Concentration in Advertising-Supported Online Markets: An Empirical Approach

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Abstract

This paper examines the causes of market concentration in advertising-supported online markets such as sports, news, and email. In particular, it is the first paper to explore the relationship between concentration and product differentiation, economies of scale, market size, advertising, content costs, and multi-market ownership in online markets. As expected, differentiated large markets with low content costs and little multi-market ownership are less concentrated. Furthermore, I show that advertising-supported online markets have much in common with the magazine industry.

Keywords: Internet, concentration, market structure

(JEL classification: L1, L8).

1. INTRODUCTION

Internet use has grown rapidly since the Internet was privatized in 1992. It has begun to permeate the everyday life of millions of Americans. When online, people generally go to free advertising-supported websites. As Nie & Erbring (2000, pp. 5) put it, "the Internet today is a giant public library with a decidedly commercial tilt." The data used in this study show that 62% of all World Wide Web traffic takes place at these advertising-supported websites. Additionally, advertising-supported websites comprise the top ten websites in terms of both most visited and total time spent and they generate billions of dollars in advertising revenue. In this study, I investigate the causes of concentration in markets for advertising-supported websites.

This study does a cross-market analysis of twenty-six different advertising-supported Internet services and explores the relationship between market concentration and market size, product differentiation, sunk costs, and multi-market ownership. I use a data set, provided by Plurimus Corporation, that tracks 7,676 households to the 325,319 websites that they visited during the week of March 23-29, 2000. Using this data I identify 26 categories for advertising-supported websites. I construct concentration measures in each of the twenty-six categories as well as measures of market size, product differentiation, ownership of more than one online website, and ownership of relevant offline content. I also have data on advertising expenditures by the websites from J. Walter Thompson Company.

Advertising-supported Internet companies function in two distinct markets. They gain their revenue from advertisers and compete for these advertising dollars with hundreds of competitors in a market that approaches perfect competition. They also compete with each other for users in several smaller markets. From the user's perspective, news websites and games websites are not substitutes, but distinct products. In this study, I focus on concentration in these smaller markets. Most of the costs faced by advertising-supported Internet companies involve bringing users to their websites and keeping them there. These users can be viewed as a product that firms sell to advertisers. In this view advertisers are the customers and users are the suppliers. Concentration in these smaller supplier markets may lead to monopsony behavior. More concentration in these markets may allow firms to exploit market power by deteriorating quality, just like a retailer with market power over manufacturers can reduce the price it pays for products.

Using Plurimus' data, I examine whether several market concentration relationships found by Bain (1956), Sutton (1991), and others in different markets hold in advertising-supported online markets. While neither Sutton nor Bain employs the same methodology that I use here, I investigate whether their hypotheses on the determinants of market concentration are robust to 'new economy' Internet services. I find that the negative impact of market size is the most important factor in determining market concentration. I find that this is an industry where market size and multi-market contact are major determinants of concentration. Also as expected, taste for variety (a form of product differentiation) is associated with lower concentration, online multi-market ownership with higher concentration, and offline content with lower concentration. Advertising does not have a significant effect. Even with only 26 data points, these results are strong and robust to specification.

The importance of market size and multi-market ownership to concentration is also true of the magazine industry. Furthermore, the market structure is similar: several large firms with products in many categories coexist with niche players. I therefore suggest that several of the strategies employed in the magazine industry will be effective in the online world.

Even though it is advertisers that are the true customers of these websites, understanding the causes of market concentration on the user side of the market is important for understanding optimal firm strategies and other measures of firm performance. Using this unique data set that allows for the variables to be measured consistently across markets, I examine several determinants of concentration in this new and poorly understood industry. Knowing that advertising-supported Internet markets share much in common with the magazine market gives a perspective for understanding these markets separate from the more common technological viewpoint.

2. MARKET POWER IN ADVERTISING-BASED INTERNET SERVICES

According to the Interactive Advertising Bureau, online advertising spending reached $8.2 billion dollars in the year 2000. Most online traffic is to advertising-supported websites. These companies, however, operate in a peculiar environment. They compete with each other to gain users in small markets and then sell access to their audience to advertisers. Almost all of their revenue comes from advertising. While the

advertising side of the market is largely competitive, many of the markets in which websites compete for users are highly concentrated.

Ideally, I would have been able to simultaneously study the advertising side of the market and the user side of the market. However, data are not yet available that would allow this project. In future work, I aim to conduct a study of market power simultaneously on both sides of the market. Nevertheless, understanding concentration on the user side of the market is interesting in itself. Concentration can lead to market power.

For example, take the standard Hotelling model of horizontal differentiation.[1] In what follows, I will give a brief description of an adaptation of this model to one of quality competition for price-taking firms. I show that market power, in the form of transportation costs, affects profits. Let two firms, A and B, be located on opposite ends of a horizontal line of measure one. Therefore a consumer located at point x has utility from consuming Firm A's product of $u_A=v-tx+q_A$ where q_A is quality of firm A and t is a transportation cost. Let v be large enough so that the market is covered. The utility from consuming Firm B's product is $u_B=v-tx+q_B$. Firm A's demand will be $D_A=x=(q_A-q_B+t)/(2t)$. Similarly Firm B's demand is $D_B=x=(q_B-q_A+t)/(2t)$. Profit for Firm I$\in$ {A,B} will be $\Pi_I=(p-cq_I)D_I$. Solving gives $q_A=q_B=p/c-t$ and $\Pi_I=0.5ct$. Therefore as the transportation cost between two competitors increases, quality decreases and profits rise. In other words, as competition falls, firms exploit market power by reducing quality. Adding more firms to a linear city model is equivalent to reducing the distance between firms, which in turn is equivalent to reducing the transportation cost in the market.

The above example shows that concentration in the market for users can lead to market power, even if firms are price takers in the advertising market. Therefore, understanding the causes of concentration on the user side of the market matters for determining optimal firm strategies.

3. A BRIEF HISTORY OF ADVERTISING-BASED INTERNET SERVICES

Before government ties to the Internet were severed in 1992, the Internet was largely a realm for academics and computer scientists. The most common application

[1] This model is adapted from Tirole (1988 section 7.1.1)

was email, although newsgroups and chat rooms were also prevalent (Clemente 1997). With the rare exception of chat room auctions, the Internet was used largely for free communication. In fact, nine of the twenty-six services used in this study existed in some form during the academic era of the Internet: email, community, chat, portal/search, genealogy, news, games, technological information, and directory. Although these would have looked quite different than they do today, people were using the Internet for these purposes before commercial activity became prevalent and even before the browser became standard.

While the browser was invented alongside the hypertext markup language (html) by Tim Berners-Lee in 1989, it did not become widely used until several computer scientists at the University of Illinois made the Mosaic browser publicly available in 1993. The intuitive interface of Mosaic (which later became Netscape), along with the concurrent privatization of the Internet, led to the growth of the first commercial websites. Almost all of these early websites did not charge users for their products and services. MTV set up its first website in 1993. The first banner advertisement (for Zima alcoholic beverages) appeared on Hotwired magazine's webpage on Halloween 1994. A new advertising-based industry was born. Several other Internet companies set up in 1994 including Yahoo!, Lycos, and Sportsline. By the end of 1995, fifteen of the twenty-six categories in this study were well established. But the end of 1996, only the two streaming media categories were not established. Advertising-supported services developed early and rapidly on the Internet.

Despite the appearance of rapid change, the leading websites in the various categories have changed little since 1997. In 18 of the 24 categories that existed at the time, the website with the most unique visitors in the category has not changed since April 1997.[2] Of those that did change, three of the former leaders are now second. Also eight of the top ten most visited websites of February 1997 remained in the top ten in March 2000. The other two remained in the top twenty. Contrary to appearances, advertising-based Internet services are relatively stable at the top end, although many medium-sized websites have disappeared since the market crashed in April 2000. This

[2]Several category leaders were listed as one of the top twenty websites in April 1997 according to RelevantKnowledge. The other category leaders were found through Lexis-Nexis searches of newspapers and magazines from the spring of 1997.

stability is an important point for the validity of this study. Schmalensee (1989, pp. 953) asserted, "The usual presumption in cross-section work in all fields of economics is that observed differences across observations reflect differences in long-run equilibrium positions." He suggested some kind of panel analysis to test for equilibrium. While I do not have data for all websites for any time other than March 2000, the data I do have from 1997 shows considerable stability. There appears to be a large first mover advantage, little successful entry, and little change in rank over time.

4. INTERNET LITERATURE

The economic literature on the Internet is small, but growing rapidly. The focus of much of this literature, however, has been on prices. Bakos (1997) asserted that price dispersion would fall due to low online search costs. Dozens of theoretical and empirical papers have followed exploring this topic and others relating to online pricing. This literature largely does not address the two major points explored in this study. It generally does not examine the advertising-supported websites at which 66.7% of all Internet traffic takes place and it does not look at concentration online.

Several papers have begun to explore economic issues at advertising-supported websites. Gandal (2001) looks at search engine competition. He explores the impact of various quality measures on market shares and on growth. Using five months of market share data spread over two years for eleven firms, he finds that there is an early entrant advantage, but that it decreases over time. From this he concludes that entry barriers are small and that switching costs are low.

There are a number of papers on concentration in related industries. Greenstein (1998, 2000) looks at concentration in the commercial Internet service provider market. Choi, Stahl, & Whinston (1997) summarize several papers on the market structure of the Internet backbone industry. There has also been considerable research on concentration in other advertising-based industries such as network television and radio. Berry & Waldfogel (1999) compare radio advertising prices and market size in several cities to determine if there is too much entry. Ekeland, Ford, & Koutsky (2000) find that radio market concentration does not have a significant effect on profits.

There is a gap in the literature, however, with regard to the market structure of advertising-based Internet services. Furthermore, the Internet has several characteristics

that make it of particular interest. Advertising-supported Internet companies are in a rapidly growing industry that, like broadcast television and radio, consists of non-rival goods.[3] The Internet differs from television and radio in that it spans all types of media from the telephone (chat) to the television (entertainment). Furthermore, in this study data collection for each Internet industry uses the same methodology, making cross-category comparisons more reliable.

5. FRAMEWORK

Cross-sectional methodology has fallen into disuse due to theoretical ambiguities in the relationship between commonly measured variables and because measurement of various factors in different industries can take different forms. These problems are limited in this study. First, economic theory does provide consistent predictions about the relationship between concentration levels and market size, preference for variety (a form of product differentiation), multi-market ownership, exogenous sunk costs, and advertising. Second, since the variables are measured using the same data for each category and since the categories are similar, measurement errors across categories are likely to be similar.

Following Schmalensee's (1989) advice for cross-sectional studies, I seek to "describe the main patterns in the data set employed as clearly and completely as possible." Based on previous economic studies, I make four hypotheses about the relationship between various factors and concentration. These hypotheses are summarized in Table 1.

Hypothesis 1: Smaller markets will be more concentrated. This relationship will be stronger when advertising is less important. The first part of this hypothesis can be found in Bain's (1956) work on barriers to entry. The basis for it is simple; as market size grows, there will be room for more firms to overcome the sunk costs associated with entry. Bain includes advertising along with other sunk costs. Since marginal costs are near zero, sunk costs will comprise the bulk of total costs. The second part of the hypothesis comes from Sutton (1991). While his argument focuses on a lower bound, he emphasizes that the relationship between concentration and market size is weaker for

endogenous sunk costs that grow with market size such as advertising and research and development than for exogenous sunk costs.

Hypothesis 2: Less differentiated markets will be more concentrated. This argument is discussed in Bain (1956) and in Schmalensee (1989). The reason for this hypothesis is that differentiation reduces competition allowing more firms to gain sufficient rents to cover the entry costs. In this study, the differentiation takes the form of preference for variety.

Hypothesis 3: Markets with higher sunk costs will be more concentrated. Bain (1956), Schmalensee (1989) and several others have argued that higher sunk costs pose a barrier to entry. Advertising-supported websites face three major types of sunk costs: content development, marketing, and infrastructure. I explore Bain's hypothesis for two of the three types of sunk costs these firms face: content development (though offline partnerships) and marketing (through advertising spending). I do not explore infrastructure costs. While Bain (1956) groups advertising in with other kinds of sunk costs, Sutton (1991) argues that advertising will not be correlated with concentration because it is an endogenous sunk cost.

Hypothesis 4: Markets with more multi-market ownership will be more concentrated. This could be due to economies of scope or the leveraging of market power. In either case a dominant firm in one market can use that position to become dominant in another market, leading to greater concentration. For example, Yahoo!Finance is the leading finance website because Yahoo encourages visitors to its search page to go to its finance page. In addition to potential economies of scope in content and infrastructure due to organizational learning, there are substantial economies of scope in marketing and distribution as there are in printed media such as newspapers and magazines. Advertising for Yahoo!'s main website leads people to its sports and entertainment sections. Also, traffic on its main website reduces the advertising costs of its other sections through links. In its annual report, Yahoo! attributes increases in sales and marketing costs to expansion into new countries, rather than to expansion of content offered.

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[3]A good is non-rival if consumption by one person does not prevent consumption by another person of the same good.

6. DATA

To investigate the above four hypotheses, I construct market shares in several advertising-supported online categories and look at the relationship between various concentration measures based on these market shares and measures of product differentiation, advertising, market size, online multi-market ownership, and offline content.

Plurimus Corporation provided the data used to construct the market shares. It tracks of a panel of 7,676 online users to every website they visited from March 23 to March 29, 2000 for a total of 325,319 website visits.[4] An advantage of this data set over that of several other online tracking companies is that the users do not know they are being tracked. People may act differently when they know that they are being tracked, perhaps avoiding websites they feel may be immoral. Plurimus' data, for example, has a larger percentage of people visiting adult and gambling websites than do other panels. The company avoids significant privacy concerns because the users are anonymous and the data cannot be traced to any actual person. They are regularly audited by PriceWaterhouseCoopers in order to ensure they exceed the privacy requirements of the FCC guidelines.

This data, however, has three weaknesses. First, the geographic distribution of the sample is unrepresentative. New York, Chicago, and Los Angeles are underrepresented. 18.3 % of the sample is from Grand Rapids, 15.8 % from Pittsburgh, and another 8.7 % from Raleigh-Durham. This problem is not as severe as it may first appear because few of the markets in this study involve local content. Of those that do, such as news, weather, and city guides, national websites tend to dominate location-specific websites.[5] Nationally representative panels from companies such as Nielsen/Netratings and MediaMetrix have similar findings. In addition the sample population and the US population are fairly close regionally. The sample has 27.9% in the Northeast, 27.2% in the South, 29.4% in the Midwest, and 15.5% in the West. According to the US census, the actual population is 19.0% in the Northeast, 35.4% in

[4]Plurimus collected data by making agreements with dozens of Internet Service Providers to collect data on their users.

the South, 23.2% in the Midwest, and 22.4% in the West. The second weakness is that it does not track America Online (AOL) users. Since AOL subscribers make up roughly 50% of all American home Internet users, this could skew the results.[6] AOL, however, provides a different product from the other Internet service providers. AOL users are encouraged to stay within the gated AOL community and they generally do not venture out onto the rest of the Internet. The lack of AOL data will reduce concentration in markets where AOL has a presence. These markets are already generally less concentrated (news, games, directory, search, etc.) and therefore including AOL users is unlikely to change the qualitative results of the study. Lastly, the data does not track users at work. This is a considerable problem since online habits at work are different from those at home; however, according to a study by Nie and Erbring (2000), 64.3% of Internet users use the Internet primarily at home; just 16.8% use it primarily at work. Furthermore, few data sets contain reliable at-work panel data.

Using Plurimus' data, I determine two measures of market share. The first, called 'unique visits', is the one generally used by websites and online marketers. It measures the number of different users who go to a given website over the course of the week. Therefore an individual who goes to a given website several times over the course of the week is counted as just one visit. The second measure, called 'total visits', measures the total number of visits to the website. Within each online market, these two measures of market share give similar results; however, in a small number of markets there are considerable differences in total market size. For example, the portal/search category is 24.5% of all total visits but only 13.2% of all unique visits. In other words, individuals return to the same portals several more times during the week than they return to other websites.

I focus on the market in which firms compete in quality and marketing for users, rather than the market for advertising. Both markets, however, are important aspects of the online publishing business. Market definition poses a considerable problem in all inter-industry studies. Any results relating to market size and product differentiation depend on the definition of the markets. The market definitions were derived from

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[5]For example, msnbc is the leading news website, weather.com is the leading weather website, and citysearch.com is the leading city guide.

twenty-two markets defined by Plurimus. I merged two of their other market definitions, and created three more from their miscellaneous category. The types of services represented in the sample vary considerably. Even though they are all advertising-supported online services they cover all kinds of media types from personal communications to reference to broadcasting. This is a strength of the study. It allows comparison of several distinct media with identical measurement tools. If a website does more than one thing, the web pages devoted to a particular category are considered part of that category. For example, YahooSports is in the Sports category and YahooFinance is in the finance category. General entertainment websites are devoted to all kinds of entertainment. For example E!Online and Entertainment Tonight count as general entertainment while Hollywood.com is movies and NBC.com is television. Those E!Online pages that focus on television content only count in the television category. Table 2 lists the categories.

The 'Number of distinct users' is the number of different people who visit a website in that category. The large number in each category shows that the measures used in this study are statistically reliable. The number of distinct users in the categories range from 188 in real estate to 5,632 in portal/search. The 'Total number of websites' is the number of websites in that category visited by at least one user in the sample. Some categories have dozens of fringe websites, much like the magazine industry. Several advertising-supported websites did not fit into any of the categories while others contained only company-specific information. These are listed in Table 2 as "Other advertising-supported websites".

Since Schmalensee (1989) notes that "received theory does not dictate the choice of concentration measure," several different measures of concentration are used as dependent variables in this study. Most of the results are reported used the four-firm concentration ratio (C4) for unique visits as the measure of concentration. I also show results for Herfindahl, C8, and C1. I choose to report mainly unique visitors rather than total visitors because there is a small number of users who go back to certain websites several times over the course of the week (especially in portal/search and general

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[6]AOL had 21 million users in March 2000 (Tsuroka (2000)), and, according to Jupiter Communications, 43 million households were online (Yung (2000)).

streaming media). By focusing on unique visits, this small number of users cannot overly influence results.

I use five independent variables in this study: product differentiation, market size, advertising, online multi-market ownership, and offline content. Of these, product differentiation is the most difficult to formalize. Any measure of product differentiation, however, will depend on market definitions. Narrowly defined markets will have less product differentiation. The results, however, are robust to dropping various markets from the study.

Product differentiation can take two forms: individual preferences for variety and different tastes between individuals. I do not have a measure of different tastes, but I do have a measure of preference for variety. I start with the percentage of individuals who went to two or more websites in the category during the week given that they went to one website in the category. This measure depends heavily on each user's total number of visits to websites in that category. Therefore I divide by the average number of visits by users in a particular category to control for this bias.

Market size is defined by the sum of all unique website visits in that category when market concentration is measured using unique visits. Similarly, when concentration is measured using total visits, market size is the sum of all visits in that category.

Advertising spending in thousands of dollars in each category was calculated using data from J. Walter Thompson Company. The data consisted of advertising spending by individual Internet companies on television, on radio, in print, and outdoors for the fourth quarter of 1999. The totals for each firm and then each category were summed together to get total advertising spending by category. This type of advertising made up over 80% of first quarter 2000 advertising spending by Internet companies according to other J. Walter Thompson Company data.

Online multi-market ownership was defined as follows. First the smallest number of websites making up 90% of all unique visits in each category was identified. Online multi-market ownership was measured as the percentage of these websites that are at least partially owned by, and hyperlinked to, one of the top fifteen websites in terms of

unique visitors.[7] There had to be ownership plus a direct hyperlink from a top fifteen website to the website in question. This variable reflects horizontal multi-market ownership and captures either economies of scope or the leveraging of market power. I focus only on top 15 websites because it is these companies that will generate market power and have the resources to allow economies of scope in distribution and content development.

Use of owned offline content was defined similarly using firms with 90% of total market share. The variable was defined as partial ownership by an offline firm where the offline owner contributed content to the website. This variable may measure some economies of scope or market power leveraging, but it likely measures lower exogenous sunk costs, or, in other words, some economies of scale. Online firms whose content comes from offline owners do not have to pay to develop that content themselves. Since content development is a considerable cost for online services, the lower content development cost in these markets likely means sunk costs are lower. Table 3 summarizes the variable definitions, and Table 4 provides summary statistics. Despite appearances in Table 4, multi-market ownership and offline content are not highly correlated (the correlation coefficient is –0.01).

7. RESULTS

Table 5 provides the general results of the study. It gives the coefficients and t-statistics of ordinary least squares regressions of concentration on various market characteristics and a constant.

As anticipated in hypothesis 1, market size has a significant negative impact on concentration. Also, as hypothesis 2 predicts, preference for variety leads to less concentration. Offline content has a significant negative impact, which is consistent with hypothesis 3. Contrary to part of hypothesis 3, however, advertising does not have a significant effect and the sign of its coefficient changes depending on the other variables included. Hypothesis 4 is supported because online multi-market ownership has a significant positive impact on concentration. This lends support to Sutton's (1991)

[7]The top fifteen were chosen because most of the well-known websites with many hyperlinks such as Yahoo and MSN are included. Furthermore, the 16th through 19th most visited have few hyperlinks: eBay, weather.com, ESPN.com, and Tripod respectively.

concept of endogenous sunk costs. This issue will be further explored below. There are thus two significant demand-side factors: market size and product differentiation; and two significant supply-side factors: online multi-market ownership and offline content (respectively economies of scope or leveraging market power and economies of scale). Marginal effects will be discussed below.

As stated in hypothesis 1, Sutton predicted that the effects of advertising would be correlated with size. He argued that size would only affect market share if advertising were unimportant in that market. Columns (3) and (4) of Table 5 explore Sutton's hypothesis on the difference between exogenous and endogenous sunk costs. They do not directly test his hypothesis because he emphasized lower bounds rather than a linear relationship. Sutton does predict that size will matter less for concentration in markets with more advertising. Two different interaction variables are used in Table 5 in order to test this prediction. The first is the multiplication of market size and an indicator variable for when advertising spending is greater than five million dollars. The second multiplies market size by advertising spending. In both cases, no effect is found.

Columns (5) through (7) show the results using different measures of concentration. The results are clearly robust to specification. The signs of all variables remain the same. The results for C8 are almost identical to the results of C4, even in terms of magnitudes of the effects. The results for C1 and the Herfindahl are also very similar to those for C4, although multi-market ownership has a smaller, statistically insignificant correlation with concentration. In both cases, this is a result of the fact that the top firm in real estate has no multi-market contact despite having the highest market share of any top firm. Dropping this observation leads to significance in both cases.

Table 6 examines the marginal effects of a one standard deviation increase in one of the independent variables. It shows that market size has by far the largest effect on concentration. A one standard deviation increase in market size decreases C4 by over 11%, a considerable drop since the average C4 is 60%. This supports the hypothesis that these are markets with high exogenous sunk costs as expected by Bain and by the non-rival, non-excludable nature of these goods. Online multi-market ownership is the second most important. The importance of both market size and multi-market ownership suggests that this industry shares many features of the magazine industry. Offline content and preference for variety also have considerable effects on concentration. Advertising

alone has little effect but there is also limited evidence for Sutton's distinction between exogenous and endogenous sunk costs. When advertising is important, the effect of market size falls.

Several different robustness checks were performed by changing the markets used, the variables analyzed, the statistical method, and the product differentiation definitions. Details of several of these can be found in the table in the appendix.

Different statistical methods do not change the results. Using weighted least squares (by number of users), the results change little in both magnitude and significance. Using a logit analysis with grouped data makes several of the results more statistically significant. I chose to focus on OLS regressions rather than the grouped data logit because the results are similar, OLS coefficients are easier to interpret, and OLS is more familiar to most researchers. Using total visits instead of unique visits also does not change the qualitative results.

When preference for variety is not normalized, the impact of market size becomes insignificant but the other results change little. As expected, this suggests that the total number of different websites in the category per household is dependent of the total number of visits by that household. Without the normalization, the preference for variety variable measures the interaction of size and preference for variety. Replacing the percentage of individuals who visit two or more websites with the mean number of websites visited does not change the qualitative results much.

Adding a dummy variable for whether the category existed before the 1992 commercialization of the Internet has no significant effect and it has little effect on the significance and magnitudes of the other variables.

8. SUBSEQUENT EVOLUTION OF MULTI-MARKET OWNERSHIP

The role of multi-market ownership in driving concentration explains much of the evolution of advertising-supported Internet markets since this data was collected at the beginning of 2000. Multi-market ownership has increased a great deal. Four firms in particular have expanded into many new categories: AOL, CNET, MSN, and Yahoo. As predicted by hypothesis 4, a dominant firm in one market can use that position to become dominant in other markets. The numerous acquisitions and expansions by these four

companies suggest they are using the large volume of users to their core websites to increase concentration in other markets.

The most dramatic of these changes was AOL's purchase of Time Warner. This gave AOL a significant market presence in all entertainment and news related categories. AOL has used this position to increase the market share of CNN.com as the leading online news source. AOL also purchased Mapquest in 2000. CNET has expanded by purchasing MySimon and supporting Gamespot. Both of these websites have increased market share recently. Microsoft's MSN has partnered with ESPN and Citysearch (city guide), launched new services at MSN homeadvisor and expanded MSN Carpoint. Again, all of these websites have increased their web presence since MSN began supporting them. Yahoo has purchased Hotjobs.com and Launch Media Inc. (music). Each of these websites showed large gains in market share after integration with the Yahoo website. Furthermore, it has started websites in new categories including Yahoo Photos, Yahoo Invites, and Yahoo Webcast. Yahoo is now among the leaders in each of these categories.[8] In each of these cases, a firm with considerable traffic to its main website has used this to increase multi-market contact in order to gain market share in other categories.

9. MAGAZINES AND THE INTERNET

In their book *Who Owns the Media?*, Compaine & Gomery (2000) discuss competition and concentration in several different media including television, radio, newspapers, and magazines. They argue that market structure in the magazine industry is characterized by a number of factors. Entry is easy, but distribution is difficult to achieve. Concentration is largely determined by market size and distribution costs. Firms that own several magazines can reduce these distribution costs by the exercise of market power and through economies of scope. Large media conglomerates coexist with small niche players. And there is a high mortality rate for magazines.

These are also all characteristics of advertising-supported online markets. Entry is easy: a personal website can be posted for less than $100. Driving traffic to a website, however, is difficult to achieve and depends on quality content and savvy marketing. I

[8] Information for this paragraph is from http://www.cyberatlas.com and from company annual reports.

showed above that concentration is largely determined by market size and sunk costs. Online publishers that own several websites can exploit economies of scope in marketing and content costs. Furthermore, large media companies like AOL/Time Warner coexist with small niche players such as gradingthemovies.com, and all players face a high mortality rate.

The similarities between these markets suggest that successful strategies in the magazine publishing industry will likely also work in the online publishing industry. As the audience for magazines developed over time, it fragmented and new niche players entered. The ability of the larger players to reduce distribution costs allows them larger profits than their smaller rivals and encourages them to buy the most successful of the small firms. Compaine & Gomery (2000, pp. 189) emphasize that successful new magazines "are started to fill a niche that no one else has noticed or that was felt to be too small." New online publishers should look for unexplored niches. Those that aim to compete against the large conglomerates will not success. For example, in online sports publishing, small players Quokka Sports and Rivals.com aimed to compete directly with Disney's ESPN and AOL/Time Warner's CNNSI. Both companies folded recently. On the other hand, mountain biking and hiking website trailmonkey.com continues to thrive. Larger websites can grow by buying the more successful of their smaller rivals. For example, Microsoft bought hotmail to help grow its media presence and AOL bought Mapquest.

Compaine & Gomery also suggest that successful magazines often use outside services for most of the physical production process, allowing them to focus on their core strength: content. Outsourcing will also likely prove an effective strategy for Internet publishers. Many already outsource hosting, and advertising sales through companies such as Homestead and Doubleclick. Successful strategies in the magazine industry work online.

10. CONCLUSION

This study has examined four hypotheses and showed that effects of market size, preference for variety, sunk costs, and multi-market ownership on concentration all proved consistent with previous results in economics through several robustness checks. The multi-market ownership results explain much of the subsequent pattern of mergers

and acquisitions. Furthermore, it showed that advertising-supported Internet markets have much in common with the magazine industry.

Market size is the most important factor in determining concentration. This is a discouraging sign for managers. As the Internet grows, the individual markets will grow with it, and larger markets will mean more competition. In order to meet this threat of growing competition, effective strategies include many used in the magazine industry such as niche marketing and outsourcing.

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TABLE 1: Summary of Hypotheses

Hypothesis 1	Smaller markets will be more concentrated. This relationship will be stronger when advertising is less important.
Hypothesis 2	Less differentiated markets will be more concentrated.
Hypothesis 3	Markets with higher sunk costs will be more concentrated.
Hypothesis 4	Markets with more multi-market ownership will be more concentrated.

TABLE 2: Online markets

Category	% of unique visits	% of total visits	# of distinct users	C4	# of websites	Top Website
Portal/search	23.5	36.8	5632	50.2	88	Yahoo
Email	7.0	8.8	2195	58.5	67	Hotmail
Community	6.3	5.8	2784	62.8	60	Geocities
Financial information	5.1	5.7	2000	47.2	161	YahooFinance
News	4.2	3.7	1848	39.7	114	CNN.com
Games	3.8	2.5	1712	35.8	219	Boxerjam
General streaming media	3.7	4.7	2196	84.5	15	Real.com
Sports	2.8	2.5	1420	59.7	116	ESPN.com
Technology	2.7	2.1	1322	60.3	108	ZDNet
Vertical portals	1.9	1.2	1156	38.9	94	Women.com
Music	1.8	1.9	899	24.1	110	MP3.com
Weather	1.8	1.9	1225	81.8	22	Weather.com
Chat	1.7	1.6	1166	71.3	50	YahooChat
Television	1.6	1.2	994	39.3	60	TVGuide
E-cards	1.5	0.8	938	68.5	37	Bluemountain
General entertainment	1.4	0.9	950	74.2	21	YahooEntertainment
Directory	1.1	0.6	730	30.9	29	Switchboard
Health information	1.0	0.5	620	45.8	55	Onhealth
Maps	0.9	0.5	633	87.9	11	Mapquest
Jobs	0.6	0.4	354	58.8	44	Monster
City guides	0.6	0.4	440	70.3	117	Citysearch
Audio-only streaming media	0.5	0.3	403	72.9	16	Winamp.com
Movies	0.4	0.2	297	58.6	34	IMDB
Genealogy	0.4	0.2	220	73.7	12	Ancestry.com
Classifieds	0.3	0.2	221	90.7	18	ExciteClassifieds
Real estate	0.3	0.2	188	76.8	27	Realtor.com
Other advertising-supported websites	18.5	14.4				
Total Number	83,366	212,877	7,676			

TABLE 3: Variable definitions

Variable	Definition
Market Size-total (unique) visitors	The sum of all (unique) website visits in that category.
Online multi-market ownership	Percentage of websites (covering 90% of the market in the category) owned by, and hyperlinked to, a top 15 website
Offline content	Percentage of websites (covering 90% of the market in the category) owned by, and using content from, an offline partner.
Preference for variety	The percentage of individuals who visit two or more websites in the category divided by the total number of visits per person in that category.

TABLE 4: summary statistics for market data (n=26)

Variable	Mean	Standard deviation	Minimum	Maximum
C4 unique visits	60.12	18.35	24.1	90.7
C4 total visits	66.69	17.94	25.8	94.2
C8 unique visits	74.58	17.07	39.8	97.4
Herfindahl index unique visits	0.159	0.0971	0.0280	0.348
Preference for variety	0.0994	0.0329	0.0450	0.178
Advertising ($ 000)	13,084.9	33,719.7	0	170,965.9
Market size unique visits	2472.15	3822.9	241	19,630
Online multi-market ownership	0.260	0.225	0	0.912
Offline content	0.280	0.320	0	0.889

TABLE 5: OLS regressions (with t-statistics in brackets)

Dependent Variable (N=26)	C4 (1)	C4 (2)	C4 (3)	C4 (4)	C8 (6)	C1 (7)	Herfindahl (5)
Market size	-0.00289***	-0.00338*	-0.00416*	-0.00376*	-0.00276***	-0.00188**	-1.40E-05**
	(-3.05)	(-1.89)	(-1.83)	(-1.835)	(-3.23)	(-2.35)	(-2.62)
Online multi-market ownership	34.06*	33.51*	32.65*	31.82*	32.65**	11.41	0.106
	(2.00)	(1.92)	(1.83)	(1.74)	(2.13)	(0.795)	(1.10)
Offline content	-20.28**	-20.53**	-19.99*	-19.61*	-17.30*	-14.43*	-0.104*
	(-2.17)	(-2.14)	(-2.04)	(-1.95)	(-2.05)	(-1.83)	(-1.96)
Preference for variety	-201.33*	-210.39*	-211.96*	-192.46^	-207.34**	-164.90*	-1.10*
	(-2.03)	(-2.00)	(-1.98)	(-1.66)	(-2.312)	(-1.97)	(-1.96)
Advertising		6.22E-05	-3.86E-05	-7.66E-05			
		(0.325)	(-0.147)	(-0.194)			
(Advertising>$5 million)*size			0.00165				
			(0.574)				
Advertising*size				9.88e-09			
				(0.405)			
R^2	0.471	0.470	0.483	0.478	0.501	0.361	0.393

*** significant at a 1% level in a two-tailed test
** significant at a 5% level in a two-tailed test
* significant at a 10% level in a two-tailed test
^ significant at a 10% level in a one-tailed test

TABLE 6: Marginal effects (standard errors in parentheses)

Variable	Regression (1) (general)	Regression (4) (Sutton)
Preference for variety	-6.62	-6.33
	(3.26)	(3.83)
Market size	-11.05	-14.37
	(3.62)	(7.82)
Online multi-market Ownership	7.66	7.16
	(3.83)	(4.12)
Offline content	-6.50	-6.28
	(2.99)	(3.22)
Advertising ($ 000)		-2.58
		(13.32)
Advertising*size		6.48
		(16.01)

Appendix

TABLE 7: Robustness of results

Variable (N=26)	OLS-C4: unique visits	WLS-C4: unique visits	Grouped Data Logit C4: unique visits	OLS C4: total visits	OLS C4: unique visits	Preference for variety not normalized	Preference for variety based on mean number websites visited
Market size	-0.00289***	-0.00428***	-1.41E-04***	-0.00172*	-.00264**	1.17E-05	-.00308**
	(-3.05)	(-3.334)	(-3.14)	(-1.77)	(-2.46)	(0.00650)	(-2.36)
Online multi-market ownership	34.06*	36.82*	1.77**	34.76*	33.57*	35.86**	47.00**
	(2.00)	(1.74)	(2.19)	(1.98)	(1.94)	(2.11)	(2.72)
Offline content	-20.28**	-20.03**	-1.01**	-14.87^	-21.19**	-19.76**	-22.37**
	(-2.17)	(-2.26)	(-2.27)	(-1.55)	(-2.19)	(-2.08)	(-2.18)
Preference for variety	-201.33*	-190.80*	-8.25*	-207.62*	-185.59*	-75.06*	-7.29
	(-2.03)	(-1.75)	(-1.75)	(-2.03)	(-1.76)	(-1.89)	(-0.272)
Exist pre-commercialization					-3.84		
					(-0.527)		
R^2	0.471	0.473	0.469	0.414	0.478	0.459	0.369

*** significant at a 1% level in a two-tailed test
** significant at a 5% level in a two-tailed test
* significant at a 10% level in a two-tailed test
^ significant at a 10% level in a one-tailed test