some conceptual background, and then some statistical background. This is followed by a description of the basic two-sided market paradigm, as applied to media markets.

2.1 Conceptual background

Perhaps the earliest model of television program choice is due to Steiner (1952). Steiner assumed simply that viewers will watch the (single) program type they prefer, and that different viewers have different preferences.[8] To take an example, suppose that 67% of the population will only watch game shows, and the rest only will watch sports. Then if there are two channels operated by competing firms, they will both offer game shows and so divide the larger pool of viewers. This is the Principle of Duplication, and is arguably prevalent on afternoon and prime-time network television. It implies that the market system does not cater to the minority taste. A monopoly though, with two channels, would not cannibalize its own game audience by providing a second game show, but would instead provide a sports show and then cater to the whole market. Implicit in the above description is that television broadcasters wish to maximize viewers. This makes sense when viewers do not mind ads, ads are sold at a fixed price per ad per viewer, and there is a binding cap on ad levels (as in the E.U. currently). Otherwise, and as we develop in the models below, broadcasters need to worry about viewers switching over or off, and extracting advertising revenues optimally.

A similar idea to Steiner's Duplication Principle is arrived at with a different variant of the model. Suppose (following Hotelling, 1929) that viewers' ideal tastes are distributed along a unit interval. Each viewer watches the channel closest to her ideal taste point. There are two broadcasters who choose "locations" in the unit interval, with the objective purely of maximizing own viewership. Then the equilibrium is what Boulding (1955) christened the Principle of Minimum Differentiation. Both broadcasters choose exactly

[8]See Cabizza (2004) for a model with a similar preference structure. Her paper addresses the extent that programs cater to minority tastes under private or public broadcasting, and in a mixed system. She also notes that, in addition to Steiner (1952), Rothenberg (1962) and Wiles (1963) indicate the tendency for duplication of program types that attract large audiences.

the same program type and split the market, just as in Steiner's analysis.[9]

An alternative specification of the program scheduling problem is formulated by Cancian, Bills, and Bergstrom (1995).[10] These authors consider two TV channels that must decide (non-cooperatively) when to broadcast their evening television news. Viewers prefer to watch the news as soon as they get home from work. The times when viewers get home are distributed on an interval of time. Broadcasters strive to maximize audience size, and each is to choose a broadcast time. This game has no pure strategy Nash equilibrium. Indeed, whenever its opponent chooses a broadcasting time past the median of the distribution, each network's best response is to broadcast its show just before its competitor's to get over half the viewers. Its best reply when its competitor's expected broadcasting time is before the median is to choose the latest possible time and so again get over half the viewers.[11]

A second early concept that still resonates today is that of the Lowest Common Denominator (LCD), proposed in this context by Beebe (1977). Beebe took issue with Steiner's assumption that viewers will not watch if they are not offered their most preferred program type - and hence took issue with Steiner's conclusion that monopoly outperforms competition in terms of catering to diverse tastes. Suppose for illustration that viewers have diverse first preferences, but all would watch a game show if nothing else were available. Then a monopoly would have no reason to offer more than one program, and it would air a game show. This is, by construction, the LCD program type. Competing broadcasters though would offer different program types in order to attract viewers from rivals.[12]

These basic analyses are important as far as they go, but they miss the crucial tension in the market. In these models, viewers are not deterred by ads, and advertisers have the same willingness to pay for communicating with viewers. The important insight from the economics of platform competition

[9] See Eaton and Lipsey (1975) for an extension to many firms, a consideration of non-uniform consumer densities, and other extensions.

[10] See also Nilssen and Sørgard (1998).

[11] Gabszewicz, Laussel, and Sonnac (2004) analyze an extension of the basic Hotelling game with single-homing advertisers and competition for viewers who dislike ads. Surprisingly, this extension also leads to non-existence of a pure strategy equilibrium, albeit in a more complex (two-stage) game where firms choose broadcast times and then ad levels.

[12] Beebe (1977) presents several numerical examples of group sizes and preference structures to determine equilibrium offerings under competition and under multi-channel monopoly. He does so for both a fixed number of channels, and for an endogenous number of channels determined by fixed costs of airing a channel.

is that the platform (broadcaster) needs to get both sides of the market on board - viewers must be delivered to advertisers, and advertisers are the direct revenue. How much they are willing to pay depends on the number of viewers delivered on the other side of the market.

2.2 Statistical background

This sub-section substantiates the view that media consumption takes up a lot of available leisure time, by providing some data about the time spent by consumers (readers or viewers) with various media. It also indicates the economic importance of advertising in the US as a fraction of total GDP and as a function of medium type, and shows that performance concerns due to large amounts of advertising might be quite well-founded. A break-down of what advertising time on various media is worth to advertisers is given later in the text.

Table 1 shows how much time is spent by households in the US watching television. The Table documents the rise in the importance of television watching over the last 50 years. The current household (not individual!) average hours watched is an astounding eight per day. Arguably this rise (from four and a half in the 1950's) is due to habit changes and technology changes (such as cheaper television sets). The 1970's and 1980's saw households owning multiple sets, as well as the advent of color televisions. In the 1990's, the set of program options (including many 24 hour programming options) increased immensely with the increased popularity of cable, satellite, etc.

INSERT TABLE 1 Time spent viewing television by households. US, 1950 - 2003.

Individual watching rates are quite a lot lower than the household rates, but still around 4 hours a day in the US (a detailed break-down by medium type is given below.) While the US rate is the highest in the world, some other countries come close. Corneo (2001) presents evidence that people spend roughly the same amount of time working as they do watching television so there is a positive correlation across countries.[13] Surprisingly, Norway has

[13] To explain this, Corneo (2001) develops a simple model in which adults choose between 3 activities, work, TV watching, and "socially enjoyed leisure" (activities enjoyed with others). To explain the positive correlation, Corneo invokes multiplicity of (Pareto-ranked) equilibria. Given that others are working long hours, it does not pay an individual to

the lowest number of hours watching (60% of the US figure).[14] On average, people spend only 30% more time working than they do watching TV.

INSERT TABLE 2. Work and TV viewing hours across countries.

Corneo estimates an OLS regression of the correlation between hours worked per adult (W) and hours watching television (TV). The estimated equation is TV = -614 + 1.05 W. Both the constant and the coefficient are statistically significant, and the R^2 value is .51.

Table 3 provides a breakdown across media (television, newspapers, radio, magazines, and the Internet) of time spent. The importance of demographics to advertisers is implicit in this Table, given the break-out of occupations, income, and education levels.[15] Poorer people tend to watch more television, as do the retired. Magazine and Internet use is highest among richer individuals.

INSERT TABLE 3. Adult time (minutes/adult) spent with major media.

To get the data in Table 3 (which pertain to January 2003), adults were asked about their prior day's usage ("yesterday"). The philosophy behind this methodology is that people remember well what they did on the previous day. Interviews were evenly conducted over a 2-week period, so that the data aggregates week-end and week-day figures (see www.tvb.org for more details on the methodology).

The cost of accessing attention differs quite substantially across media. More detailed data are given later. For instance, the current rate for a 30 second commercial on prime-time translates into a rate of 2 cents per household reached. For spot television commercials, the rate is somewhat higher, at 2.7 cents per home reached. For comparison, the newspaper rate for the year 2000 works out at nearly seven cents per home for a half-page advert. We turn now to the share of advertising expenditures in the economy,

---

invest greatly in social ties. In a related vein, Rogerson (2005) explains the big difference in continental European (France, Germany and Italy) hours worked as due to different tax rates: the Europeans consequently indulged in more "home production."

[14] Surprising at least, because one might imagine that long winter nights would be spent watching television.

[15] Wildman, McCulloch, and Kieshnick (2004) show empirically that implicit prices for access to different individual types in a program's viewership have different prices. See also Goettler (1999) and Wilbur (2004b).

and how much of this is on TV. The share of advertising in GDP has remained roughly 2% over the last forty years.

INSERT TABLE 4 Gross Domestic Product, Total Ad Volume, and Television Ad Volume 1963-2003

A break-down in terms of advertising volume across media (also from www.tvb.org) is given below. The last year (2003) is broken out into shares and the percentage change over the previous year. Television (summing broadcast and cable) accounts for about a quarter of the total spending, and, using the data from the previous table, therefore accounts for about half a percent of GDP on its own.

INSERT TABLE 5 Advertising expenditures by medium, US

Finally, the amount of advertising is also a performance concern. In broadcast media, especially, ads are hard to avoid Shields (2004) reports a study by MindShare for 2003 "ad clutter" meaning non-program (commercials, promos, PSAs, etc.) minutes. The data are recorded in Table 9. ABC, NBC, and Fox all passed 15 mins. /hr.; and CBS has increased its clutter, but is still below the 15-minute mark at 14:18 minutes.[16] All are trending upward, as are Cable networks, though they generally carry less clutter. At one extreme, MTV carries 15:25 minutes every hour, while ESPN carries "only" 11:48 minutes of non-programming. By contrast, the EU has advertising caps that restrict the level of advertising to 9 minutes per hour. This level is very similar to the 9.5 non-programming minutes per hour that were standard in the US twenty years ago. This amount was a limit on commercials that was agreed upon by the National Association of Broadcasters and maintained by a voluntary code.[17] There is evidence the actual programming is being subverted with messaging too.

[16]Some popular programs are among those with the highest clutter (for the fourth quarter of 2003). These include "The Bachelor" (18:08 minutes), "My Wife and Kids" (17:40), "Everybody Loves Raymond" (16:15), "Survivor: Pearl Islands" (16:05), and "Friends" (16:06) (source: Shields, 2004). However, daytime television carries even more clutter than prime- time. In November 2001, NBC's "Days of our lives" carried 23:23 minutes per hour, ABC's "All of our children" carried 22:59 minutes, and ABC's "General hospital" had 22:31 minutes. These figures, and much further interesting data on clutter, can be found in the American Association of Advertising Agencies and the Association of National Advertisers, Inc. joint 2001 Television Commercial Monitoring Report.

[17]Unfortunately (and interestingly), Nielsen does not publish data on advertisement ratings (number of people watching the ads) even though it has the technology to do so.

INSERT TABLE 6 Advertising minutes per hour, US prime time.

Shields suggests that total viewer demand for TV is pretty inelastic: "overall TV viewing is not that different [over the last decade] suggesting that clutter isn't driving viewers from the set, but may be causing them to flip [channels]" and notes that network ratings have dropped for prime time programming as fragmentation spreads viewership over hundreds of channels.

2.3 Platform competition

The key to the basic market model is that advertisers want to reach viewers, but viewers dislike ads,[18] and the size of each of these two segments matters both for the equilibrium arrangement and the optimum. The platform, or intermediary, is the broadcast company (or companies) that renders the ads palatable by bundling them with programs that are the viewers' ultimate objective. That is, entertainment is provided free of a direct price, and this sugar-coats the consumption of ads the prospective consumer would otherwise not choose to watch. However, the platform recognizes the trade-off between higher ad levels that lead to more revenue per viewer, and the loss in viewer base from ramping up ad levels too high. Thus the platform has to coordinate the two sides of the market to get them both on board in the numbers that maximize revenue, and recognizing how both sides benefit or suffer from the interaction. When the market structure has more than one platform, competition from other platforms must also be factored into each platform's calculus.

The economics of two-sided markets was developed after researchers into credit card markets recognized that this is a market not immediately amenable to traditional analysis.[19] Instead, credit cards and other prominent examples are two-sided in the sense that the benefits one receives on one side of the market depend not directly on the number of other agents on one's own side,

[18] In the ad-loving variant, they do like ads.

[19] Indeed, even though it was sometimes suggested that credit cards constitute a market with network externalities, the prevailing model of network externalities at the time was one in which these externalities were "one-sided." That is, a consumer's benefit from carrying a card depends on the number of other card holders. Some reflection suggests that this is true to the extent that more shops are likely to take a card if more prospective consumers carry it. However, this mechanism ought to be modeled directly. The one-sided prototype might fit well such networks as fax machines or computer software (see Economides, 1996, for a review).

but rather on the number of agents on the other side. Thus the benefits to a shopper from holding a card depend on the number of stores that take it, and the benefits to a store from taking a card depend on the number of consumers who carry it. The credit card example has two-sided positive externalities. Here the card-issuing company is the platform, the intermediary that coordinates the two sides of the market.

The economics of two-sided markets were pioneered by Caillaud and Jullien (2001, 2003) and Rochet and Tirole (2002), and further synthesized and extended by Armstrong (2003) and Rochet and Tirole (2004). The latter authors address the tricky task of defining two-sided markets.[20] Wright (2003) provides a useful service in indicating several examples of fallacious reasoning that would be ill-inspired from thinking about traditional markets in a context that was actually two sided. For example, one might think pricing below marginal cost would be indicative of predatory intent. However, in a two sided market, such pricing is quite natural, and stems from the need to get one side on board in order to extract surplus from the other side. In the TV context, viewers watch for "free" but advertisers pay for access. Indeed, Armstrong suggests that creates more benefits for the other side is the one that will enjoy low prices (for joining the platform). Wright though warns against thinking of this as a cross-subsidy from one side to the other, pointing out that with traditional subsidies, the side "paying" would prefer that the other were eliminated, along with the implicit tax. In the television context, the advertisers definitely would NOT like to see the viewers barred from the market! Rather, it is the low (or zero) price that attracts the viewers and therefore provides the surplus to the advertisers.[21]

[20] The typical firm must get both worker and consumer sides "on board" in the sense of coordinating different agent groups, but this should not be considered a two-sided market problem. As Armstrong (2004) notes, "agents from one group generally do not care how well the firm performs in the market for the other group, but only about their own terms for dealing with the platform." Two-sided markets also involve cross-group network effects absent in the simple firm context.

[21] In a similar vein, the earlier papers by Caillaud and Jullien (2001, 2003) situate the problem as competing "cybermediaries" (internet matchmakers) that coordinate groups of agents that wish to transact. The "Chicken and Egg" problem to which they refer alludes to getting both sides on board. In the simplest variants of the models, there are just entrance fees to the parties who may then interact. In a more complex version, agents transact if they find a match (which they do with an exogenous probability), and the platform can charge a price on that transaction too. This would be analogous to a royalty on sales following an ad on TV, which is an arrangement not seen in practice in

Caillaud and Jullien (2003) also allow for "multi-homing"[22], meaning that sometimes agents from one side of the market may use more than one platform - men (or indeed women) could use two different dating services, say. In the television context below, Anderson and Coate (2005) have multi-homing by advertisers, meaning that advertisers can place ads on several channels, while Gabszewicz et al. (2003) have single-homing.[23]

3 The model ingredients

Going beyond the powerful, but rather rudimentary analyses of Steiner (1952) and Beebe (1977) means getting more explicit about the tastes and objectives of the three principal groups of agents who interact in the market. For concreteness, consider the case of television. The agents are the viewers, the advertisers, and the broadcast companies who have the central role of coordinating the two sides of the market. We describe these in turn.

3.1 Viewers and readers

The model is built up from the basic ingredients that form its micro underpinnings. This means describing the tastes of diverse individuals to then generate their choices. We then aggregate up over individuals to find the viewership of each program type offered.[24]

Viewers make a discrete choice of which station to watch. At any moment, a viewer can reasonably only watch one station. Although a viewer might switch channels over a given hour (and we describe below how to allow such behavior), our starting point is to have viewers watch a single channel. We must also modify the model in the case of newspapers for which it is

ad markets.

[22]The term comes from usage on the Internet, meaning to have more than one Internet Service Provider.

[23]Gabszewicz and Wauthy (2004) contribute further to the debate.

[24]Of course, this is not the only way to proceed. There is a long-standing tradition in Industrial Organization (and more recently on Macroeconomics) to use representative consumer models to portray the aggregate taste. These have also been used in Media Economics: see Barros, Kind, Nilssen, and Sørgard (2005) for an application to the Internet and vertical integration. Cunningham and Alexander (2004) study an equilibrium model and find that greater concentration (the inverse of the number of firms broadcasting) may decrease the total amount of programming broadcast, and a decrease in consumer welfare.

conceivable that a reader may buy and read several alternative papers: a fortiori for magazines (multi-homing by readers).[25] Table 3 above showed a break-down across media of time spent by individuals. In parallel, Table 7 shows the fraction of adults that each medium reaches (i.e., it gives a break-down by category of how many individuals are accessing the medium.)

INSERT TABLE 7. Adults using major media (percentage of adults reached).

A simple way to model tastes is to suppose that each viewer has a conditional utility function for each option i, and this utility depends on the *match value*, which is the intrinsic benefit of entertainment, and may differ across viewers. From this we subtract the full price paid for the option. The full price consists of the monetary (or subscription) price, s_i, from watching channel $i = 1, ..., n$, plus any nuisance from advertising. Supposing the advertising level is a_i, the simplest way to capture the nuisance cost is to assume it is linear in the advertising level, at a rate γ per ad. This nuisance rate may be constant across the population, or may differ across different viewers. We also deduct from the full price any expected surplus the consumer may expect from trades inspired from the ads seen. Loosely, such surplus serves to reduce the effective γ, and may even render it negative. Such might be the case with classified ads for which the consumer actively searches out information and so advertising provides a positive net benefit. In the sequel we shall assume that nuisance costs are the same for all viewers, and that viewers expect no surplus from the goods they see advertised. We denote the full price of option i as f_i and it is thus given by

$$f_i = s_i + \gamma a_i \tag{1}$$

The match utility is inspired from the standard stable of discrete choice models of product differentiation. From models of vertical (or quality) dif-

[25] Models in which viewers are assumed to mix between channels include Gal-Or and Dukes (2003) and Peitz and Valletti (2005). Anderson and Neven (1989) analyze the welfare properties of such a set-up in the context of product differentiation. Indeed, while without mixing the socially optimal locations are the quartiles of a linear location space, with mixing the optimal locations are the extreme ones. The positive analysis is the same if there is a linear likelihood of buying a product after seeing an ad; when it comes to the pricing analysis, the analogy is to a model of pay-per-view rather than flat subscription pricing. Another interesting issue that arises is that mixing viewers may be reached on two different channels, thus eroding the monopoly bottleneck that channels have over delivering viewers.

ferentiation (Mussa and Rosen, 1978, Gabszewicz and Thisse, 1979, Shaked and Sutton, 1982) we draw a taste for a measure of quality, θq_i, with θ an individual specific marginal willingness to pay for quality, and q_i the quality of option i. From models of spatial competition we draw the distance disutility $\tau(.)$ that measures how disappointed is the consumer from not getting her ideal horizontal product specification. This depends on the "distance" between the viewer (at x) and the program offering (at x_i). From models of probabilistic discrete choice, we draw an alternative way to conceptualize horizontal differentiation, via match values $\mu\varepsilon_i$. These are typically assumed independently and identically distributed across consumers, and so (if the other potential sources of differentiation are not present), products are symmetric substitutes and competition is "global" in the sense that each product competes symmetrically with each other one. This is to be compared to the "local" competition inherent in the spatial model: each product competes directly with only its two neighbors.

In sum, the utility of consumer with preference draws $\{\theta, x, \varepsilon\}$ (i.e., located at x and buying from a firm "located" at x_i with quality q_i and setting price s_i with ad level a_i) then becomes:

$$u_i = y - [s_i + \gamma a_i] + \theta q_i - \tau(|x - x_i|) + \mu\varepsilon_i, \quad i = 1, ..., n, \tag{2}$$

where the term in square brackets is the full price (i.e., f_i: recall (1)) and y is consumer income (which we suppose is the same across all consumers since it anyway plays no role in the choice model). In the sequel, we shall typically only deal with one type of differentiation in (2) at a time, and the others will be suppressed.

3.2 Advertisers

The Economics of Advertising are quite controversial when it comes to the normative analysis. This is because successful advertising shifts demand, and therefore (presumably) consumer surplus. A comprehensive survey of the Economics of Advertising is provided in Bagwell (2003), and some salient points are discussed following the presentation of the model used here.

The simplest formulation for advertiser demand is that it is perfectly elastic. This means that there is no producer surplus to worry about. This assumption was used by Spence and Owen (1977). These authors assume that ad demand is flat and also that broadcast firms run into regulatory caps, so effectively there is neither an ad level decision to make, nor is there any ad surplus to worry about. Many papers treat this (simple) case of perfectly elastic demand, including Gabszewicz et al. (2003) and Hansen and Kyhl (2001). Other authors treat a downward sloping ad demand but do not treat ad surplus in the welfare analysis. This makes sense if all ads are viewed as pure social waste, and just serve to reshuffle demand. Nonetheless, such analyses do impart a socially important role for advertising spending - that of financing the media. On the other hand, if ads do generate some expected surplus to consumers, this surplus ought to be added to the utility function when deciding which channel to watch.[26] In order to disentangle the market performance in the media market per se from that in the ad market, we shall analyze a benchmark case in which the private and social demand for advertising coincide.

One consistent story that generates such an ad demand is as follows. Suppose all advertisers are independent producers of new goods. Ads communicate the existence of these products to prospective consumers who could not otherwise find out about these goods and so can only buy them if they see an ad. Such ads are not persuasive but informative, and so are readily amenable to welfare analysis. The independence assumption implies that there can be no business stealing. We further suppose that each good is sold at a price that extracts all consumer surplus. This therefore closes down the other possible channel for deviation of social and private advertising.[27] Moreover, it obviates having to deal with the consumer surplus from goods

[26] This rather complicates matters. Anderson and Coate (2005) refer to analysis of this issue.

[27] The broad Industrial Organization principle that governs the optimality of various economic magnitudes (following Spence, 1976) is that the bias depends on where the balance tilts between two opposing forces. First, firms do not take into account incremental consumer surplus that they cannot capture when they decide the level of an activity. This is termed Consumer Surplus Non-Appropriability. Second, firms do not account for the fact that they reduce other firms' profits. This effect is commonly termed Business Stealing. These principles are usually applied to entry decisions (Spence, 1976) but apply equally well to advertising levels. In general then we should not expect the ad level to be optimal for these reasons. Dukes (2004) highlights business stealing by using the framework of Grossman and Shapiro (1984).

A neutral benchmark case naturally arises when we close down both of these channels of discrepancy of equilibrium from optimal levels. This has the advantage that we can then concentrate directly on the distortions inherent in finance by ad support, without yet worrying about the ad benefit per se. Put another way, the backdrop is one in which the private demand for ads coincides perfectly with the social demand.

in the viewer choice model. A simple formulation that ensures there is no consumer surplus arises when viewers, if interested, buy one unit of the good up to a reservation price that is common to all consumers.[28]

The aggregate demand for ads is then determined as follows. Following Anderson and Coate (2005), assume that advertisers differ in the probability that consumers are interested in their products, but advertisers are otherwise identical. More generally, it suffices to rank advertisers by a scale of high to low profit from contacting a viewer. All viewers are the same except for their tastes for programs, so there can be no targeting of ads correlated to programs.[29] Then the demand for advertising is simply the mass of advertisers who find that the expected benefit from communicating with viewers exceeds the price stipulated by the channel. We also assume that viewers "single-home" (watch one channel), and that there is a single period only. A viewer only needs to see an ad once in order to be informed of the product.[30] Taken together, the above assumptions imply that all that matters to an advertiser is the price for contacting a viewer. If the advertiser's demand price exceeds the price quoted, the advertiser will advertise on the channel and reap a surplus equal to demand price minus advertising price per viewer, all multiplied by the number of consumers reached. This also means that active advertisers will typically advertise on all channels available, in order to reach the consumers who are delivered only through those channels. Equivalently, the advertisers engage in "multi-homing."[31]

Let then the inverse advertising demand be given by $p(a)$ per viewer when a channel carries a ads. The corresponding revenue per viewer is then $R(a) = p(a)a$. We assume below that this revenue function is log-concave. This means that the revenue function is quite "well-behaved" (the assumption includes a concave revenue as a special case).

At this juncture, we briefly review alternative views of advertising proposed in the literature on the economics of advertising. This literature tra-

[28] Alternatively, we could envisage a perfectly discriminating monopoly using two-part tariffs.

[29] Allowing targeted ads is a potentially important extension given the importance of demographic variables in ad demand.

[30] Shields (2004) reports that less clutter i.e., non-program material) may result in a greater impact for advertisers. Ford sponsored the season-premiere of "24" on FOX, which was otherwise commercial-free. Ford's brand recall score was over twice the average for the time period, according to IAG's Reward TV data.

[31] We address single-homing advertisers in Section 6 below.

ditionally distinguishes persuasive from informative advertising. Persuasive advertising is viewed as shifting consumer tastes (see for example the somewhat controversial paper by Dixit and Norman, 1978, and the comments thereon in later issues of the Bell Journal). Dixit and Norman (1978) take an agnostic view of how advertising works, but they take as a primitive that it shifts demand. The problem then for the practitioner of welfare economics is which demand curve to take as the true one. Dixit and Norman argue that over-advertising is the norm in both cases, whether one takes the pre-advertising demand or the post-advertising demand as the "true" one. However, explaining why demand shifted frequently leads us back to the complementary goods story or the informative advertising one described in more detail below.

Informative advertising works by telling consumers something about the product that then makes them more likely to buy, or to buy at a higher price. Informative advertising can be further split into that which indirectly informs consumers, and that which directly communicates product characteristics, quality, or price. Indirect information is communicated in signalling models (such as Milgrom and Roberts, 1986) in which advertising allows consumers to infer high quality in an adverse selection context.[32]

Directly informative advertising has been the topic of many studies. A major result in this context is due to Butters (1977), who finds that the market provides the socially optimal amount of advertising. His model was extended by Stegeman (1991), who suggests that the market tends to err towards under-advertising. An important contribution by Grossman and Shapiro (1984) introduces product differentiation via a circle model (as in Vickrey, 1964, and Salop, 1979). This formulation was used by Dukes (2004) in the broadcasting context.

Another view is associated with the Chicago School (see for example

[32] The view of advertising as a signal of product quality goes back to Nelson and to Klein and Leffler. A more formal treatment was undertaken by Milgrom and Roberts (1986), and several subsequent papers have extended this line of enquiry. The basic view is that advertising communicates quality by the firm "putting its money where its mouth is." A low quality producer would not conspicuously spend large sums of money in promoting a product that no consumer would ever buy again. Thus reassured, consumers buy the product knowing that it is of high quality and they will repeat their purchases. The firm recoups its advertising expenses on the profits from the repeat purchases, and the advertising, which equivalently is public "money-burning," serves an indirectly informative role, though no direct information about the product is actually transmitted in the advertisement.

Stigler and Becker, 1977, and Becker and Murphy, 1993), and holds that advertising can provide a complementary good to the physical product. Advertising can be seen as enhancing the perceived product quality, for example by fostering a brand image that consumers appreciate being associated with. Stigler and Becker (1977) argue first that "persuasive" advertising can be addressed within economic models, and, further that the level of advertising is socially optimal.

Depending on which view one takes, the conclusions below as regards the optimality of industry performance need to be tempered. For example, if there is over-advertising on broadcasts in the benchmark model, and it is believed that advertising levels are themselves excessive (so that the private benefit overstates the social benefit), then a fortiori advertising is excessive. Matters become more delicate when the conclusions from the separate parts run in opposite directions.

3.3 Platforms

The platforms are the TV stations that intermediate between the advertisers and the viewers. They are, of course, crucial to the two-sided market because they coordinate and balance the two sides on the platform. By bundling entertainment with the ads, they sweeten the delivery of the message in order to get it across.

The platforms that are covered by the current analysis are broadcasters (television and radio), publishers (newspapers and magazines), and web portals. Each follows the basic business model of delivering prospective customers to advertisers by attracting the viewership/listenership, readership, or web-surfer with news or entertainment content that carries a set of messages, superfluous (and possibly annoying) to the person enjoying the content. The relative size of the costs and benefits to agents who participate on the platform differs across applications. With television and radio, the advertisements break into the content and supplant it. In newspapers and magazines, the reader can easily bypass the ads so that the nuisance cost per se is likely negligible. While the overall modeling framework applies to various different markets, parameter values will differ across market applications.

The next Table gives a time series of rates for prime-time network TV.

INSERT TABLE 8 Costs of reaching viewers by network television. US

These rates are somewhat lower than the spot television rates, which are given in the next Table.

INSERT TABLE 9 Costs of reaching viewers by spot television. US

For comparison, magazine rates and newspaper rates are given below in Section 7.

In what follows we look at several variants of the model. We first consider a short run analysis in which the number of platforms is fixed. In the long-run, the number of platforms is determined by a free entry condition. We shall also first take the product locations as fixed, then look at them as being endogenously determined.

4 Equilibrium

We now find the equilibrium for the model, starting with a short-run analysis (a fixed number of firms) and then moving to a zero-profit (free entry and exit) equilibrium. In the next sub-section, we consider the case when advertising is the only revenue source. We then look at subscription pricing alone, and finally at pricing and advertising together. The model below encompasses many of those used in the literature as special cases, and we derive the equilibrium values for these special cases for comparison purposes. The particular models include the duopoly at the ends of a Hotelling line with linear transport costs (Anderson and Coate, 2004); the quadratic transport cost version (Gabszewicz, Laussel, and Sonnac, 2002); and the Vickrey-Salop circle model with linear transport costs (Choi, 2003; Crampes, Haritchabalet, and Jullien, 2004).

4.1 Short-run Equilibrium with Advertising

Suppose that there are n platforms and let K be the fixed cost in setting up a platform. Given the revenue per consumer, $R(a_i)$, the profit to broadcaster i is

$$\pi_i = R(a_i) N_i(f_i, f_{-i}) - K \tag{3}$$

where we recall that $f_i = s_i + \gamma a_i$ denotes the full price of broadcaster i; f_{-i} denotes the vector of full prices of all broadcasters other than i, and the viewership functions $N_i(.)$ are determined from the particular viewer model assumed (i.e., the specification of (2)). We go into more detail on this below (and give derivations in the Appendix), but for the moment write the own viewership derivative with respect to full price as $N_i' < 0$ (i.e., $\partial N_i(f_i, f_{-i}) / \partial f_i$). Then, suppressing arguments, we have, for an interior solution:

$$R'(a_i) N_i + R(a_i) \gamma N_i' = 0, \tag{4}$$

or, in elasticity form:

$$\frac{R'(a_i)}{R(a_i)} a_i + \frac{\gamma N_i'}{N_i} a_i = 0.$$

As long as R is log-concave, R'/R is a decreasing function. Likewise, as long as the viewership demand function is well behaved in the sense that N_i is log-concave, then N_i'/N_i is a decreasing function. These conditions suffice to ensure a unique solution for ad levels. In the case of a symmetric demand model, the equilibrium is symmetric. Supposing that there is a unit mass of consumers, the equilibrium viewership is $N_i = 1/n$. Denoting the common value of the viewership derivative (with respect to full price) by N' (i.e., $\partial N_i(f, f) / \partial f_i$), the equilibrium ad level, a^*, is defined implicitly from (4) as

$$\frac{R'(a^*)}{R(a^*)} + \gamma n N' = 0. \tag{5}$$

In the Appendix we derive some common solutions for the viewer demand switch-over rate, N'.

It is useful to point out the case of $\gamma = 0$, meaning that viewers and readers are neutral about ads. In that case, due to product differentiation, each media firm will have its own market share, and is the exclusive channel for reaching the corresponding prospective consumers. Each channel will then price ads at the point where the marginal revenue from ads is zero (which is the marginal cost to the firm of airing an ad, and corresponds to the point of unit elasticity of the ad demand function.)

If $\gamma > 0$, then viewers or readers find ads to be a nuisance. Advertising levels are then lower than if ads are not a nuisance. The reason is that competition is in nuisance levels, and firms strive to reduce the nuisance (all the while recognizing that the "nuisance" is the source of their income). It therefore makes sense that more competition (higher n) results in lower equilibrium nuisance, just as more competition typically leads to lower prices (also a nuisance!) in standard models of product differentiation. These conclusions are borne out in the Appendix for some standard formulations of viewer choice. This interpretation in terms of competition for nuisance is important because one might usually expect the total "output" (ad level, by analogy) to be higher when there are more firms.[33] Along with a lower level of ads the more firms there are, the approach concurrently predicts that the price per ad per viewer should be higher (with fewer firms advertising, the demand price is higher). Empirical evidence presented in Brown and Alexander (2004) gives the opposite relation, and so disagrees with the set-up above, but is consistent with the representative consumer model presented in Cunningham and Alexander (2004). More work is needed here to evaluate the hypotheses of the alternative approaches.

If $\gamma < 0$, then viewers or readers actually appreciate ads. While this does not seem relevant for the case of television or radio for the majority of people (since ads then necessarily displace entertainment content that presumably drew the individual in the first place to watch or listen), with magazines or newspapers there is no such presumption. The value of γ then represents the expected (net) surplus per ad seen by the reader. If this is negative, there is a desire for ads (ad-lovers), and the intermediary (television or radio broadcaster, newspaper or magazine publisher, web-master) must take this into account when determining how many ads to run. Now, more ads will actually attract more readers or viewers, but running more ads will also bring the broadcaster or publisher into the region where marginal revenue is negative. It follows from this logic, and from the equations presented previously, that now ad levels rise with the number of firms. This at least might sound more intuitive - "output" is larger with more firms and each has less market power to keep down the advertising level and so keep up the advertising price. Then the competition among firms is not in nuisance but rather in the attractivity that is afforded by carrying many (desirable) ads.

Dukes (2004) emphasizes strategic interaction among advertisers. He models the product market with a circle framework using the oligopoly informative advertising model of Grossman and Shapiro (1984), and so allows for an explicit business stealing effect (at the cost of assuming that one industry supports the medium). The media are modeled with the circle framework, as above. He shows that less product differentiation or more media differentiation lead to a higher market level of advertising.[34] His result that there are

[33]Indeed, though, the ad level per firm is lower. These properties vis-a-vis the workhorse Cournot model were first brought out by Masson, Mudambi, and Reynolds (1990).

[34]Anderson and Coate (2005) get the latter result, but cannot treat the former in their ad specification. Dukes (2001) assumes instead that advertising is not informative but is

more ads per station when products are closer substitutes contrasts with the standard Grossman and Shapiro (1984) finding, and underscores the importance of jointly considering the advertising and product markets. In the other direction, Dukes and Gal-Or (2003), Gal-Or and Dukes (2003) and Gal-Or and Dukes (2006) show that several features of the media industry may be explained by the joint incentive of both media and advertisers to limit the extent of advertising in order to limit competitive product information from consumers.[35][36]

4.2 Short-run Equilibrium with Pricing

At this point it is worthwhile deriving several results that are quite standard to the economics of product differentiation regarding the pricing of differentiated commodities. These results are useful both in their own right for describing the properties of equilibrium when there is no advertising, and as an ingredient for the analysis of the next sub-section, which treats subscription prices along with advertising.

So consider now a broadcaster's (or a newspaper's, or a magazine's) profit if it uses only subscription prices. Assuming zero marginal cost for reaching viewers or readers,[37] its profit is

used to differentiate a product from competing products. As usual, lower levels of media market competition lead to more advertising. However, here more advertising leads to higher surpluses in product markets since more advertising leads to more product market differentiation.

[35]These results stem from the fact that informative advertising is a competitive externality for competing producers (see Grossman and Shapiro, 1984). Then competing producers supply too much advertising relative to the joint profit maximization. Competitive conditions in the commercial media industry determine the extent of this externality.

[36]Dukes and Gal-Or (2003) modify the Dukes (2004) model to investigate the incentives for broadcasters to sign exclusive contracts with advertisers, whereby competing advertisers are excluded from advertising. While such exclusion unambiguously benefits an advertiser, certain conditions must be satisfied before a broadcaster will offer such a contract. Exclusive contracts are offered when media have sufficient power in the market for advertising vis-à-vis advertisers since they are able to capture rents from consumers who are excluded from informative advertising. Exclusive contracts are more likely to occur when media markets are less differentiated or when consumers are unlikely to be informed about products in the absence of advertising.

[37]Positive marginal costs are addressed below, and are given a separate development because of their importance in the analysis of pricing and ad level choice which follows.

$$\pi_i = s_i N_i - K,$$

and so the price equation (the pricing first-order condition) is

$$N_i + s_i N_i' = 0,$$

which has a similar form to the advertising equation (4) above.[38]

Now, under demand symmetry, $N_i = 1/n$, and this pricing equation reduces to a simple form

$$s = \frac{-1}{nN'}$$

where again the notation N' denotes that the viewer share derivative is taken at a symmetric solution (recall that this is negative, and so the subscription price is positive!) The values of N' for the commonly used models of product differentiation are given in the Appendix, and hence the solutions for the symmetric subscription price are readily derived.

It is useful for the analysis of the next sub-section to now present an intermediate result, dealing with the case when the subscription revenue received by the broadcaster or publisher is augmented by a fixed sum per viewer (or listener, as the case may be) of $\bar{R}$. This could arise if there is a step demand for ads per viewer, but we shall see below that it belies a more general principle.

The broadcaster's (publisher's) profit then is

$$\pi_i = \left(\bar{R} + s_i\right) N_i - K,$$

and, following the same steps as above, the price equation under demand symmetry reduces to a simple form

$$\bar{R} + s = \frac{-1}{nN'}.$$

We can now re-introduce this into the profit function to give the equilibrium value of profits as

$$\pi^* = \frac{-1}{n^2 N'} - K.$$

The key property here is that this profit level is independent of $\bar{R}$. This is because whatever extra rents may be attached to the consumer are competed

[38] Equivalently, the elasticity of the own viewer demand is -1.

away at the equilibrium pricing decision. We term this result the revenue-neutrality property.[39] The revenue-neutrality result arises because markets are fully covered (all consumers watch/buy a magazine) and because each reader/viewer buys one magazine or TV channel each. Note from the form of the profit function that $\bar{R}$ enters just like a (negative) average cost per unit would. In this light, it is unsurprising that average cost levels in such models do not affect equilibrium profit levels. The pricing equation simply determines mark-ups, which are the revenues earned per reader or viewer delivered. We return below to the wider impact of the revenue-neutrality property.

4.3 Short-run Equilibrium with Pricing and Advertising

We now allow the platforms to price along with their ad levels. When both price and advertising are positive, the value of advertising, a_p, solves[40]

$$R'(a_p) = \gamma.$$

It is noteworthy that this result is independent of market structure. The intuition behind the result is that it parlays nuisance costs into ad revenues. Indeed, suppose that γ were above $R'(a)$. Then a could be reduced by a small amount, da, while s could be raised by a small amount γda so that the full price to consumers is constant. Ad revenues would go down by $R'(a)\,da$, but by supposition this is less than the rise in subscription revenues (γda).

Given that a_p is determined by $a_p = R'^{-1}(\gamma)$, we can substitute this relation into the profit function and write it as

$$\pi_i = (R(a_p) + s_i)\, N_i - K,$$

[39] This result that has been noted previously by several authors, including Armstrong (2004) and Anderson and Coate (2005). Wright (2003a) gets it in the context of mobile phone telephony.

[40] The idea behind this result can be seen by thinking of the broadcaster as maximizing revenues per viewer for a given level of full cost per viewer. That is, recalling the full cost is $s + \gamma a$, a broadcaster that maximizes the revenue per viewer, $R(a) + s$, subject to this constraint, will optimally choose to set $R'(a) = \gamma$. If negative pricing is not permissible or feasible, then the price is zero (there is no subscription fee even if one is feasible), and the ad level is determined by the market interaction over ad levels alone, as per the analysis of the preceding sections.

and think of the broadcasters choosing just the subscription levels (or indeed, the full prices), since $R(a_p)$ is tied down by the above relations.[41] This though means that the revenue $R(a_p)$ plays just the same role as the fixed revenue $\bar{R}$ in the analysis of the previous sub-section. The implication is then from the revenue-neutrality property that short-run profits are independent of the strength of advertising demand as long as $s > 0$ (so that $R'(a_p) = \gamma$). They are also independent of γ. Note lastly that ad levels are independent of the number of firms.

We have now to determine when subscription pricing will be used in equilibrium. As we argued above, a broadcaster will monetize the nuisance if $R'(a) < \gamma$. Conversely then, we can say that a broadcaster will not monetize any nuisance if $R'(a) > \gamma$. Most importantly, if the equilibrium without subscription pricing involves $a^* = R'^{-1}(\gamma) < a_p$, then introducing the ability to price will not have any effect and the equilibrium will be as in the first sub-section above. That is, pricing will not be used, and the equilibrium will remain a free-to-air commercial television, free newspapers or web-sites, etc., if $a^* < a_p$. If though $a^* > a_p$, the equilibrium when pricing is feasible will have positive subscription prices and the equilibrium level of advertising a_p. Pricing has important distributional effects. First, profits rise. This can be seen from comparing profit levels with and without it. With pricing, profits are $\pi_p^* = \frac{-1}{n^2 N'} - K$. Without pricing, they are $\pi_a^* = \frac{R(a^*)}{n} - K$, with a^* determined from $\frac{R'(a^*)}{R(a^*)} = -n\gamma N'$. Hence $\pi_p^* > \pi_a^*$ as $\frac{-1}{nN'} > R(a^*)$. Since $R'(a^*) < \gamma$ in order for pricing to be used, then profits are higher when pricing is chosen in equilibrium.[42] Advertisers lose out because the ad level is lower, and so they lose some surplus. Viewers lose out because the full price (the sum of the advertising nuisance plus subscription price) rises.

The strong conclusion above is that the properties of the market equilibrium are just the same as the subscription-price-only model when prices are positive. They therefore depend only on the product differentiation specification used to describe the consumer preferences in the market.[43] It is

[41] See Anderson and Coate (2005) for more details on equilibria with ads and pricing.

[42] It is obvious that the ability to price raises profits for a monopoly, but it is not a priori clear that this is so for oligopoly since competition might be expected to be more severe once firms compete in more dimensions.

[43] Peitz and Valletti (2005) consider a two-stage duopoly game in which location along the unit Hotelling line is chosen first, then broadcasters compete for viewers. Otherwise the set-up is the same as in Anderson and Coate (2005), so that one contribution can be seen as endogenizing locations. Peitz and Valletti (2005) consider two symmetric games; one

important to reiterate that these properties stem from full market coverage, unit demand per consumer, and also that parameter values ensure the equilibrium is in the regime with positive subscription prices along with advertising.[44] The influence of the latter condition may be rather subtle. As we shall see below, the equilibrium product selection may change drastically as parameters change, and the reason revolves around this condition.

4.4 Long-run equilibrium (free entry)

The long-run equilibrium we consider involves zero profits for all firms.[45] The corresponding numbers of firms are determined from setting the profit

without subscription pricing, and the other one with subscription pricing. Their objective is to analyze the welfare properties of these two formulations. With subscription pricing, the location game involves extreme differentiation. Under free-to-air broadcasting, there is always some provision of ads (unless platforms are located at the very same point, which does not happen at equilibrium). As expected, ads decrease with nuisance, and increase with transportation costs (at a given location). Candidate location equilibria go monotonically from minimal differentiation (when nuisance is zero or transportation cost is infinity) to maximal (when nuisance is high enough or transportation cost is low enough). For given locations, welfare is only affected by ads. As expected from the Anderson-Coate (2005) analysis, pay-tv is better than free-to-air when nuisance is high (since free-to-air overprovides), or when locations are sufficiently close (under such duplication, both systems underprovide, but more so with free-to-air since competition escalates in providing few ads that cannot be compensated by pricing). Finally, for endogenous content provision, Pay-tv is better with high nuisance costs: both systems provide extremely differentiated content, but pay-tv offers efficient ad levels, while free-to-air overprovides. When the nuisance parameter is very small: free-to-air almost minimally differentiates content, and pay-tv maximally differentiates (but these have same welfare losses), so free-to-air is worse because it severely underprovides ads given locations are almost at the centre. Similar effects arise with respect to transportation costs.

[44] It is possible that advertising is chosen to be zero, which will happen if $R'(0) \leq \gamma$, meaning that the marginal revenue from the advertising sector starts out no higher than the nuisance cost. Then advertising is so annoying that broadcasters would price it out of the market. Note then that the optimal level of ads is also zero in this case.

[45] Spectrum constraints limit the number of broadcasters in many markets. Even if there are no such constraints (as with newspapers and magazines) the number of firms should be an integer, so the equilibrium number is the largest number making non-negative profits (implicitly assuming profits per firm decline with firm numbers), while the optimum number is not so constrained with a floor. The integer problem is ignored below, although explicitly considered in Anderson and Coate (2005), albeit for at most two firms. We also do not consider here the possibility of equilibria with entry deterrence: see Eaton and Wooders (1985) and Anderson and Engers (2001) for a description of such possibilities.

expressions in the sub-sections above equal to zero. This is straightforward for the most part, but the effects of allowing pricing (as compared to the advertising-only equilibrium) does bear comment.

As noted above, when pricing is actually used along with advertising, short-run profits are independent of the strength of advertising and the nuisance to consumers. This turn means that the long-run (zero-profit) configuration of firms is independent of these variables, and indeed is just the same as when there is no advertising or only subscription prices are chosen. As compared to the equilibrium with advertising only, if then pricing is rendered feasible, the long-run equilibrium number of broadcasters will be greater because of the higher profits associated with the ability to price.

5 Welfare analysis

Suppose that parameters ensure that all markets are served.[46] Then the *optimum* advertising level, a_o, has the marginal social cost, $\gamma \geq 0$, equal to the marginal social benefit, which is the advertising demand price. Thus it solves

$$p\left(a_o\right) = \gamma$$

It is therefore immediately clear that the advertising level with pricing is below what is optimal. The marginal revenue curve that determines the equilibrium level is below the demand curve that determines the optimal level.

Without pricing though, either relation is possible, as the following discussion makes clear. For low γ, virtually all the advertisers ought to be communicating with the viewers. The equilibrium has the ad level provided by each broadcaster bounded above by the level $R'^{-1}(0)$, where marginal revenue is zero. This is effectively the "competitive bottleneck" property (see Armstrong, 2004) that each broadcaster has a monopoly in delivering its viewers and so prices access to those viewers monopolistically.[47] This is

[46]Unserved markets are addressed in Anderson and Coate (2005).

[47]This monopoly position is due to the assumption in the models described that viewers are single-homing (choosing just one channel to watch). While it is true that at any given time a viewer may only watch one program, there still may be competition in delivering viewers in a multi-period context when viewers switch channels. Anderson and Coate (2005) provide a preliminary analysis of two-period competition with broadcasters, while Armstrong (2004) analyzes (simultaneous) readership of multiple magazines along the lines

a feature of two-sided markets when one side single-homes. At the other extreme, if $\gamma \geq p(0)$, the optimum has no advertising because the nuisance cost exceeds the demand price (social benefit) of all ads. The equilibrium though always has advertising, because ads are the only source of revenue for broadcasters.

We now look at the entry dimension of performance. We continue to suppose that subscription pricing is infeasible (or indeed that it is not used in equilibrium). It is insightful to suppose that $\gamma = 0$ and retain the assumptions of fully covered markets and unit demands by consumers. Then there is a total disconnect between the equilibrium and the optimum. The optimum has the number of firms as described in the previous section, which depends on the product differentiation parameters. It also has a level of advertising determined by $p(a) = 0$: given that viewers and readers are not disturbed at all, the social optimum should have all advertisers with positive demand price communicate with the prospective buyers of their products. On the other hand, if $\gamma = 0$, there is no conduit for competition between firms. Each will choose the level of ads such that $R'(a) = 0$, and so maximizes the revenue per reader or viewer delivered. Advertisers (leastwise, those with demand prices for ads above $p(R'^{-1}(0))$) choose to advertise on all channels so the number of prospective buyers reached is independent of the number of broadcasters in the market. What this means is then that the total revenue, $R(a^*)$, is a "prize" that is fully dissipated by the n broadcasters entering the market. The equilibrium number of broadcasters is then $R(a^*)/K$. Hence, for example, doubling the number of advertisers (at each level of willingness to pay), will double the number of firms in the market at equilibrium. But the optimal number will remain unchanged.

In summary, the advertising level when $\gamma = 0$ is too small at the equilibrium and advertising revenue is a pure rent split by the number of firms. Hence there are too few ads and the number of firms may bear no relation to the optimal number. A weak ad demand will mean the market cannot be served; a strong one will be massively over-served. Anderson and Coate (2005) already note that if there is little ad demand, then the free market cannot provide much programming. This is clear in a system that needs ad revenues to survive. On the other hand, the market may over-provide too. For example, Anderson and Coate (2005) show the market may be served by two firms when it is optimal to only have one. This possibility of over-entry

of Caillaud and Jullien (2003).

clearly extends to circle model with free entry, as is borne out by results in Choi (2003). It is also apparent for the explicit advertising model with business stealing as used by Dukes (2004). Indeed, parallel to the finding in Anderson and Coate (2005), Dukes finds that advertising is above the optimal level when media differentiation (measured by τ) is high enough.

Consider briefly the case when ad demand is perfectly elastic with demand price β per advertiser per viewer reached. Then ads are formally like standard prices in product differentiation models. At the optimum, though, we should have no ads shown if $\gamma > \beta$. Conversely, if $\gamma < \beta$, all advertisers should be allowed to advertise. The equilibrium number of ads varies continuously with γ though.

Finally, we return to the case when pricing is feasible along with advertising. Then, as shown in the short-run analysis, ad levels are independent of firm numbers. Ad levels are insufficient, because the optimum under covered markets sets $p(a) = \gamma$.[48] The number of firms in the market is the same as in the model when only prices can be used, and we know that the number of firms is typically too large in models of product differentiation, and these conclusions transfer directly. These conclusions differ quite drastically from those of the equilibrium without pricing (i.e., advertising only). It is worth recalling though our earlier caveat that we have assumed that each viewer watches one program, and that parameters ensure the equilibrium is in the region with fully served markets.

6 Product selection: choosing program type

We now address the issue of "breadth" provided by the market, by which we mean the horizontal differentiation between products selected. To ease readability, we develop the model from the beginning to make this section free-standing. Given the motivating example is newspapers, we refer throughout to papers and readers.

Suppose then that there are two newspapers. Each produces at unit cost $c \geq 0$, and each sells advertising space to advertisers. The newspapers are sold at prices s_i, $i = 1, 2$, to readers. Each reader buys only one paper ("single-homing"). Readers' political opinions range from the extreme left to the extreme right. This taste diversity is represented by the unit interval $[0, 1]$. In standard fashion, the further the newspaper's stance from the

[48] Anderson and Coate (2005) deal with uncovered markets.

reader's ideal point, the higher the disutility of the reader. Following Gabszewicz et al. (2002), we suppose that this disutility is $t\,(x-x_i)^2 + s_i$ for a reader of type x buying a newspaper offering opinion x_i (see (2)).

Let x_1 and x_2 denote the locations of the papers. The demand functions N_1 and N_2 for the newspapers are then easily derived as

$N_1(s_1, s_2) = \frac{x_1+x_2}{2} + \frac{s_2-s_1}{2t(x_2-x_1)}$

and

$N_2(s_1, s_2) = \frac{2-x_1-x_2}{2} + \frac{s_1-s_2}{2t(x_2-x_1)}$.

The corresponding editorial revenues are then $\pi_i = (s_i - c)\,N_i(s_1, s_2)$, $i = 1, 2$.

This model of the press industry is the standard Hotelling location model with quadratic transportation costs, and for this problem we know that firms always locate at the two extremes of the unit interval at the unique sub-game perfect equilibrium of the game in which firms select price and location (see d'Aspremont and al. (1979)). Thus, in the absence of advertising revenues, the media's ideological messages reflect maximal political diversity at equilibrium.

We now introduce the second source for financing daily press, revenue accruing from advertising. Of course, if advertising rates and volumes are assumed to be fixed and independent of the number of readers, the above conclusion still holds and advertising revenues simply add to revenues. However, the larger the readership, the more attractive should be the newspaper to advertisers, and the more they are willing to pay for exposure to a larger block of readers. For simplicity, we suppose that the demand for advertising per reader reached is perfectly elastic, and let the demand price (per advertiser per viewer) be β.

Then profits accruing to paper i from newspapers' sales to the readership and advertising space to the advertisers now amount to

$$\pi_i = (s_i - c)\,N_i(s_1, s_2) + \beta N_i(s_1, s_2) \qquad i = 1, 2.$$

Substituting from the reader demand functions above, we get

$$\pi_1(s_1, s_2) = (s_1 + \beta - c)\left(\frac{x_1 + x_2}{2} + \frac{s_2 - s_1}{2t\,(x_2 - x_1)}\right)$$

and

$$\pi_2(s_1, s_2) = (s_2 + \beta - c)\left(\frac{2 - x_1 - x_2}{2} + \frac{s_1 - s_2}{2t\,(x_2 - x_1)}\right).$$

These revenue expressions are just the same as those obtained by the firms in a spatial competition model with quadratic transportation costs, when a constant unit subsidy equal to $\beta - c$ is added to the newspaper's price. This subsidy is equal to the difference between the unit receipt originating from advertising sales and the unit production cost of each copy of the newspaper. We may now identify the sub-game perfect equilibrium of the sequential game in which editors select, in the first stage, their political images x_1 and x_2 (opinion game) and in the second stage, their newspapers' prices s_1 and s_2 (price game). In the price game, payoffs are given by the equations above. However, prices are constrained to be non-negative. When the price game has an interior solution with positive prices[49], these are given by

$$s_1^* = c - \beta + t\,(x_2 - x_1)\left(\frac{2 + x_1 + x_2}{3}\right)$$

and

$$s_2^* = c - \beta + t\,(x_2 - x_1)\left(\frac{4 - x_1 - x_2}{3}\right).$$

Substituting these sub-game equilibrium values of the price game back into the profit functions enables us to now solve for the equilibrium to the papers' location game. This yields the conclusion that the equilibrium outcome depends crucially on the size of t and β (see Gabszewicz et al., 2002, for full details). Indeed, when political preferences are strong (t "large") and/or when advertising receipts are weak (β "small"), the opinion game has a unique equilibrium with maximal political diversity. This is much as the game in pure subscriptions, which might be expected with weak advertising demand.

However, with weak political preferences and/or significant advertising receipts, the opinion game has a unique equilibrium with *minimal* political diversity.[50] Thus, when papers seek advertising revenue, there are considerable consequences on the equilibrium of the opinion game: the tendency

[49] This assumption simplifies the presentation of the results here. It is not true though that the price game always has an interior solution. The values for prices given in the text can become negative, for instance when β is large compared with c, in which case the subscription price must be equal to zero. See Gabszewicz et al. (2002) for more details.

[50] There is also an overlap region where both are equilibria. Gal-Or and Dukes (2003a) offer an additional explanation for duplication. By offering similar programming (i.e. duplicating) media induce stiffer competition for viewers, thus coordinating on lower levels of advertising and thereby raising advertisers' surpluses in product markets.

to offer readers maximal political diversity is fully reversed when political preferences are weak and/or advertising receipts are sufficiently important[51]. This conclusion reveals that the dependence of advertising rates on the readership's size may well induce editors to influence the political content they display to their readership so as to develop higher advertising resources.

The welfare economics of the above model are quite straightforward. The social optimum locations are at the quartiles.[52] The equilibrium though involves either minimum differentiation, or maximum differentiation.[53] These locations are equally bad from the social perspective. Recall that if the subscription prices are allowed to be negative, the only equilibrium is maximal differentiation. Negative prices could be reflected in giveaways like free gifts, although in that case one might expect readers could pick up several copies of free papers along with free gifts, so rendering such negative prices infeasible.[54] In practice, even though there do exist newspapers that are given away free, one might expect the non-negativity constraint to be reflected in a small nominal price to obviate outright wastage.

The equilibrium determined above was derived from two specific assumptions on nuisance costs (they are zero) and advertising revenues (they are constant per viewer). We might though expect somewhat similar results with positive nuisance costs and a revenue function that exhibits decreasing average returns per ad per viewer. Indeed, as long as the subscription price is positive, newspapers carry the ad level that satisfies $R'(a) = \gamma$, and so profits are independent of the ad revenue and competition is effectively competition in subscription prices alone, as we have seen above. Such competition leads to maximal differentiation. However, when locations are "too close," the

[51]The price floor (non-negative price) is crucial to this result. Without it, equilibrium prices can take on negative values, dissipating advertising revenues to the benefit of readers and maximum differentiation would continue to prevail. With a price floor, the editors can, beyond some point, choose a political position closer to their competitor's, without further exacerbating competition.

[52]These locations minimize the average distance travelled. Each location is at the midpoint of the market it serves, and market sizes are equal.

[53]The maximum differentiation result is rather an artefact of the assumption that firms must locate in the unit interval. If locations are unrestricted, they choose to locate at $\left(\frac{-1}{4}, \frac{5}{4}\right)$, which locations are outside the unit interval, although not as far apart as they could possibly go. These locations are more extreme than the tastes of any reader, and are socially less desirable than minimum differentiation.

[54]The "free gift" could be interpreted as the comics pages, so individuals only want one copy.

subscription price is capped at zero. Then the equilibrium is in ads alone. This consideration leads us to briefly consider the case of competition in ads alone.

Suppose then that $R(a) = \beta a$, so that the ad demand is the same as above, yet now with $\gamma > 0$. Then the result is maximal differentiation because the ad competition model is formally equivalent to the pure subscription price one.[55] This means that there is a discontinuity in behavior between the cases of $\gamma = 0$ (minimum differentiation) and $\gamma > 0$ (maximal differentiation).

Suppose now that $R'(a)$ is strictly concave. Note first that if $\gamma = 0$, both papers carry the ad level such that $R'(a) = 0$, and papers just strive to maximize the number of readers. Then they minimally differentiate. The analysis is quite complex if $\gamma > 0$. Preliminary results suggest that the equilibrium locations may get arbitrarily close to minimal differentiation. However, verifying that the second order conditions hold for the first stage (location) game remains elusive.

An overall evaluation of the state of the art on location competition as applied to the economics of media industries is as follows. The standard specification of quadratic disutility costs and price-only competition leads to maximal differentiation. This result constrains welfare analysis because it predicts that locations are always excessively far apart, contradicting casual empiricism and flexibility of the solution. Allowing for advertising competition offers the tantalizing proposition that locations could vary between maximal and minimal differentiation (according to parameters), and so the solution is not a priori constrained by excessive diversity. However, actually proving that the candidate equilibrium is the solution to the problem is a difficult mathematical problem.

7 Press concentration and advertising

Specialists in media economics have often viewed the advertising market as responsible for *concentration* in the press industry. This is backed up with empirical work that relates advertising rates to the circulation of newspapers[56]. Earlier theoretical contributions that ascribe the growth of concen-

[55]To see this, note that the ad competition profit function is $\pi_i = \beta a_i N_i(.)$ and the profit function under price competition is $\pi_i = s_i N_i(.)$. The argument of the readership function in both cases is the full price, so the two problems give the same solutions.

[56]See Dertouzos and Trautman (1990), Reimer (1992) and Kaitatzi-Whitlock (1996).

tration within the press industry to the interaction between advertising and newspapers' markets are due to Furhoff (1973), Gustafsson (1978), and Engwall (1981). We now understand these interactions as those of a two-sided market. The market for printed media is a particularly significant example of this phenomenon. Newspapers sell some space to advertisers and the larger the demand for advertising, the higher the share of advertising revenues in their total profits. On the other side of the market, readers' attitudes toward printed media advertising are quite ambiguous. Although it seems generally accepted that TV-viewers dislike advertising (see, Brown and Rothschild, 1993, and Danaher, 1995), it seems that readers of printed media have mixed views, and some have a positive perception of press advertising while others are negative[57]. If we take this at face value, then the utility of the readers is related to the size of advertising demand, positively for some and negatively for others. This means there are different types of network effects at play between the printed media and the advertising markets for the readership too. Indeed, some think that advertising could foster the circulation of newspapers (see Blair and Romano, 1993, Gustafsson, 1978, and Rosse, 1980). Others believe that it slows it down (see Musnick, 1999, and Sonnac, 2000).

Some statistics on advertising costs through reaching readers by magazine ads and by newspapers are given in the next Table.

INSERT TABLE 10 Costs of reaching viewers by magazine and by newspaper, US.

We now analyze the interaction between the newsprint media and advertising industries when there are readers of both stripes. Let there be two editors producing differentiated newspapers or magazines (for instance, news-magazines proposing different political opinions) that take the extreme positions on a unit segment. Readers' tastes are distributed uniformly on $[0,1]$. Newspaper 1 is located on this spectrum at point 0, while newspaper 2 is located at point 1. Editors also sell some proportion of their newspaper's surface to advertisers who buy it to promote the sales of their products. At each point x of the unit interval $[0,1]$, a fraction λ of readers are *advertising-avoiders* and a proportion $1-\lambda$ are *advertising-lovers*. The advertising-avoiders lose utility when there are more ads in the paper, while

[57] In a recent opinion poll, 37 % of French readers claimed to be ad-averse (*Le Monde,* November, 9, 2002).

the advertising-lovers gain. More precisely, suppose editor i quotes a price s_i for the newspaper and sells a proportion a_i of it to advertisers. For an advertising-avoiding reader located at x, the total loss in utility when buying newspaper 1 (at 0) is

$$x^2 + \gamma a_1 + s_1, \quad \gamma > 0,$$

while the total loss in utility when buying newspaper 2 (at 1) is $(1-x)^2 + \gamma a_2 + s_2$. Similarly, for one of the $1-\lambda$ advertising-loving readers at x, the total loss in utility when buying newspaper 0 is

$$x^2 - \gamma a_1 + s_1, \quad \gamma > 0$$

and the total loss in utility when buying newspaper 2 is $(1-x)^2 - \gamma a_2 + s_2$. Note that, for simplicity, it is assumed that the ad-loving propensity on one side is exactly equal to the ad-avoiding cost on the other side.

Define $\tilde{k} = \gamma(2\lambda - 1)$ (so that the case of all ad avoiders corresponds to $\tilde{k} = \gamma$). The reader demand function for newspaper i , $i = 1, 2$, is then

$$\begin{aligned} D_i(s_1, s_2, a_1, a_2) &= 0 \qquad \text{for } s_i \geq 1 + s_j + \tilde{k}(a_j - a_i); \\ D_i(s_1, s_2, a_1, a_2) &= 1 \qquad \text{for } s_j + \tilde{k}(a_j - a_i) - 1 \geq s_i \geq 0; \\ D_i(s_1, s_2, a_1, a_2) &= \frac{1}{2}\left(1 + (s_j - s_i) + \tilde{k}(a_j - a_i)\right) \qquad \text{otherwise.} \end{aligned}$$

The difference $(a_i - a_j)$ between the advertising volumes in the papers plays a crucial role in the demands for the newspapers. At equal prices, the paper with the more advertising benefits from a larger readership if and only if there is an ad-loving majority in the reader population ($\lambda < \frac{1}{2}$).

Total revenues also include advertising revenues from sales of advertising space. We now develop a model of the advertising market to derive the demand for advertising space as a function of the advertising rates charged by the editors in this market. Let q_i denote the unit price of an ad charged to advertisers by paper i, $i = 1, 2$. Advertisers are ranked in the unit interval $[0, 1]$ by increasing willingness to pay for an ad. Assume that each advertiser θ, $\theta \in [0, 1]$, buys an ad in only one of the two newspapers, at the exclusion of the other (thus we assume single-homing for advertisers). Assume that advertiser θ's benefit from inserting an ad in newspaper i at a rate q_i is $D_i\theta - q_i$, where D_i is the readership of paper i as given above. Since $\theta \in [0, 1]$, the advertising market is never covered.[58] This representation of the advertising

[58] The case of a covered market is treated in Gabszewicz et al. (2004).

market sets it up as a vertically differentiated industry (Gabszewicz and Thisse, 1979); here, the "high quality" product firm is the newspaper with the larger readership.

Consequently, if a_i advertisers buy their ads in newspaper i, paper i's total profit π_i is

$$\pi_i(s_1, s_2, q_1, q_2) = s_i D_i(s_1, s_2, a_1, a_2) + q_i a_{i.}, \quad i = 1, 2. \tag{6}$$

We consider a two-stage game played between the papers. At the first stage, they select newsstand prices $s_1(a_1^a, a_2^a)$ and $s_2(a_1^a, a_2^a)$ conditional on the expected volumes a_1^a and a_2^a of advertising which will be determined in the second stage. Payoffs in the first stage depend on the expectations of both editors and readers about the difference $a_i^a - a_j^a$ between the advertising volumes sold by the editors in the second period. These payoffs are given by (6) with $a_i - a_j = a_i^a - a_j^a$.

The second stage strategies are the advertising prices q_1 and q_2. Entering in this stage, prices s_1 and s_2 have been already selected determining readerships, $D_i(s_1, s_2) = D_i$. Based on the above model of the advertising market, payoffs in the second stage game are derived as a function of advertising rates q_1 and q_2. Denoting by $s_i^*(a_1^a, a_2^a)$, $i = 1, 2$, the equilibrium values in the first-stage game, conditional on expectations a_1^a and a_2^a , and by (q_1^*, q_2^*) the equilibrium of the second-stage game, we further require $a_i(q_1^*, q_2^*) = a_i^a$: the value of the demand function of each editor in the advertising market at the second-stage equilibrium is consistent with first-stage expectations on these values.[59]

The equilibria of the game are as follows (and broadly substantiate parallel results by Caillaud and Jullien, 2003). First, whatever the value of $\lambda \in [0, 1]$, there always exists an equilibrium corresponding to symmetric expectations $(a_1^a = a_2^a)$, with prices and market shares equal in both markets. This is an equilibrium with symmetric expectations about the advertising market shares. This equilibrium leads to Bertrand competition in the advertising market and, consequently, to equal prices and market shares in the newspaper market. In the case of ad-repulsion $(\lambda > \frac{1}{2})$, no other equilibrium exists than the symmetric one.

Second, consider the case of a majority of ad-lovers $(\lambda < \frac{1}{2})$. Then, if ad-attraction is strong $(-6 \geq \tilde{k} = \gamma(2\lambda - 1))$, there are two asymmetric equilibria. At each, one editor eliminates the rival completely, and the

[59] For a detailed equilibrium analysis, see Ferrando et al. (2004).

eliminating editor is the one who is expected to sell more advertising. If ad-attraction is weaker ($\tilde{k} > -12$), there are also two asymmetric equilibria with both editors enjoying strictly positive market shares in both the readership market and in the advertising markets. The paper which is expected to sell more advertising has higher prices and larger market shares in both markets. This latter result is akin to the base intuition of Furhoff (1973) revealing why ad-attraction can drive concentration growth in the daily newspaper industry. This intuition was described by Gustafsson (1978, p.1) in the following terms: "The larger of two competing newspapers is favoured by a process of mutual reinforcement between circulation and advertising, as a larger circulation attracts advertisements, which in turn attracts more advertising and again more readers. In contrast, the smaller of two competing newspapers is caught in a vicious circle, its circulation has less appeal for the advertisers, and it loses readers if the newspaper does not contain attractive advertising. A decreasing circulation again aggravates the problems of selling advertising space; so that finally the smaller newspaper will have to close down." The equilibria under strong advertising attraction can be viewed as the limit of the market dynamics underlying this description. The paper which is expected to sell a larger number of ads makes itself more attractive than the rival one. The more ads the former inserts, the more this reinforces the attractiveness. This strengthening finally leads to the eviction of the latter from both the press and advertising markets. There also exist other equilibria corresponding to situations of weaker ad-attraction. At these equilibria, the paper with the larger expected share in the advertising market does not completely evict its rival. Nevertheless, the initial asymmetry about expected advertising market shares makes the paper with the larger expected share the leader in both industries since it sells more in both, and at higher prices.

The interaction between the reader and advertising markets is rather complex when the two-sided network effects between these two industries are explicitly taken into account. It leads however to an important conclusion: *under ad-attraction, concentration in the press industry should be expected as a direct and natural consequence of the advertising market.* Since newspapers constitute a major vehicle for spreading political and social information to citizens, it is important to recognize the shortcomings in the business model that might lead to high concentration.

8 Conclusions

Television indubitably drives much of popular culture today and radio, magazines, and the Internet are other important drivers. Households in the US currently watch some 8 hours of television a day. A common business model describes several media markets, including television and radio, the Internet, and newspapers and magazines. Entertainment and content are the bait to get prospective purchasers of consumer goods to be exposed to advertisements. This Chapter has described the economics of this business model. What makes broadcasting different from other goods is that the broadcast delivers two goods, the program to viewers and the audience to the advertisers. This is why it is a two-sided market. Put another way, the advertising is piggy-backed onto the program that interests the viewers.

We have examined several dimensions of performance of the market. These include the range, quality, and breadth of the offerings (magazines, television programs, web-sites) provided. Since these are classic dimensions studied in the economics of product differentiation, we borrowed heavily from the economic theory of product differentiation. The dimension of interest may also be a political measure, such as the difference between the political stances represented in newspapers. There are other dimensions apart from the measures of the diversification of offerings that are important to the economics of media industries. All of these dimensions are important determinants of the cultural level. However, the economic models must be interpreted with care. For example, a higher "quality" in the model is one that more people choose, ceteris paribus. This may not correspond to some paternalistic view of what people "should" be watching, reading, or listening to.

Media industries exhibit several market imperfections. Broadcasting is a public good that is nonetheless provided by the market system, and the reason it is provided is advertising finance. But the ads are a nuisance to viewers (negative externality). Broadcast firms often historically formed a tight oligopoly. Given this knot of imperfections, one might have a poor expectation of performance in the industry. Indeed, one usually expects public goods to be under-provided, market power to also cause underproduction, and negative externalities to cause overproduction. Surprisingly then, media markets are able to deliver optimal performance configurations. Careful empirical work is needed to determine the values of key parameters in the structural model and hence to determine how far current practice deviates from optimal, and in what direction. For valuable progress in this direction, see Wilbur (2004b).

There is another type of market failure inherent to the market provision of broadcasting through advertising finance. Television offerings are disciplined by indirect consumer sovereignty: viewers "vote" with their eyes, and broadcast companies want to deliver viewers – of the right demographics – to advertisers. However, there is no incentive under advertising-based finance to cater to the tastes of viewers who would not buy the products advertised. This means there will be bias even without paternalistic views of what people "ought" to be watching. This bias explains the targeting of TV programs to those demographics that deliver most expected revenues to advertisers. Loosely, one would expect these to be the twenty- and thirty-somethings with high disposable incomes. Those with as-yet unformed tastes and large discretionary spending are the most lucrative targets for advertisers. Insofar as characters in television programs often reflect their audience (people like to watch characters similar to themselves), then one can indeed see many programs with characters in the 20-50 year old range. The reason is quite straightforward: the advertising dollars are in this range. This causes quite an important cultural bias. Goettler (1999) finds that shows attracting more homogenous viewerships (in terms of age and gender) elicit higher advertising prices. This makes sense because then ads may be better targeted. The concurrent bias that this effect suggests is that there is a tendency for programming to be too narrow. Second, he finds that shows watched by 35-49 year olds command higher advertising rate premia, suggesting a bias in catering to this group. Third, he finds that the advertising price increases in the size of the audience in a convex manner. The associated bias is toward programming with mass appeal, and the Lowest Common Denominator concern of Beebe (1977) arises from this incentive.

Of course, whenever an audience is watching or paying attention to any event, there is the incentive to try to reach them with a message. This is all the more true in the age of TiVo and other ad avoidance technologies, and ever greater demand from advertisers to get their messages across. Commercial placement is being seen increasingly in movies and programs (e.g., BMW's in James Bond films in place of the traditional Aston Martin), and it will alter the scripts of the movies themselves, as writers have to write in the sponsoring products. One might view such placement as a Trojan Horse carrying in undesired elements. A similar phenomenon has been happening in US schools. Channel One provides programming free to schools and even pays for the hardware (televisions, satellite dishes, etc.). The Trojan horse is the advertising that comes with the programming. The schools must guarantee 90% of students watch, and they are not allowed to turn off the supposedly educational programming. The programming is designed rather like MTV programming, and, although purportedly covering current affairs, is really designed as a vehicle for advertisements.[60] Advertisers in turn pay high premia for slots: up to twice the amount spent to reach adults.[61]

Children's viewing habits are also the concern underlying the FCC's requirement (since 2001) that each new television be equipped with a V-chip (see http://www.fcc.gov/vchip/). The chip enables parents to block programming deemed unsuitable, as rated by the "TV Parental Guidelines," that were established by the National Association of Broadcasters, the National Cable Television Association and the Motion Picture Association of America. However, use of this blocking device does not seem to have caught on (in contrast with Internet blocking filters). As Hazlett (2004) puts it: "Perhaps parents adopted Internet filters and spurned the V-chip because watching television is generally a more public activity: It's easier to keep an ear on what your kids are watching in the living room than to keep an eye on every Web site they see."

Several recent papers have empirically investigated models of two-sided markets in various different contexts. The pioneering paper in the print area is Rosse (1970), who estimated cost curves in the newspaper industry in the context of a model that included newspapers' feedback effects between advertising and readership. Rysman (2004) considers welfare properties of various market structures in the yellow-pages market, and finds that oligopoly is preferred to monopoly. Since consumers use yellow pages to find information, his conceptual framework could be applied to a newspaper industry with ad-loving readers. Kaiser and Wright (2004) take Armstrong's (2004) model of two-sided market competition to data on the German magazine industry, assuming single-homing on the part of both advertisers and readers.

There have also been several recent empirical studies of the broadcasting industry. Berry and Waldfogel (1999, 2001) use data on radio listenership to look at the effects of entry and concentration in radio. Sweeting (2004) tackles the difficult problem of estimating an equilibrium model of the timing

[60] "Channel One is more commercial than network TV; its hipper, faster-moving, full of loud rock music and directly or indirectly, its always selling something." (Fox, 2004).

[61] "Each 30 second ad costs advertisers nearly $160, 000, more than twice the cost of a commercial on prime time television news." (Gange, 2004, in a review of Fox, 2004).

of radio stations' commercial breaks. Wilbur (2004a) uses advertising levels and ad prices and viewing data to estimate a two-sided model of the television advertising market. He finds ads cause viewing losses: preliminary estimates indicate that 30 seconds of ads on top of the current level will decrease watching by 1.1% of viewers (or 0.7% of households) per hour.

One direction for future research is to take a deeper look at actual market structures. Most systems are mixed, and include a variety of different firm types. Anderson (2003) provides a preliminary analysis in this direction by looking at the coexistence of advertising financed and subscription financed television, while Peitz and Valletti (2005) also compare these two types of regime. If we look at actual market structures there are various types operating in the market, with varying degrees of public support, regulation, advertising finance, etc. In the US, public television, supported by the Federal Government and by private donations, coexists with commercial channels, pay channels and religious channels. In the UK, the B.B.C. is supported by television license fees and Government grants, and is not allowed to carry ads. There are six major channels in the television market in France. These vary by the level of Government support and the number of ads they are allowed to screen, as well as by content of programming, and one is a pay channel during prime time and into the night. One thorny problem for future research concerns the appropriate modeling of the behavior and objectives of a Public Broadcaster.

On the empirical side, it is worth investigating more deeply the extent to which programming is indeed duplicated along the lines suggested by Steiner (1952), and the work on the Pensée Unique, or whether indeed programs are more differentiated. Very useful work in this direction is the study by Goettler and Shachar (2001). These authors suggest that broadcast firms instead differentiate their offerings quite substantially.

Another issue of cultural concern is the "quality" of programming defined from the perspective of the local community. The FCC in the US stresses concerns about "localism" in the decision to grant a license. Similarly, local content rules (as in France and Australia, among others) are designed to retain and foster national programming. These are related issues because they stress a concept of quality that reflects and bolsters community appreciation of its integrity. If an objective such as protecting community identity is valued, then it would presumably need special protection (or subsidy) when faced with a Lowest Common Denominator type programming of mass appeal ("Hollywood" to the protagonists). The appropriate policy stance in this regard remains an open research issue.

Acknowledgement. *The first author gratefully acknowledges research funding from the NSF under grant SES-0137001. We thank many conference participants for their comments, insights, and presentations. We also thank our co-authors for several of the insights on which we draw, Victor Ginsburgh for editorial help, Juan Carlos Bisso for research assistance, and Anthony Dukes, Serguey Khovansky, Alan Krueger, Nathalie Sonnac, Cat Tyler, and Ken Wilbur for comments and suggestions.*

Appendix

Several special cases treated in the literature may be derived from a circle model with power transport costs. We therefore determine the equilibrium for that model. Assume the circle has circumference L, and the transport cost function is $\tau(.)$. We seek a symmetric equilibrium. Let the indifferent viewer between broadcaster i (at location 0) and its clockwise neighbor (at L/n) be at $\hat{x}$, so i's viewership is simply $2\hat{x}$, and our task is to determine the value of N'.

If the other broadcasters all set a common ad level a, while broadcaster i sets a_i, demand satisfies equality of "full nuisance" or

$$\gamma a_i + \tau(\hat{x}) = \gamma a + \tau\left(\frac{L}{n} - \hat{x}\right).$$

Evaluating at a symmetric solution,

$$\frac{d\hat{x}}{da_i} = \frac{-\gamma}{2\tau'\left(\frac{L}{2n}\right)}.$$

For power transport costs, $\tau(x) = tx^{\alpha}$, $\alpha \geq 1$, this becomes

$$\frac{d\hat{x}}{da_i} = \frac{-2^{\alpha-2}\gamma n^{\alpha-1}}{\alpha t L^{\alpha-1}}$$

so that ad levels solve (by (5) and recalling that in a symmetric equilibrium, $N_i = L/n$, and $N_i' = \frac{2}{\gamma}\frac{d\hat{x}}{da_i}$)

$$\frac{R'(a^*)}{R(a^*)} = \frac{2^{\alpha-1}\gamma n^{\alpha}}{\alpha t L^{\alpha}}$$

Since the L.H.S. is falling in a, the important result here is that the equilibrium ad level is *decreasing* in the number of competing platforms. This makes sense here because competition is effectively contested over the nuisance value to consumers, and more competition means less nuisance, and so less advertising on each channel.[62]

There are some important special cases to this. First, suppose that ad demand is perfectly elastic. Then $R = \beta a$, where β is then the demand price for ads. Then $\frac{R'}{R} = \frac{1}{a}$ and we can solve for a^* directly as

$$a^* = \frac{\alpha t L^\alpha}{2^{\alpha-1} \gamma n^\alpha}. \tag{7}$$

Ad levels rise with product differentiation (t) and fall with the number of firms. They fall as viewers get more annoyed by them too.

The special case of $\alpha = 1$ gives the standard Vickrey-Salop (1964, 1979)

[62] We assume in the main text that the strategic variable is price per ad per viewer. This is equivalent to ad levels being the strategic variables (this equivalence property follows from the feasibility of multi-homing for advertisers and the assumption that the willingness to pay for an ad is a linear function of the number viewers delivered by a channel). This strategic assumption corresponds to broadcasters that choose the size of their advertising breaks and then sell the space to prospective advertisers. An alternative strategic assumption is that broadcasters take as given the ad prices of rivals. This could be considered a Bertrand assumption where the standard one is a Cournot assumption. The implications of the alternative (Bertrand) assumption may be thought of as follows. When a broadcaster changes its price per ad, and a rival's price is assumed fixed, the rival must adjust its ad levels to keep its price per ad constant. More concretely, suppose a broadcaster raises its price per ad. Fewer advertisers want buy ads there, and so more viewers watch (which dampens the initial effect somewhat). This means that the rival needs to cut back its ad level because otherwise the rival is delivering fewer consumers per ad. It must make up for that by improving the "quality" of its ads - by delivering more viewers. This then means that the ad levels move together when broadcasters use ad price as strategies. This means more collusive behavior. Since more collusion implies MORE ads, price strategies lead to more ads, and closer to monopoly levels. It is noteworthy that Bertrand competition in standard differentiated products markets typically leads in stead to more competitive outcomes than Cournot competition. Crampes, Haritchabalet, and Jullien (2003) also uncover such an effect. Nilssen and Sørgard (2003) compare price and quantity strategies, using a representative consumer approach to advertising demand.

result of[63]

$$a = \frac{tL}{\gamma n}.$$

Noting that the standard duopoly line model is like $L = 2$ (the firms are one unit distance apart), then (setting $n = L = 2$ and $\alpha = 1$ in (7)) we have for that case[64]

$$a = \frac{t}{\gamma}.$$

In a similar fashion, for the standard version of the line model with two platforms and quadratic transport costs, set $n = L = \alpha = 2$ in (7) to give exactly the same result as for linear transport costs:

$$a = \frac{t}{\gamma}.$$

Rather similar qualitative results hold for the logit model of demand

[63] Gal-Or and Dukes (2003b) investigate the incentives for non-consolidating media mergers for firms on the circle, using the framework of Dukes (2004) described further below. On the one hand, a merging media firm improves its market power vis-à-vis advertisers since they now have a larger set of viewers. However, reduced competition for viewers induces higher equilibrium levels of advertising, which, in their model, lowers product market surpluses. They show that media mergers are profitable when the media market is sufficiently competitive so that, post-merger, the market power benefit exceeds the losses associated with increased advertising levels. Their results contrast with traditional product markets, where mergers are more profitable with less competition (Deneckere and Davidson, 1985). Choi (2003) considers mergers of neighboring firms in the context of the model of this section. He shows the more familiar result (see also Eaton and Wooders, 1985) that such mergers raise the profits of all firms, and these profits are lower for firms further from those that merge.

[64] The monopoly case is rather interesting. Anderson and Coate (2005) show that the monopoly ad level for the Hotelling specification may be higher or lower than the duopoly one as the market is or is not served respectively under monopoly. This result appears quite specific to the Hotelling model with unserved markets though, as we argue below.

considered by Anderson (2000).[65] Here we have simply that

$$N' = \frac{1}{\mu}\frac{1}{n}\left(\frac{1}{n} - 1\right),$$

and so the equilibrium ad level is given by

$$\frac{R'}{R} = \frac{\gamma}{\mu}\left(\frac{n-1}{n}\right).$$

With perfectly elastic ad demand, as above, this reduces to the closed form:

$$a = \frac{\mu}{\gamma}\left(\frac{n}{n-1}\right)$$

which increases with product differentiation as measured by μ and also decreases with the number of firms.[66]

The logit form may also readily be extended to allow for viewers who do not watch. Then, with the logit above, and an outside option,[67] we get an implicit form for the equilibrium ad level of:

$$\frac{R'}{R} = \frac{\gamma}{\mu}\left(1 - \frac{\exp\left(\frac{-\gamma a}{\mu}\right)}{n\exp\left(\frac{-\gamma a}{\mu}\right) + \exp\left(\frac{V_o}{\mu}\right)}\right)$$

where V_o denotes the relative quality of the outside option.

---

[65] The logit model is given by assuming the ε_i terms in (2) are i.i.d. double exponential. Suppressing the transport cost and quality components, the viewership demand function is

$$N_i = \frac{\exp(-\gamma a_i/\mu)}{\sum_{j=1,\ldots,n} \exp(-\gamma a_j/\mu)}.$$

[66] These properties hold for a general class of discrete choice models with i.i.d. idiosyncratic tastes with a log-concave distribution.

[67] The viewership demand function is then

$$N_i = \frac{\exp(-\gamma a_i/\mu)}{\sum_{j=1,\ldots,n} \exp(-\gamma a_j/\mu) + \exp(V_o/\mu)},$$

where V_0 measures the attractivity of the outside option.

Rewriting,

$$\frac{R'}{R} = \frac{\gamma}{\mu}\left(1 - \frac{1}{n + \exp\left(\frac{V_o + \gamma a}{\mu}\right)}\right)$$

Since the RHS is increasing in a, there is a unique solution; since the RHS is increasing in n, higher n always means lower ad levels for all n, including the transition from monopoly to duopoly. The intuition follows naturally since competition over viewers involves nuisance levels (where one would normally have direct prices) higher competition implies lower prices.

References

[1] American Association of Advertising Agencies and the Association of National Advertisers, Inc [2001] 2001 Television Commercial Monitoring Report.

[2] Anderson, Simon P. [2000] "Advertising and the Media." Mimeo, University of Virginia.

[3] Anderson, Simon P. [2003] "Broadcast competition: Commercial and Pay TV." Mimeo, University of Virginia.

[4] Anderson, Simon P. and Stephen Coate [2000] "Market Provision of Public Goods: The Case of Broadcasting." NBER Working paper 7513.

[5] Anderson, Simon P. and Stephen Coate [2005] "Market Provision of Broadcasting: A Welfare Analysis." *Review of Economic Studies*, forthcoming.

[6] Anderson, Simon P., André de Palma, and Jacques-François Thisse [1992], *Discrete Choice Theory of Product Differentiation*. MIT Press, Cambridge, Mass.

[7] Anderson, Simon P. and Maxim P. Engers [2001] "Pre-emptive Entry in Differentiated Product Markets." *Economic Theory*, 17, 419-445.

[8] Anderson, Simon P. and Damien J. Neven [1989] "Market Equilibrium with Combinable Products." *European Economic Review*, 33, 707-719.

[9] Armstrong, Mark [2004] "Competition in Two-Sided Markets." Mimeo, University College, London.

[10] Bagwell, Kyle [2003] "The Economic Analysis of Advertising." Mimeo, Columbia University.

[11] Barros, Pedro P., Hans Jarle Kind, Tore Nilssen, and Lars Sørgard [2005] "Media Competition on the Internet." *Topics in Economic Analysis and Policy*, 4(1), article 32 (18 pp.)

[12] Baxter, William [1983] "Bank Interchange of Transactional Paper: Legal Perspectives." *Journal of Law and Economics,* 26, 541-588.

[13] Becker, Gary and Kevin Murphy [1993] "A Simple Theory of Advertising as a Good or Bad." *Quarterly Journal of Economics*, 107, 942-964.

[14] Beebe, Jack [1977] "Institutional Structure and Program Choices in Television Markets." *Quarterly Journal of Economics*, 91, 15-37.

[15] Berry, Steven and Joel Waldfogel [1999a] "Public Radio in the U.S.: Does it Correct Market Failure or Cannibalize Commercial Stations," *Journal of Public Economics*, 71(2), 189-211.

[16] Berry, Steven and Joel Waldfogel [1999b] "Free Entry and Social Inefficiency in Radio Broadcasting." *RAND Journal of Economics*, 30, 397-420.

[17] Berry, Steven and Joel Waldfogel [2001] "Do Mergers Increase Product Variety? Evidence from Radio Broadcasting." *Quarterly Journal of Economics*, 116(3), 969-1007.

[18] Berry, Steven and Joel Waldfogel [2003] "Product Quality and Market Size." NBER Working Paper 9675.

[19] Blair Roger D. and Richard E. Romano [1993] "Pricing Decisions of the Newspaper Monopolist." *Southern Economic Journal*, 59(4), 723-732.

[20] Boulding, Kenneth [1955], *Economic Analysis. Volume I: Microeconomics*, 3d Ed. New York: Harper & Row.

[21] Brown, Allan and Martin Cave [1992] "The Economics of Television Regulation: A Survey with Application to Australia." *The Economic Record*, 68, 377-94.

[22] Brown, Keith and Peter J. Alexander [2005] "Market Structure, Viewer Welfare, and Advertising rates in Local Broadcast Television Markets." *Economics Letters*, 86(3), 331-337

[23] Brown, Tom J. and Michael L. Rothschild [1993] "Reassessing the Impact of Television Advertising Clutter." *Journal of Consumer Research*, 20, 138-146.

[24] Busse, Meghan and Marc Rysman [2004], "Competition and Price Discrimination in Yellow Pages Advertising," *RAND Journal of Economics*, forthcoming.

[25] Butters, Gerard [1977] "Equilibrium Distributions of Sales and Advertising Prices," *Review of Economic Studies*, 44, 465-491.

[26] Cabizza, Mariella M. [2004] "Minority programming in television markets." Mimeo, University of York (UK).

[27] Caillaud, Bernard and Bruno Jullien [2001] "Competing cybermediaries." *European Economic Review,* 45, 797-808.

[28] Caillaud, Bernard and Bruno Jullien [2003] "Chicken & Egg: Competition Among Intermediation Service Providers." *RAND Journal of Economics,* 34(2), 309-328.

[29] Cancian, Maria, Bills, Angela and Theodore Bergstrom [1995] "Hotelling Location Problems with Directional Constraints: An Application to Television News Scheduling." *Journal of Industrial Economics*, 43, 121-124.

[30] Caplin, Andrew, and Barry Nalebuff [1991] "Aggregation and Imperfect Competition: On the Existence of Equilibrium," *Econometrica*, 59, 25-59.

[31] Chakravorti, Sujit [2003], "Theory of Credit Card Networks: A Survey of the Literature." *Review of Network Economics*, 2(2), 50-68.

[32] Choi, Jay Pil [2003] "Broadcast competition and advertising with Free Entry." Mimeo, Michigan State University.

[33] Coase, Ronald, [1966], "The Economics of Broadcasting and Government Policy." *American Economic Review*, 56, 440-447.

[34] Corneo, Giacomo, [2001] "Work and Television." IZA Discussion Paper 376.

[35] Cornes, Richard and Todd Sandler [1996] *The Theory of Externalities, Public Goods and Club Goods* (Second Edition). Cambridge University Press: Cambridge.

[36] Crampes, Claude, Carole Haritchabalet, and Bruno Jullien [2004] "Competing with advertising resources." Mimeo, IDEI, Université de Toulouse.

[37] Crawford, Gregory S. [2000], "The Impact of the 1992 Cable Act on Household Demand and Welfare," *RAND Journal of Economics*, 31(3): 422-449.

[38] Cunningham, Brendan M. and Peter J. Alexander [2004] "A Model of Broadcast Media and Commercial Advertising." *Journal of Public Economic Theory*, Blackwell Publishing, 6(4), 557-575

[39] d'Aspremont Claude, Jean J. Gabszewicz and Jacques-François. Thisse [1979] "On Hotelling's "Stability in Competition." *Econometrica*, 47 (5), 1145-1150.

[40] Danaher P. J. [1995] "What Happens to Television Ratings During Commercial Breaks," *Journal of Advertising Research*, (37), 37-47.

[41] Davies, Gavyn et al. [1999] *The Future Funding of the B.B.C.: Report of the Independent Review Panel*. Department of Culture, Media and Sport.

[42] Deneckere, Raymond and Carl Davidson [1985] "Incentives to Form Coalitions with Bertrand Competition." *RAND Journal of Economics,* 16(4), 473-486.

[43] Dertouzos J. N. and W. B. Trautman [1990] "Economic Effects of Media Concentration: Estimates from a Model of the Newspaper Firm." *Journal of Industrial Economics*, 39 (1), 1-14.

[44] Dixit, Avinash and Victor Norman [1978] "Advertising and Welfare," *Bell Journal of Economics*, 9, 1-17.

[45] Doyle, Chris [1998] "Programming in a Competitive Broadcasting Market: Entry, Welfare and Regulation." *Information Economics and Policy*, 10, 23-39.

[46] Dukes, Anthony J. [2005] "Media Concentration and Consumer Product Prices." Mimeo, Aarhus University.

[47] Dukes, Anthony J. [2004] "The Advertising Market in a Product Oligopoly." *Journal of Industrial Economics*, 52, 3, pp. 327-348, September 2004

[48] Dukes, Anthony J. and Esther Gal-Or [2003] "Negotiations and Exclusivity Contracts for Advertising." *Marketing Science*, 22 (2), 222-245.

[49] Eaton, B. Curtis, and Richard G. Lipsey [1975] "The Principle of Minimum Differentiation Reconsidered: Some New Developments in the Theory of Spatial Competition." *Review of Economic Studies* 42, 27-49.

[50] Eaton, B. Curtis, and Myrna Wooders [1985] "Sophisticated Entry in a Model of Spatial Competition,"*RAND Journal of Economics*, RAND, vol. 16(2), 282-297.

[51] Economides, Nicholas [1996] "The Economics of Networks." *International Journal of Industrial Organization,* 14, 673-699.

[52] Ekelund, Robert, Ford, George and John Jackson [1999] "Is Radio Advertising a Distinct Local Market? An Empirical Analysis." *Review of Industrial Organization*, 14, 239-256.

[53] Engwall L. [1981] "Newspaper Competition: A Case for Theories of Oligopoly." *Scandinavian Economic History Review* , 29 (2), 145-154.

[54] Evans, David [2003] "The Antitrust Economics of Multi-Sided Platform Markets." *Yale Journal on Regulation,* 20(2), 325-382.

[55] Ferrando Jorge, Gabszewicz, Jean J., Didier Laussel, and Nathalie Sonnac [2004] "Two-Sided Network Effects and Competition: an Application to Media Industries."
Lucarnes bleues 2004/09, CREST/LEI.

[56] Fox, Roy F. [2004] *Harvesting Minds: How TV Commercials Control Kids.* Praeger.

[57] Furhoff L. [1973] "Some Reflections on Newspaper Concentration." *Scandinavian Economic History Review*, 1, 1-27.

[58] Gabszewicz, Jean J., Didier Laussel, and Nathalie Sonnac [1999] "TV Broadcasting Competition and Advertising." Lucarnes bleues # 9972 CREST/LEI, CORE Discussion Paper # 2000(6).

[59] Gabszewicz, Jean J., Didier Laussel, and Nathalie Sonnac [2001] "Press Advertising and the Ascent of the Pensée Unique?" *European Economic Review*, 45, 645-651.

[60] Gabszewicz, Jean J., Didier Laussel, and Nathalie Sonnac [2002] "Press Advertising and the Political Differentiation of Newspapers." *Journal of Public Economic Theory*, 4 (3), 249-259.

[61] Gabszewicz, Jean J., Didier Laussel, and Nathalie Sonnac [2004] "Programming and Advertising Competition in the Broadcasting Industry." *Journal of Economics and Management Strategy*, 13(4), 657-669.

[62] Gabszewicz, Jean J., Didier Laussel, and Nathalie Sonnac [2005] "Competition in the Media and Advertising Markets." *Manchester School*, forthcoming.

[63] Gabszewicz, Jean J. and Jacques-François Thisse [1979] "Price Competition, Quality and Incomes Disparities." *Journal of Economic Theory*, 20 (3), 340-359.

[64] Gabszewicz, Jean J. and Xavier Wauthy [2004] "Two-Sided Markets and Price Competition with Multi-homing." CORE Discussion Paper 2004(30), Louvain-la-Neuve, Belgium

[65] Gal-Or, Esther and Anthony J. Dukes [2003a] "Minimum Differentiation in Commercial Media Markets." *Journal of Economics and Management Strategy*, 12 (3), 291-325.

[66] Gal-Or, Esther and Anthony J. Dukes [2006] "On the Profitability of Media Mergers." *Journal of Business*, 79(2).

[67] Gange, Mike [2004] "Making a Killing on Our Kids" Review of *Harvesting Minds: How TV Commercials Control Kids* by Roy F. Fox. http://medialit.med.sc.edu/fox.htm

[68] George, Lisa, and Joel Waldfogel [2003] "Who Benefits Whom in Daily Newspaper Markets? " *Journal of Political Economy*, 111(4), 765-785.

[69] George, Lisa, and Joel Waldfogel [2004] "Does the New York Times Spread Ignorance and Apathy? " Mimeo, Michigan State University.

[70] Goettler, Ronald and Ron Shachar [1999] "Advertising Rates, Audience Composition, and Competition in the Network Television Industry." Mimeo, Carnegie-Mellon University.

[71] Goettler, Ronald and Ron Shachar [2001] "Spatial Competition in the Network Television Industry," *RAND Journal of Economics*, 32, 624-656.

[72] Grossman, Gene and Carl Shapiro [1984] "Informative Advertising with Differentiated Products." *Review of Economic Studies*, 51, 63-81.

[73] Gustafsson, K. E. [1978] "The Circulation Spiral and the Principle of Household Coverage." *Scandinavian Economic History Review*, 26(1), 1-14.

[74] Hackner Jonas and Sten Nyberg [2001] "Advertising and Media Market Concentration." Mimeo, Department of Economics, Stockholm University.

[75] Hamilton, James T. [2004] *All the news that's fit to sell.* Princeton University Press.

[76] Hansen, Claus and Soren Kyhl [2001] "Pay-per-view Broadcasting of Outstanding Events: Consequences of a Ban." *International Journal of Industrial Organization*, 19, 589-609.

[77] Hazlett, Thomas [2004] "Requiem for the V-Chip: a relic of the last battle over indecency on TV." http://slate.msn.com/id/2095396/ Friday, Feb. 13, 2004.

[78] Holden, Steinar [1993] "Network or Pay-per-view?" *Economics Letters*, 43, 59-64.

[79] Hotelling, Harold [1929], "Stability in Competition," *Economic Journal* 39,41-57.

[80] Kaiser, Ulrich and Julian Wright [2004], "Price Structure in Two-Sided Markets: Evidence from the Magazine Industry," mimeo, University of Southern Denmark.

[81] Kaitatzi-Whitlock S. [1996] "Pluralism and Media Concentration in Europe." *European Journal of Communication*, 11(4), 453-483.

[82] Kind, Hans J., Tore Nilssen, and Lars Sørgard [2004] "Advertising on TV: Over- or Underprovision?" Mimeo. Bergen.

[83] Klein, Benjamin and Keith B. Leffler, [1981], "The Role of Market Forces in Assuring Contractual Performance," *Journal of Political Economy* 89, 615-41.

[84] Masson, Robert, Mudambi, Ram and Robert Reynolds [1990] "Oligopoly in Advertiser-Supported Media." *Quarterly Review of Economics and Business*, 30 (2), 3-16.

[85] Milgrom, Paul and John Roberts [1986] "Prices and Advertising Signals of Product Quality." *Journal of Political Economy*, 94, 796-821.

[86] Minasian, Jora [1964] "Television Pricing and the Theory of Public Goods." *Journal of Law and Economics*, 7, 71-80.

[87] Motta, Massimo and Michele Polo [1997] "Concentration and Public Policies in the Broadcasting Industry: The Future of Television." *Economic Policy*, 25, 294-334.

[88] Musnick I. [1999] "Le Cœur de Cible ne Porte pas la Publicité Dans son Coeur," CB News, 585, 11-17 October, 8-10.

[89] Mussa, Michael and Sherwin Rosen, [1978], "Monopoly and Product Quality." *Journal of Economic Theory* 18, 301-317.

[90] Nelson, Phillip, [1974], "Advertising as Information," *Journal of Political Economy* 82, 729-754.

[91] Nilssen, Tore and Lars Sørgard [1998] "Time schedule and programme profile: TV news in Norway and Denmark." *Journal of Economics and Management Strategy,* 7(2), 209–235.

[92] Nilssen, Tore and Lars Sørgard [2003] "The TV Industry: Advertising and Programming" Mimeo, Bergen.

[93] Noam, Eli M. [1987] "A public and private-choice model of broadcasting." *Public Choice,* 55, 163–187.

[94] Owen, Bruce M. and Wildman, S. S. [1992] *Video Economics.* Harvard University Press, Cambridge, Massachusetts.

[95] Papandrea, F. [1997] "Modelling television programming choices." *Information Economics and Policy,* 9, 203–218.

[96] Peitz, Martin, and Tommaso Valletti [2005] "Content and advertising in the media: pay-tv versus free-to-air." Mimeo, Imperial College, London, CEPR working paper #4771

[97] Picard Robert G. (Ed.) [1988] "Press Concentration and Monopoly: News Perspectives on Newspaper Ownership and Operation." Alex Publishing Corporation, Norwood, New Jersey.

[98] Reimer E. [1992] "The Effects of Monopolization on Newspaper Advertising Rates." *American Economist*, 36(1), 65-649.

[99] Rochet, Jean-Charles and Jean Tirole [2002] "Cooperation among Competitors: Some Economics of Payment Card Associations." *RAND Journal of Economics,* 33(4), 549-570.

[100] Rochet, Jean-Charles and Jean Tirole [2003a] "Platform Competition in Two-Sided Markets," *Journal of the European Economics Association,* (forthcoming).

[101] Rochet, Jean-Charles and Jean Tirole [2003b], "An Economic Analysis of the Determination of Interchange Fees in Payment Card Systems," *Review of Network Economics,* 2(2), 69-79.

[102] Rochet, Jean-Charles and Jean Tirole [2004]. "Two-sided markets: an overview." Mimeo, IDEI, Université de Toulouse.

[103] Rogerson, Richard [2005] "Structural transformation and the deterioration of European labor market outcomes." Mimeo, Arizona State University.

[104] Rosse, James N. [1970], "Daily Newspapers, Monopolistic Competition, and Economies of Scale," *American Economic Review*, 57(2), 522-533.

[105] Rosse James N. [1980] "The Decline of Direct Newspaper Competition." *Journal of Competition*, 30, 65-71.

[106] Rothenberg, J. [1962] "Consumer sovereignty and the economics of television programming." *Studies in Public Communication,* 4, 45–54.

[107] Rysman, Marc [2004] "Competition between Networks: A Study of the Market for Yellow Pages."*Review of Economic Studies*, 71(2), 483-512,.

[108] Salop, Steven [1979] "Monopolistic Competition with Outside Goods." *Bell Journal of Economics*, 10, 141-156.

[109] Samuelson, Paul [1958] "Aspects of Public Expenditure Theories." *Review of Economics and Statistics*, 40, 332-338.

[110] Samuelson, Paul [1964] "Public Goods and Subscription TV: Correction of the Record." *Journal of Law and Economics*, 7, 81-83.

[111] Schwartz, Marius and Daniel Vincent [2001] "Same Price, Cash or Credit: Vertical Control in Electronic Payments Networks." Mimeo, Georgetown University.

[112] Shachar, Ron and Bharat Anand [1998] "The Effectiveness and Targeting of Television Advertising," *Journal of Economics & Management Strategy*, 7, 363-396.

[113] Shaked, Avner and John Sutton, [1982], "Relaxing Price Competition through Product Differentiation," *Review of Economic Studies* 49, 3-14.

[114] Shapiro, Carl [1980] "Advertising and Welfare: Comment." *Bell Journal of Economics*, 11, 749-752.

[115] Shields, Michael [2004] "Ad Clutter Reaches New High, Encroaches On Program Content." *MediaPost Daily News.* Tuesday, April 13, 2004.

[116] Sonnac, Nathalie [2000] "Readers Attitudes Towards Press Advertising: are They Ad-lovers or Ad-averse?" *Journal of Media Economics*, 13(4), 249-259.

[117] Sonnac, Nathalie [2002] "Monopole televisuel et publiphobie." *Recherches Economiques de Louvain*, 68(4), 513-526.

[118] Spence, A. Michael [1976] "Product Selection, Fixed Costs and Monopolistic Competition." *Review of Economic Studies*, 43, 217-235.

[119] Spence, Michael and Bruce Owen [1977] "Television Programming, Monopolistic Competition and Welfare" *Quarterly Journal of Economics*, 91, 103-126.

[120] Stegeman, Mark [2004] "A Model of Internet Advertising." Mimeo, Virginia Polytechnic Institute.

[121] Steiner, Peter O. [1952] "Program Patterns and Preferences, and Workability of Competition in Radio Broadcasting." *Quarterly Journal of Economics,* 66, 194–223.

[122] Stigler, G. J., and G. S. Becker, [1977], "De Gustibus Non Est Disputandum," *American Economic Review* 67, 76-90.

[123] Sweeting, Andrew [2004], "Coordination Games, Multiple Equilibria and the Timing of Radio Commercials," mimeo, Massachusetts Institute of Technology.

[124] *1999 Television Commercial Monitoring Report*, American Association of Advertising Agencies.

[125] Tirole, Jean [1988] *The theory of Industrial Organization,* M.I.T. Press, Cambridge, Mass.

[126] Vaglio, Alessandro [1995] "A Model of the Audience for TV Broadcasting: Implications for Advertising Competition and Regulation." *Rivista Internazionale di Scienze Economiche e Commerciali*, 42(1), 33-56.

[127] Vickrey, W. S., [1964], *Microstatics.* Harcourt, Brace and World, New York. Selection republished as Vickrey, W. S., Simon P. Anderson and Ralph M. Braid, "Spatial Competition, Monopolistic Competition, and

Optimum Product Diversity," *International Journal of Industrial Organization* 17, 953-963.

[128] Wilbur, Kenneth C. (2004a) "Modeling the Effects of Advertisement-Avoidance Technology on Advertisement-Supported Media: the Case of Digital Video Recorders," mimeo, University of Virginia.

[129] Wilbur, Kenneth C. (2004b) "Not all eyeballs are created equal." Mimeo, University of Virginia.

[130] Wildman, Steven S., McCulloch, Robert, and B.D. Kieshnick [2004] "A new look at the Economics for Television Ad Time." mimeo, Michigan State University.

[131] Wildman, Steven S. and Bruce Owen [1985] "Program Competition, Diversity, and Multichannel Bundling in the New Video Industry," in Eli Noam, (Ed.), *Video Media Competition: Regulation, Economics and Technology*, Columbia University Press: New York.

[132] Wiles, P. [1963] "Pilkington and the theory of value." *Economic Journal,* 73, 183–200.

[133] Wright, Donald [1994] "Television Advertising Regulation and Program Quality." *Economic Record*, 70, 361-367.

[134] Wright, Julian [2002] "Access Pricing under Competition: An Application to Cellular Networks," *Journal of Industrial Economics*, 50, 289-315.

[135] Wright, Julian [2003] "One-Sided Logic in Two-Sided Markets." Brookings Working Paper 03-10.

Table 1. Time spent viewing per household, US

Year	Time Spent Per Day
1950	4 hrs. 35 mins.
1955	4 hrs. 51 mins.
1960	5 hrs. 06 mins.
1965	5 hrs. 29 mins.
1970	5 hrs. 56 mins.
1975	6 hrs. 07 mins.
1980	6 hrs. 36 mins.
1985	7 hrs. 10 mins.
1990	6 hrs. 53 mins.
1995	7 hrs. 17 mins.
1996	7 hrs. 11 mins.
1997	7 hrs. 12 mins.
1998	7 hrs. 15 mins.
1999	7 hrs. 26 mins.
2000	7 hrs. 35 mins.
2001	7 hrs. 40 mins.
2002	7 hrs. 44 mins.
2003	7 hrs. 58 mins.

Source: www.tvb.org, based on data from Nielsen.

Table 2.
Average annual hours spent for TV and work, 1994-1997

Country	TV-Viewing hours per adult	Work hours per person in employment	Work hours per adult
Norway	878	1413	850
Switzerland	882	1608	1036
Sweden	893	1600	981
Finland	929	1725	1043
Germany	1148	1563	903
France	1166	1616	878
Japan	1324	1885	1116
Spain	1334	1813	903
Italy	1340	1637	761
UK	1387	1738	1065
USA	1462	1954	1264

Source: Corneo (2001)

Table 3.
Adults: Time Spent Yesterday in Minutes with Major Media

Adults	Television	Newspapers	Radio	Magazines	Internet
Age					
18+	258.4	32.4	120.7	18.3	65.8
18-34	236	16.4	141.3	16.9	71.4
18-49	234.3	23.7	131.2	15.6	79.5
25-49	234.8	26	132.2	13.2	84.6
25-54	239.4	27.2	132.6	14.2	85.3
35-64	254.6	34.1	116.3	16.3	76.9
65+	317.1	58.1	94.9	27.3	18.6
Household Income					
Under $25K	318.7	27.6	101.7	18	30.3
$25-50K	277.7	31.9	139.5	18.8	81.4
$50-75K	234.5	24.6	129.6	12.3	56
$75-100K	212.6	42.1	111	17.5	92
$100K+	203	39.7	91.4	19.2	79.5
Education					
HS Grad	287.8	27.9	133.3	16.9	44
Some College	273.9	30.5	134.9	19.4	74.9
College Grad+	204.7	39.6	109	17.4	88.6
Occupation					
Prof/Tech/Mgr/Owner	199.8	31.2	134.3	18.1	101.1
Admin/Clerical/Sales	238.5	24.7	145	16.7	69.2
Trade/Service	223.8	21.2	148.7	18.1	39.4

Source: www.tvb.org, based on data from Nielsen.

Table 4.
Gross Domestic Product, Total Ad Volume, and Television Ad Volume 1960-2003

	GDP*	AdVolume		TVAdVolume	
Year	$Billions	$Millions	%GDP	$Millions	%Ad Volume
1963	617.7	13,100	2.12%	2,032	15.50%
1973	1,382.70	24,980	1.81%	4,460	17.90%
1983	3,536.70	76,000	2.15%	16,879	22.20%
1993	6,657.40	140,956	2.12%	32,471	23.00%
2003	10,987.90	245,477	2.23%	60,746	24.70%

* Sources: GDP, bea.doc.gov; Ad Volume and TV Ad Volume www.tvb.org, based on data from Nielsen.

Table 5.
Estimated Annual U.S Advertising Expenditures (in millions of dollars)

	1953	1973	1983	1993	2003	2003
	$ m.	$ m.	$ m.	$ m.	$ m.	Share
Newspapers:	2,632	7,481	20,582	32,025	44,843	18.3
National	606	1,049	2,734	3,620	7,357	3
Local	2,026	6,432	17,848	28,405	37,486	15.3
Magazines:	627	1,448	4,233	7,357	11,435	4.7
Weeklies	351	583	1,917			
Women's	158	362	1,056			
Monthlies	118	503	1,260			
Farm Publications	71	65	163			
Broadcast TV:	606	4,460	16,879	28,020	41,932	17.1
Network	320	1,968	6,955	10,209	15,030	6.1
Spot (nat'l)	145	1,377	4,827	7,800	9,948	4.1
Spot (local)	141	1,115	4,345	8,435	13,520	5.5
Syndication			300	1,576	3,434	1.4
Cable:			452	4,451	18,814	7.7
Cable Network			376	3,295	13,954	5.7
Cable (non-net)			76	1,156	4,860	2
Radio:	611	1,723	5,210	9,457	19,100	7.7
Network	141	68	296	458	798	0.3
Spot (nat'l)	146	400	1,038	1,657	3,540	1.4
Spot (local)	324	1,255	3,876	7,342	14,762	6
Yellow Pages:			4,400	9,517	13,896	5.7
National			489	1,230	2,114	0.9
Local			3,911	8,287	11,782	4.8
Direct Mail	1,099	3,698	11,795	27,266	48,370	19.7
Business Papers	395	865	1,990	3,260	4,004	1.6
Out of Home:	176	308	794	1,090	5,443	2.2
National	119	200	512	605	2,298	0.9
Local	57	108	282	485	3,145	1.3
Internet				0	5,650	2.3
Miscellaneous:	1,523	4,932	9,954	18,513	31,990	13
National	846	2,562	6,952	13,534	24,550	10
Local	677	2,370	3,002	4,979	7,440	3
TotalNational	4,515	13,700	42,660	81,867	152,482	62.1
TotalLocal	3,225	11,280	33,340	59,089	92,995	37.9
GrandTotal	7,740	23,210	76,000	140,956	245,477	100

Source: www.tvb.org, based on data from Nielsen.

Table 6.
2003 Prime-Time Clutter (Minutes:Seconds)

	Network commercial Minutes		Non-Program Minutes	
	2002	**2003**	**2002**	**2003**
ABC	10:15	10:15	15:16	15:31
CBS	9:03	9:19	14:06	14:18
Fox	9:04	9:11	14:47	15:13
NBC	9:41	9:19	14:49	15:07

Source: www.tvb.org, based on data from Nielsen.

Table 7.
Adults Reached Yesterday by Major Media (%)

Adults	Television	Newspapers	Radio	Magazines	Internet
Age					
18+	90	65.2	72.8	48	51.1
18-34	87.6	48.5	80.1	48.1	55.6
18-49	88.5	58.7	79.9	48	58.1
25-49	89.8	64	81.1	45.1	57.3
25-54	90.5	65.9	80.2	47.7	58.9
35-64	91.5	71.4	74.8	49.9	57.9
65+	89.9	77.5	51.9	41.5	19.9
Household Income					
Under$25K	87.3	57.4	59.7	40.2	27.8
$25-50K	91.6	66.3	72.6	48.6	48.9
$50-75K	89.8	66.9	77.1	45.6	56.5
$75K+	89.8	71.2	83	55.2	74.8
$100K+	92.2	72.5	85.5	61.2	75.9
Education					
HS Grad	90	60.9	69.4	42.3	35.5
Some College	92.3	67.2	73.6	51.4	54.3
College Grad+	89.4	72.2	80.7	53	71.9
Occupation					
Prof/Tech/Mgr/Owner	89.6	65.3	84.8	54.1	73.5
Admin/Clerical/Sales	88.7	64.2	79.2	48.2	47.4
Trade/Service	85.8	65.3	78.7	52.4	38.1

Source: www.tvb.org, based on data from Nielsen.

Table 8
Network Television Cost, Primetime (Mon-Sun) Average Program*

	Households Viewing Avg. Min.	Cost Per 30 Sec.	Cost Per 1000 Homes
1965	9,968,000	$19,700	$1.98
1975	13,500,000	32,200	2.39
1985	14,510,000	94,700	6.52
1995	10,860,000	95,500	8.79
2004	6,070,000	120,500	19.85

Source: www.tvb.org, based on data from Nielsen.

Table 9
Spot Television Cost for Top 100 Markets/30-Second Commercial Primetime (Mon-Sun)

	Households Per Rating Primetime	Cost Per Households Rating Primetime	Cost Per 1000 Homes
1982	703,092	$6,235	$8.87
1985	732,211	7,360	10.01
2005	941,219	24,181	25.69

Source: www.tvb.org, based on data from Nielsen.

Table 10
Magazine Advertising Cost and Daily Newspapers, U.S., Circulation, Costs, & Cost Per 1000 readers.

			1965	**1985**	**1997**	**2000**
Magazine	**Combined Circulation**	**(000)**	147,080	159,978	129,623	
	Combined Page Rate	**B&W**	$595,143	1,695,541	3,358,235	
		4C	$826,879	2,288,036	4,437,329	
	Cost Per Page Per 1000	**B&W**	$4.05	10.59	25.91	
		4C	$5.53	14.3	34.23	
Newspapers	**Total Daily CIRC**	**(000)**	60,358	62,766		55,773
	Cost 1/2 Page Each Daily		$312,112	1,515,163		3,712,65 0
	Cost Per 1000 CIRC		$5.17	24.14		66.57

Source: www.tvb.org, based on data from Nielsen.