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Does New Information Technology Lower Media Quality? The Paradox of Commercial Public Goods

Man-Lui Lau

Bruce Wydick
University of San Francisco, wydick@lucas.usfca.edu

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Man-Lui Lau and Bruce Wydick

Department of Economics
University of San Francisco
2130 Fulton St.
San Francisco, CA 94117

e-mail: *wydick@usfca.edu*

Abstract: We define *commercial public goods* as goods that are broadcast via television, radio, newsprint, or websites for which consumption is non-rival and non-exclusive, and revenue is generated mainly through advertising alongside a product in a two-sided market. With new information technology the fixed cost of entry in these markets has substantially declined. We demonstrate that as fixed costs of entry decline in a competitive media market, lower industry concentration results in lower resources to each firm for the production of commercial public goods. The counterintuitive result of new information technology is that it may result in lower quality news reporting and a less-informed population. The result may hold even when consumers exhibit preferences for diversity in media outlets.

1. Introduction

As new information technology has lowered the costs of entry into media markets, the number of news sites has proliferated. In the course of this proliferation, the attention of the public has been diffused, drawn away from "old media" such as traditional network television, radio, and big-city newspapers. There are numerous positive effects of the new media technology on consumer welfare. The proliferation of firms allows for the development of new media market niches and for catering to a greater heterogeneity of consumer tastes. In this paper, however, we set aside these more obvious and salient advantages of new media technology, instead focusing on a potentially negative impact. We demonstrate that due to reduced industry concentration brought about by lower barriers to entry in media markets and because consumption of media is purchased through viewers' time rather than through a market price, innovations in information technology may actually reduce the quality of news available to consumers.

The typical television or radio broadcast, or web-based media site provides content that is non-rival and non-excludable and that is typically underwritten almost exclusively by advertising rather than prices paid by consumers. This type of news media provision is a special case of a two-sided market, where we believe it is more straightforward to refer to such a product as a *commercial public good*. We demonstrate in this paper that when news media is delivered to consumers as a commercial public good, higher costs of market entry and a higher degree of industry concentration may be beneficial to viewers because it provides for a more efficient synthesis of news content for a given amount of consumer viewing time.

Economists have traditionally regarded industry concentration as detrimental to consumers. In markets for private goods, industry concentration can result in equilibrium prices that remain above average costs of production. Higher industry concentration reduces consumer variety. Lower fixed costs reduce industry concentration and prices, and are thus generally beneficial to consumers. However, when media is provided as a commercial public good, we demonstrate that lower costs of entry and lower industry concentration may actually *hurt* consumers. This occurs because lower industry concentration implies that viewer-minutes are divided among more media firms such that the revenue generated by each media firm through advertising falls. As advertising revenues fall to each firm, so does the quality of the commercial public good provided by it. In the example we present in this paper, this decline in quality is the investigative quality of the news broadcast by each media outlet, although with some modification, our results can be broadly generalizable to other types of media.

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Previous work such as Rochet and Tirole (2003), Anderson and Coate (2005), and Anderson and Gabszewicz (2005) has viewed the provision of commercial media through the lens of a two-sided market. In products with two-sided markets, such a product or "platform" caters to two simultaneous markets. With video games, for example, video hardware must cater to both game developers and game users. Credit card companies must cater to both card users and merchants. Likewise, news media firms must also cater to advertisers and viewer/readers.

Advances in new technology have opened up myriad new sources of media, but have resulted in the decline of traditional two-sided-market media in traditional newspapers, television, and radio. Table 1 illustrates the precipitous decline in viewership of the three major network evening news broadcasts, where the mean percentage of households tuned into the programs has fallen from 14.1 in 1980 to 10.4 in 1990, and to 6.3 in 2005. In recent years nearly all major newspaper dailies in the United States have laid off workers and reduced circulation. From January 2007 to October 2009, at least 10 major daily papers closed their doors (see Table 1), with dozens of other newspapers converting to an on-line format. Table 2 shows the decline in daily newspaper circulation, which reached its height around 1990, falling from 62.6 million households to 49.1 by 2008. Trends in radio listening, while not quite as steep as other traditional media, have also declined in the last decade as shown in Figure 2. A recent news consumption survey of 3,003 adults by the Pew Charitable Trust found sharp declines in adults reading print newspapers and watching television news (Pew Research Center, 2012, see Figure 3). Although part of this has been made up by increased use of online news sources, the study also reports that the number of adults reading a daily newspaper in any form fell from 54% in 2004 to 38% in 2012.

We argue here that part of this news media decline may be attributable to lower fixed costs of entry into media markets where news is supplied as a commercial public good. While variable costs such as the cost of labor and technical skill remain high, the cost of establishing a "broadcasting platform" (such as a news website, podcast, or a cable network channel) has substantially declined relative to labor costs. Given the standard assumptions about cost structures in competitive markets, as fixed costs decline, the equilibrium number of firms in a market increases. In a normal market for private goods, lower fixed costs reduce the market price, yielding an unambiguous benefit to consumers. However, with commercial public goods, a relative reduction in the fixed costs of entry at least initially causes the number of firms to expand, causing viewers' attention to be diverted across a greater number of media outlets. A smaller viewing audience then results in lower advertising revenue to each firm in the market,

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and a commensurate reduction in the quality of the product produced by each firm. Since the cost of these goods to consumers is a function of time rather than money, consumers become worse off because the quality of the commercial public good is lower given any fixed amount of time devoted to reading, viewing, or otherwise interacting with media.

Competition from low-cost providers of media is particularly evident among traditional television networks, newspapers, and radio, who have struggled to maintain advertising revenue with the increasing number of entrants into their markets. Much of this entry has occurred via the internet, where firms are able to compete with each of these types of media, respectively, via video clips on *YouTube*, writers' blogs, informal web-based news sources, and online podcasts. Our main example in this paper focuses on journalistic news quality. Some journalists at leading newspapers have even questioned if professional journalism (and the accountability of our institutions) will be able to survive in a media environment in which access to media broadcast is so low that everyone can be a reporter, yet nobody is fully accountable for holding "journalists" accountable.[1]

A number of more comprehensive articles on the industrial organization of the media have preceded our analysis. Seminal articles in the newspaper and television industries include Steiner (1952), Rosse (1967) and Spence and Owen (1977), respectively. Rosse's empirical work investigates the reason for strong geographical segmentation in the newspaper industry, finding economies of scale to be the most important determinant of tendency toward geographical monopoly in the newspaper industry, which in most media markets is able to overwhelm the opposing force of heterogeneous preferences among readers (New York City being one clear counter-example).

Spence and Owen's (1977) seminal paper on the television industry considers the biases in program selection that arise under advertiser-supported and pay television, respectively and whether either type of regime creates a bias in the number of programs offered that departs from optimal consumer welfare. They show that an advertiser-supported regime biases against programs that are appealing to a minority of voters and against more expensive programs because pay television prices reflect preferences of viewers more clearly than the flat rate paid by advertisers.

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[1] See for example "Quality Reporting Doesn't Come Cheap" Peter R. Kann. *Wall Street Journal* (Eastern Edition) York, N.Y.: Sep 26, 2009, and "Mourning Old Media's Decline, David Carr, *New York Times*, Wednesday, October 29, 2008.

Anderson and Coate (2005) consider whether the market yields the correct number of programs and types of programs under advertiser-supported regimes. Their results indicate that market competition can yield either too few or too many varieties of television programs, depending on the relative size of viewing benefits and the benefits to advertisers from their commercials, but that it is possible that the market equilibrium could reach close to an optimal solution.

Searching for common themes across different types of media, Gabszewicz and Anderson (2005) develop a model showing that under weak advertising demand, equilibrium program selection may cater to extreme consumer tastes as broadcasters strive to avoid subscription-price competition. In contrast, strong advertising demand may lead to little media product differentiation. Kind et. al (2006) find in a model of a television oligopoly that the more viewers dislike ads, the more likely it is that welfare is increasing in the number of advertiser-supported television channels, where they show public television may be able to correct the distortions introduced by advertiser-sponsored networks.

While these papers have focused on the industrial organization of traditional forms of media, our paper most closely resembles the recent work of Frijters and Velamuri (2010), who develop a model that analyzes the changes brought about by new and less-costly forms of media. Among other findings, they argue that new internet-based media firms reduce the effective property rights of more established professional news media, creating a disincentive for the more established outlets to invest in high-quality news production. This kind of undermining of professional news organizations is similar in spirit to the main point we develop about how declining barriers to entry may have deleterious effects on professional media.

2. A Simple Model of Commercial Public Goods in the News Media

In this section, we develop a simple model of the news market. We do not seek to create a comprehensive model that captures the complexity and heterogeneity of the media market or one that seeks to model the various effects of new technology on consumer welfare, but rather to create a stylized model of a competitive market that helps us to illustrate the main point of our paper. We consider first a homogeneous media good that can only vary in quality. The market consists of news media firms that investigate and produce news. In our model, news media firms (at least initially) only differ in their news quality and news is considered to be higher-quality to the extent that it is more accurate. High-quality news is more costly to produce, but attracts more viewers. Once the news is produced, it will be available to all

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viewers as a commercial public good, non-excludable and non-rival, financed by advertisements from the goods producers. We implicitly assume that producers advertise with news media firms because consumers are willing to pay a higher price for a producer's goods when they are more familiar with its products.

A. Media Firms

Let a market of news media firms be indexed by i, where $i \in \{1, 2...n\}$, where for our present case we will assume that the firms broadcast news and information from a media site, and for now we assume the market is perfectly competitive with homogeneous firms. In our model we assume the following:

Assumption 1: Consumers randomly search for a news forum among the active news media firms, find a random news media firm, observe its quality and then consume the optimal amount of news only from that firm. (This assumptions makes the total number of consumers equal to the product of the number of consumers per media firm times the number of media firms.)

Assumption 2: Firms are homogenous; they simply report the news that they investigate. (Initially) we assume they have no bias or other characteristics that differentiate them to viewers that would allow them market power.

News media firms, hereafter media firms, have a fixed platform (*e.g.* one 24-hour television or radio broadcast, one newspaper of a fixed size, one web site). We consider the case here in which firms report only the news they investigate so that there is no "stealing" of news from other sources. Let q_i be the "viewer time" that reflects the number of viewers, readers, or listeners attracted by the product of media firm i, multiplied by how much time, we will suppose in minutes, each engages with the news of a given media firm.[2] As more viewer-minutes yields more advertising revenue, attracting more viewers/listeners and inducing each to view and watch more is clearly desirable. Media firms collect information about a subject of investigation and report it. We will model the costs of this information collection process.

Assumption 3: Each firm has a fixed startup cost equal to f, which are the capital costs of the firm. Media firms use labor to gather information to report to their consumers; each unit of information requires the use of one unit of labor, L, the wage of which is set to unity.

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[2] If we interpret the media firms as newspapers, then the "viewer-minutes" can be interpreted as the number of readers of the newspapers, which can be more than the number of newspaper sold as a single copy can be read by more than one person. For radio media, what we call "viewer-minutes" is obviously listening minutes.

To picture this process more clearly, consider a large field containing balls that are either red or green. Each ball represents one unit of information, which, for example, could represent the extent of corruption in a political administration, where a red ball is evidence of corruption and a green ball is evidence of honesty. The media firm reports on the fraction of red balls it finds from its investigative sample in its broadcast. The more balls the media firms survey, the more accurate the results will be. As it takes 1 unit of labor to survey 1 ball, it will take L units of labor to survey L balls.

Assumption 4: *The accuracy of news is positively related to the number of balls the news media firm samples. Specifically, $s = \frac{\sigma}{\sqrt{L}}$ where s is inaccuracy and σ is the level of inaccuracy if the media firm only samples only 1 ball.*

Thus a larger sample of balls attracts more viewer-minutes to the news media site as viewers prefer more accurate reporting on events. As a site becomes more accurate as its findings are corroborated more frequently, the site gains more viewers. Hence the amount of viewer time is inversely related to s; we will assume they are related by the simple function $q = \frac{\alpha}{s}$, where α is a constant, and for now we drop the subscript i on media firms for convenience. This implies that the information-gathering process yields the production function $q = \alpha \frac{\sqrt{L}}{\sigma}$, and the units of labor needed to generate q viewer-minutes is $L = \left(\frac{\sigma}{\alpha}\right)^2 q^2$, which generates a simple cost function, $C(q) = f + \left(\frac{\sigma}{\alpha}\right)^2 q^2$, where the exogenous wage again is equal to unity.

Media provided as a commercial public good has no direct cost to its consumer-viewers.[3] Content is free, non-excludable, and non-rival to viewers who own the proper receiving device (TV, radio, or computer with internet access), which we count as a sunk cost. To finance production of news, media firms sell advertising minutes. (The fraction of radio or broadcast television airtime that is devoted to advertising we will take as given, the product of a separate optimization problem that is not our present focus.) Let p_q be the market price of sponsoring of a unit of q sold to advertisers. In a long-run competitive equilibrium, p_q will be driven down to a level where profit of each media firm is equal to zero such that all firms are competitive price-takers.

The strategic decision facing each of our n identical media firms is to choose the viewer-minutes, q, that maximizes the firm's profit:

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[3] We refer to the public good properties of our news media sites, although for analytical tractability we have assumed each consumer in our model receives media from a single source.

(1)
$$\Pi = p_q q - f - \left(\frac{\sigma}{\alpha}\right)^2 q^2,$$

with first-order condition $\frac{d\Pi}{dq} = p_q - 2\left(\frac{\sigma}{\alpha}\right)^2 q = 0$. This simple functional form is used for ease of transparency, but without loss of generality to our results.

Average cost of production for any given level of viewer minutes for each news firm is then equal to $AC = \frac{f}{q} + \left(\frac{\sigma}{\alpha}\right)^2 q$, which implies that in long-run competitive equilibrium (where profit is equal to zero), the level of output per media firm, price of viewer-minutes, p_q, and total revenue (cost), and variable costs per firm are given by equations (2a-d).[4]

(2a)
$$q_{AC\ min} = \frac{\sigma}{\alpha}\sqrt{f}$$

(2b)
$$p_q = AC_{min} = \frac{2\sigma}{\alpha}\sqrt{f}$$

(2c)
$$R = C = p_q \cdot q_{AC\ min} = 2f$$

(2d)
$$VC = C - L = C - f = f$$

B. Consumers

We model consumer behavior as a time-allocation problem with consumers' one-unit endowment of time allocated between earning wage income or watching/reading/listening to commercially provided news. For our consumers we assume the following:

Assumption 5: There are N consumers, indexed by j, where $j \in \{1, 2 \dots N\}$. Let q_j be the time consumer j devoted to news media viewing, $(1 - q_j)$ be the time devoted to work, w be the wage and $w(1 - q_j)$ be total income, which is transformed into consumption of goods created by producers.

Consumers have a separable utility function of two arguments: income, which is entirely spent on private goods, and the quantity and quality of news viewing. The utility generated from the high-quality news viewing component is equal to $\frac{\alpha}{s} ln(q_j)$, where $\frac{\alpha}{s}$ is a measurement of the quality of news. Thus the problem faced by the consumers is

(3)
$$max\ U_j = \beta w(1 - q_j) + \frac{\alpha}{s} ln(q_j)$$

By *Assumption 3*, the wage is equal to unity, allowing us to drop w from (3), and furthermore, as seen in (2d) this makes variable costs equal to L. Under *Assumption 4*, the quality of news provided by the news media firms depends on the labor costs realized by media firms in

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[4] $\frac{dAC}{dq} = -\frac{f}{q^2} + \left(\frac{\sigma}{\alpha}\right)^2$; *thus at minimum AC we have* $q_{AC\ min} = \frac{\sigma}{\alpha}\sqrt{f}$, *and* $AC_{min} = \frac{f}{\left(\frac{\sigma}{\alpha}\sqrt{f}\right)} + \left(\frac{\sigma}{\alpha}\right)^2 \frac{\sigma}{\alpha}\sqrt{f} = \frac{2\sigma}{\alpha}\sqrt{f}.$

collecting news information, so that $s = \frac{\sigma}{\sqrt{L}}$. Moreover, in long-run equilibrium, since $C = 2f$, fixed costs are equal to f, and $L = f$, so that our maximization problem becomes

(4) $$max \, U_j = \beta(1 - q_j) + \frac{\alpha\sqrt{f}}{\sigma} \ln(q_j).$$

The first-order condition from (3) therefore is

(5) $$q_j^* = \frac{\alpha\sqrt{f}}{\beta\sigma}.$$

The equilibrium number of viewer minutes is fixed from the parameters of the model in equation 2(a). In equilibrium, we must have the total number of viewer-minutes of consumers equal to the total amount of viewer-minutes produced by all media firms, or

(6) $$n\left(\frac{\alpha\sqrt{f}}{\sigma}\right) = N\left(\frac{\alpha\sqrt{f}}{\beta\sigma}\right)$$

This establishes the number of media firms in the industry at

(7) $$n = N/\beta$$

such that in our model the number of media firms is equal to the number of media consumers over consumer preferences for media time over income generation.

C. Results of the model

Our model yields the following key results:

RESULT 1: *As fixed costs of entry into a media market decline, the new equilibrium will be characterized by lower news media quality.*[5]

The intuition for this result is that each firm becomes smaller when fixed costs to market entry fall. Resources for news gathering become more diffuse; hence firms are less efficient at synthesizing information within any given media platform. Specifically, since in zero-profit equilibrium total costs are equal to total revenue and the variable costs of information gathering are directly related to fixed costs, the quality of news provided by each firm declines.

RESULT 2: *As fixed costs of entry into a media market decline, the new equilibrium will be characterized by less news viewing by consumers and greater consumption of private goods.*[6]

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[5] From *Assumption 4*, $s = \frac{\sigma}{\sqrt{L}}$, and by (2d) we have $L = f$. Thus we have that $\frac{ds}{df} < 0$.

[6] From equation (4) $q_j^* = \frac{\alpha\sqrt{f}}{\beta\sigma}$. Thus we have that $\frac{dq_j^*}{df} > 0$, which implies both that media viewing declines and that $w(1 - q_j)$, income earned and spent on private goods, increases.

This is apparent from equation (4). Equilibrium media viewing is a function of media quality which as demonstrated by RESULT 1 is a positive function of fixed costs. As media quality declines, consumers optimally re-allocate time away from news viewing and toward income-generating activity. Hence they re-allocate activity toward increased consumption of private goods sold by producers.

RESULT 3: *As fixed costs of entry into a media market decline, consumer utility declines.* [7]

This follows from a simple application of the Envelope Theorem to equation (4). As the quality of media falls, with homogeneous media firms, consumers are left unambiguously worse off by lower fixed costs of entry into media markets.

Our results highlight the potentially negative impacts of lower barriers to entry in news media markets in which news is generally provided to the population as a commercial public good. A new equilibrium is characterized by poorer news media quality, less news watching by consumers, the combination of which create a more poorly informed population. Consumer time is re-allocated to work and consumption of private goods. It is the provision of news as a commercial public good rather than as a private good that drives our results.

The intuition for the result is that when media is transmitted as a commercial public good, higher fixed costs in media firms "concentrates" investigative resources into a smaller number of media outlets. Consumers benefit through the higher viewership for each media outlet that facilitates the concentration of more information-gathering resources in each firm. In this way, higher fixed costs of entry into such a market results in a more efficient synthesis of information for viewers, allowing viewers higher quality information in the same amount of viewing time. When fixed costs in the industry decrease, the concentration of information-gathering resources is diluted across firms to the detriment of consumers, since viewers are constrained to only watch or read one media outlet at a time.

D. Heterogeneous Media

A straightforward extension of our model illustrates the impact of lower fixed costs into media entry on consumers when media outlets are differentiated. Suppose now that we have a monopolistically competitive market for advertising with n media firms, where market demand for viewer minutes by private good producers in the advertising market is equal to $Q = \Gamma - p_q$. Here we modify Assumption 2 into Assumption 2B:

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[7] From (4), by the Envelope Theorem, $\frac{dU_j^*}{df} = \frac{\alpha}{2\sigma\sqrt{f}} ln(q_j) > 0.$

Assumption 2B: The monopolistically competitive market for viewer minutes is equally divided among n heterogeneous media firms such that the inverse demand for viewer minutes faced by each media firm is $p_q = \Gamma - nq$.

Continuing with our previous average cost function, $AC = \frac{f}{q} + \left(\frac{\sigma}{\alpha}\right)^2 q$, two conditions in the market for viewer minutes must hold in long-run zero-profit equilibrium:

(8)
$$\frac{-f}{q^2} + \left(\frac{\sigma}{\alpha}\right)^2 = -n,$$

which says that zero-profit equilibrium must be characterized by the tangency point between the slopes of the average cost curve and the inverse demand curve for each media firm, and

(9)
$$\frac{f}{q} + \left(\frac{\sigma}{\alpha}\right)^2 q = \Gamma - nq = p_q,$$

which says that in zero-profit equilibrium, the price of a viewer minute (paid by advertisers, not viewers) must be equal to average cost. Totally differentiating and putting these equations into matrix form yields

$$\begin{bmatrix} 1 & \frac{2f}{q^3} \\ q & 0 \end{bmatrix} \begin{bmatrix} \frac{dn}{df} \\ \frac{dq}{df} \end{bmatrix} = \begin{bmatrix} \frac{1}{q^2} \\ -\frac{1}{q} \end{bmatrix},$$

which yields the comparative static $\frac{dn}{df} = \frac{\frac{2f}{q^4}}{\frac{-2f}{q^2}} = -\frac{1}{q^2} < 0$. Thus, as in the case of homogeneous firms, in a monopolistically competitive industry with heterogeneous firms, as the number of firms increases as fixed costs become lower.

Suppose viewers maximize a utility function that is similar to (3), but they have a preference for diversity across heterogeneous media products. We assume that one unit of consumer time is allocated across media sites. Let $\ell \equiv \frac{\alpha\sqrt{f}}{\sigma}$ represent media quality, and without implications for our result, we drop work activity. Thus consumers maximize

(10)
$$U_j = \sum_{i=1}^{n} \left(\ell q_{ij}\right)^\eta,$$

where q_{ij} is the amount of time consumer j spends on media firm i, $\sum_{i=1}^{n} q_{ij} = 1$, and $0 < \eta < 1$. A smaller η represents preferences for greater product diversity, while ℓq_{ij} represents quality-adjusted viewer minutes for each media site i. Suppose consumers maximize utility, achieving

optimal levels of labor and viewing time for each media site. As consumers can obtain information from one media firm at a time, they will spend an equal amount of time on each site, and hence we can re-write (10) as

$$(11) \qquad U_j = n\left(\ell q_{ij}\right)^{\eta}.$$

RESULT 4: *With a monopolistically competitive media industry and consumer tastes for heterogeneous media, consumers may be better off or worse off with lower costs of entry, depending on the strength of preferences for heterogeneity.*

When will lower fixed costs of entry, and the subsequently larger array of media sites increase or decrease consumer utility? Differentiating (11) with respect to f yields the following:

$$(12) \qquad \frac{\partial U_j}{\partial f} = \frac{dn}{df}\left(\ell q_{ij}\right)^{\eta} + \eta\left(\ell q_{ij}\right)^{\eta-1}\left(\frac{d\ell}{df} q_{ij}\right) n.$$

As $\frac{dn}{df} < 0$, the first term is negative and as $\frac{d\ell}{df} > 0$, the second term is positive. This implies that $\frac{\partial U}{\partial f} < 0$ when η is small (close to zero) and consumers value greater product diversity. In this case lower fixed costs to entry in the media market will benefit consumers because even though the quality of media falls, this is outweighed by the greater diversity of media sites. However, when η is large (close to one), then consumers may be worse off. In this case there is a low preference for media diversity and consumers care relatively more about media quality. If declining fixed costs have a strong negative impact on quality, then $\frac{\partial U}{\partial f} > 0$, and lower fixed costs of entry may make consumers worse off.

3. Conclusion and Implications

New information technology has substantially reduced the cost of entry into media markets. What communications researchers call "new media" (internet news and video sites, blogs, music-based webcasts, niche cable or satellite network channels) now compete in the same markets as "old media" (local newspapers, AM and FM radio, traditional local and national broadcast networks). We have shown that in terms of the number of firms providing commercial public goods in the media industry, it may be true that "less is more." With homogeneous news sources, a market with fewer firms is more efficiently able to synthesize information-gathering resources for the viewing public. We show that the unambiguity of our results depend on our assumption that media firms are homogeneous, and that viewers are lured to media sites based on the level of quality (accuracy) in news reporting. If consumers

benefit from a diversity of perspectives, or if there are other fundamental differences between media sites that are important to consumers, lower barriers to entry in a monopolistic competition setting may make consumers either better off or worse off. Whether the positive benefits of increased diversity outweigh the negative consequences from the decline in quality depends on the relative preferences for diversity in consumer utility.

Theoretical models have already cast doubt on the notion that advertiser-supported media results in an optimal array of media programming (Spence and Owen, 1977; Anderson and Coate, 2005; Frijters and Malathi, 2010). While theoretical models have argued that viewer-supported media may be more likely to result in more optimal outcomes from the standpoint of the consumer, there will remain a tendency for "free" (advertiser-sponsored) programming to undercut viewer-supported media in some media markets, and that commercial public goods will always account for a large share of our news and entertainment. In the sense that news media creates a good with positive externalities, our conclusion is similar to Anderson and Coate as well as Frijters and Malathi, who both find that advertising-funded media may undercut quality, though for different reasons than we provide here.

Clearly the positive externalities of news media provision are significant. High-quality media reporting is one of the pillars of modern society, a critical component to the system of checks and balances in a functioning democracy. With relatively few news media sites, media firms whose products operate as commercial public goods are more likely to generate sufficient revenue to hire professional journalists governed by professional ethical codes who are in turn more likely to be held accountable for their content. Moreover, fewer media sites focus attention on the accuracy of individual reporting of events, promoting journalistic accountability. On top of the many new media sites that operate as commercial public goods, there are added tens of thousands of "volunteer" news media sites, where individual bloggers offer their own accounts of events, but where there is far less incentive for the accountability that is inherent in the operation of a large media firm. To a significant level, increased resources purchase accountability and professional integrity. In practical terms, if the entrance of thousands of "new media" sites into the news market are able to divert enough viewership away from traditional sites that have operated as commercial public goods, the loss in advertising revenue (and thus journalistic resources) from these sites may lower journalistic quality and integrity.

If society has an interest in maintaining a high quality of news media, what may reverse a slide into lower-levels of media quality? Alternative funding of journalistic media offers one such possibility, where outlets such as the Public Broadcasting Service (PBS) are funded at least

in part via private donations and through government contributions rather than through advertisements. As the general quality of media has declined, it could be argued that the quality of programming on outlets such as PBS has increased, at least in relative terms. A second possibility is that reputation effects may create equilibria in which a certain few sites become the "trusted" media sites. The interesting question then becomes what levels of economies of scale are necessary for reputation effects to take hold for the emergence of these "trusted" sites. This poses an interested question for future research.

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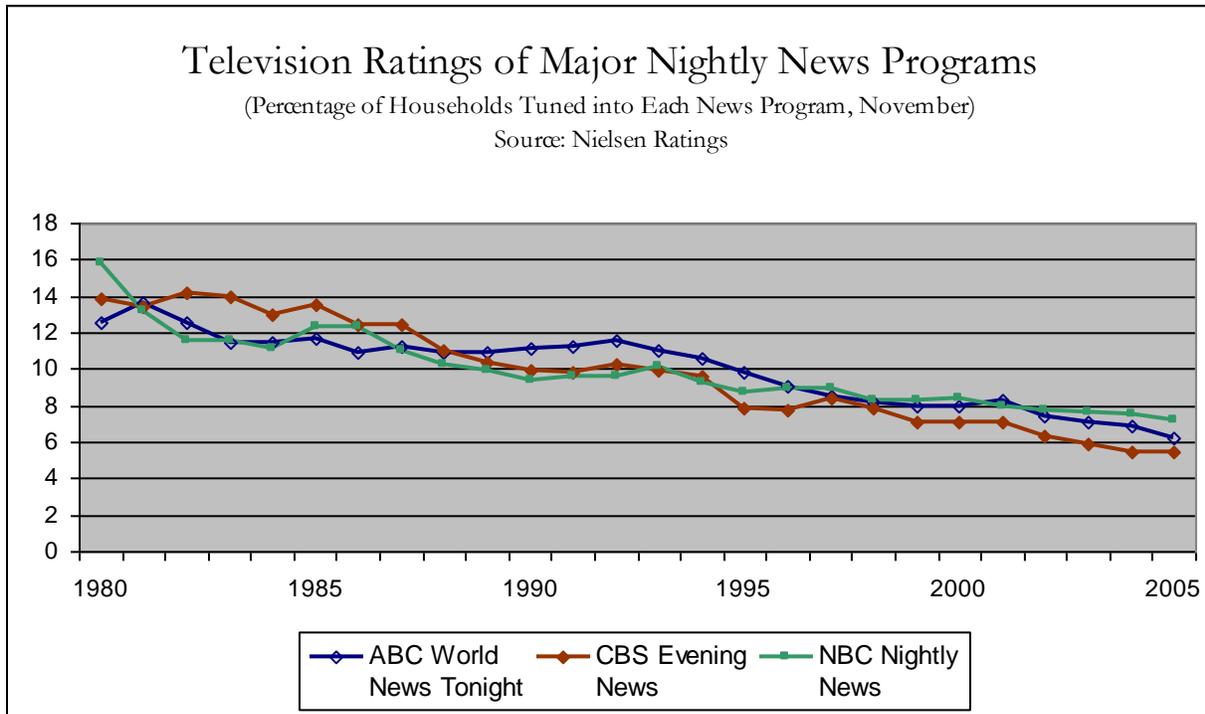
Figure 1: Decline in Television Ratings

Television Ratings of Major Nightly News Programs
(Percentage of Households Tuned into Each News Program, November)
Source: Nielsen Ratings

Legend: ABC World News Tonight | CBS Evening News | NBC Nightly News

Table 1: Newspaper Closures

Newspaper	Date of Demise
Tucson Citizen	May 2009
Rocky Mountain News	February 2009
Baltimore Examiner	February 2009
Kentucky Post	December 2007
Cincinnati Post	December 2007
King County Journal	Jan 2007
Halifax Daily News	February 2008
Albuquerque Tribune	February 2008
South Idaho Press	August 2008
San Juan Star	August 2008
Source: Newspaper Death Watch, October 2009	

Table 2: Decline in Newspaper Circulation

| Number of Daily Newspapers | | | | |
Year	Morning	Evening	Total Newspapers	Total Circulation
1940	380	1,498	1,878	32,371,000
1950	322	1,450	1,772	46,582,000
1960	312	1,459	1,763	47,699,000
1970	334	1,429	1,748	49,217,000
1980	387	1,388	1,745	54,676,000
1990	559	1,084	1,611	62,635,000
2000	766	727	1,480	59,421,000
2002	777	692	1,457	58,780,000
2004	814	653	1,457	57,754,000
2006	833	614	1,437	53,179,000
2008	872	546	1,408	49,115,000
Source: Editor and Publisher International Yearbook				

Figure 2: Percentage of People Listening to Radio at Least Once Per Week:
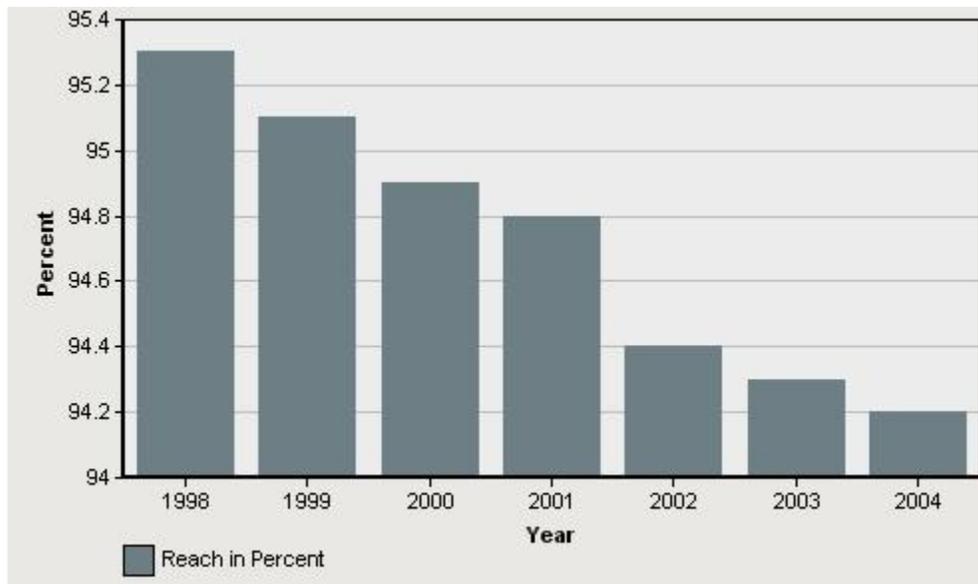
Source: Arbitron Media Research

Figure 3: Percentage of People Who Viewed or Read News by Various Media Platforms
(Among Those Who Viewed or Read News Yesterday)
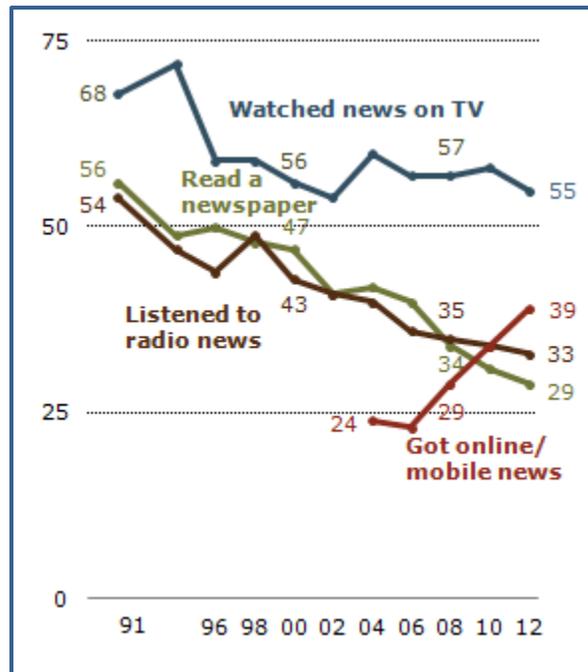
Source: Pew Research Center, 2012 News Consumption Survey