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Why Are There So Few (and Fewer and Fewer) Two-Newspaper Towns?

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Abstract

Local concentration in the U.S. daily newspaper industry increased dramatically over the past century. Between 1923 and 1980, the number of counties with more than two competing newspapers fell by half - from 45% of counties with at least one newspaper to but 21%. During that same time period, the monopoly entry threshold population level remained remarkably constant, while the duopoly entry threshold population level increased substantially. This pattern indicates that neither cost changes nor shifts in the overall newspaper demand can be responsible for the growing concentration, and, indeed, the time series of per-unit costs and per-capita readership and linage is supportive of that conclusion. A changing degree of competition is the natural alternative. Yet the paper shows that obvious sources of such a change, such as a decrease in demand heterogeneity or a changing taste for variety, are unlikely explanations for the entire time period. A number of other explanations are also rejected. A scenario in which demand and supply-side economies of scale lead to multiple equilibria, and a merger entails a shift from an unconcentrated to a concentrated equilibrium is offered as a possible explanation.

Section 1: Introduction

Average local concentration in the daily newspaper industry in the United States increased dramatically over the twentieth century. Whereas in 1923 there were over 500 cities with competing daily newspapers, by 1980 there were only 50 such cities. By the late 1990s there were less than ten. This paper asks why. In doing so, it demonstrates how calculation of absolute entry threshold levels over time, introduced by Bresnahan and Reiss (1990), can help narrow the set of candidate explanations for observed changes in concentration.

The increasing concentration rate in this industry is well known. That the increase has been unaccompanied by any significant change in the incidence of newspaper-less markets, conditional on population, has not been noted before. As will be shown, in 1923, it took a county population of 30,000 to support a single newspaper, and about 69,000 - somewhat more than twice as much - to support a second one. The one-firm entry threshold remained constant until the 1950s, then slowly increased to 42,000 by 19890. In contrast, the two-firm threshold increased dramatically from 1924 on, reaching (at least) 425,000 by 1980.

One would not expect this from a simple demand contraction or an increase in scale economies. Rather, these patterns suggest a change in the nature of competition that must have made profits in oligopoly markets much less profitable, and so discouraged entry of a second firm (or encouraged its exit). After outlining the basic method of Bresnahan and Reiss (including a small, but useful, generalization) in Section 2 and presenting the results in Section 3, the paper proceeds in Sections 4, 5 and 6 to examine a number of possible mechanisms that might have led to fiercer competition, with particular emphasis on a fall in consumer taste for multiple newspapers and afternoon newspaper.

In contrast to much current work in empirical industrial organization, I make no attempt to estimate demand curves, but rather rely only on the estimated thresholds, and aggregate or industry reported data and firm level quantities, to assess the

theories. This is intentional, as my purpose is to show how much of industry evolution can be studied in the absence of demand estimates. Although it is always helpful to have demand estimates, obtaining them is not always feasible - good instruments are hard to find. In particular, the approach taken by Berry, Levinsohn and Pakes of using product location and firm ownership to form instruments is clearly inappropriate where the purpose is to explain product and firm entry.

The daily newspaper industry is useful to study because the presence of many local markets, and the unchanging nature of the basic product over the century provide an opportunity to explore the determinants and effects of market structure while holding the general technology and demand considerations constant. It is also an important industry to study in its own right because of the central role of newspapers in political discourse, and the damage that monopoly supply of the news might do to that discourse. The importance of newspapers to a well functioning political system has of late been promoted by the World Bank (Djankov et al), and has long been argued by media critics (e.g., Bagdikian, Compaine). The industry is also useful as a paradigm of other media industries, where advertising is the main revenue generator.

(A final, introductory note: the reader's indulgence is begged for the seemingly arbitrary time periods used to consider some of the hypotheses in the second half of this paper. This is the result of revising the paper in the course of constructing a fuller database, that will incorporate additional years and variables.)

Section 2: Entry Thresholds

Bresnahan and Reiss showed that one can measure the degree of competition, armed only with data on market demographics and the number of firms. The more potentially competitive an industry, the greater the percentage price decline upon entry, and so the greater the proportional increase in the number of

potential customers a second firm needs in order to cover its fixed costs.

Their approach is most easily presented for the case of a homogenous good produced under constant (and equal) constant marginal cost plus a fixed cost of entry, F. Then per-firm profits can be written as $W(N,S)= Sw(N) - F$, where S is population, and N the number of firms.[1] Under the weak assumption that w(N) is decreasing in N, the free entry condition implies that at least N firms will be observed if $Sw(N) - F > 0$. Define the N-firm entry threshold, S_N as the population level at which an Nth firm just breaks even: $S_N=F/w(N)$.

If we assume a random component to profits, exp(-e), proportionate to variable profits or fixed costs, with med(e)=0, we can rewrite the condition for observing at least N firms as

$$\ln S + \ln w(N) - \ln F^0 > e$$

so that, letting H be the distribution of e,

$$(1) \quad \text{Prob}\{n \geq N|S\} = H(\ln S + \ln w(N) - \ln F^0)$$

which is an ordered probability model. If we assume that H is the normal distribution, this can be estimated by an ordered probit regression of the number of firms in the industry on log population. The N-firm entry threshold, S_N, is then estimated by (the exponentiated value of) the cut off point divided by the coefficient on lnS. Note that $\text{Prob}\{n \geq N|S_N\} = 0.5$.[2]

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[1]For example, equilibrium profits are of this form in the following models: Cournot, differentiated Bertrand, Friedman's basic supergame oligopoly model, Rotemberg and Saloner, Shaked and Sutton's model of vertical differentiation.

[2]The Bresnahan and Reiss model is more general in allowing the variance of the profit level to be linear, as opposed to affine, in market size: i.e., $u = \exp(-e) - 1 == u_1 + Su_2$, and so $\text{Var}(u) = \text{Var}(u_1) + S^2\text{Var}(u_2)$. Obviously only the ratio $\text{Var}(u_2)/\text{Var}(u_1)$ (which they estimate between 3 to 4) is identified from a qualitative choice analysis. I deal with log profits, and so

Alternatively, equation (1) can be estimated separately for each N. Thus where H is assumed to be normal, this would entail estimating separate probit regressions for each event "N or more firms observed". Essentially, this means allowing the coefficient on lnS to differ by the event.

Obviously, the newspaper market does not quite fit this model: the joint production of circulation and advertising, which entails economies of scope in revenue and diseconomies of scale in production, make it unlikely that profits will take the exact form assumed above. However, the basic methodology is easily generalized. Let W(N,S,e) denote the equilibrium profits of the marginal firm in a N firm industry, with population S. Assume W is decreasing in N, and increasing in both S and e, and med(e)=0. We will observe at least N firms if $\Pi(N,S,e) > 0$. Define S_N as $\Pi(N,S_N,0) = 0$. This may be consistently estimated by $\underline{S}_N$ which satisfies $g^N(\underline{S}_N)=0.5$, where g^N is the Kernel estimate of the regression of the dummy indicator $1\{n_i \geq N\}$ on S, where n_i is the observed number of firms in the market. Note that this approach imposes neither distributional nor ordering assumptions, and very weak functional form assumptions on W.

Section 3: Entry Thresholds - Results

I estimate this model by the three methods described above on data on county population and the number of newspaper *firms* per county in the United States. Thus two or more newspapers published by the same firm in a given country are counted as one. I choose to work with counties and not cities or towns, both because comprehensive population figures are available further back in time for the former, and because the county designation provides a mutually exclusive and exhaustive coverage of the United States. Although politically designated boundaries may

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implicitly set $Var(u_1)=0$. In consequence, they can separately identify the fall in the price cost margin with more firms, from the rise in fixed entry costs. (However that is so only in principle; in practice it is difficult to do.)

seem arbitrary for a market analysis, local newspaper content will be differentiated, in part, according to exactly those boundaries.[3]

Information on newspapers comes from various editions of Editor and Publisher International Yearbook, a yearly listing of daily newspapers' circulation and advertising and circulation rates. Before the 1960s, Editor and Publisher locates newspaper by city only, and not by county. I map city to county by means of the U.S. Geological Service Gazetteer (available through www.census.gov). Although Editor and Publisher lists the county for later years, I continue to follow that procedure to ensure that my results are not an artifact of matching errors in the earlier years. I then obtain county population figures from the U.S. Census Bureau's county Population Census counts.

I drop Alaska, as county population is missing for the early decades, counties in New York City due to the geographical complexity, and Westchester county in New York State, where for several decades many local newspapers have been printed in a single plant and advertising sold in combination.

Newspapers operating under Joint Operating Agreements (JOAs) are treated as belonging to a single firm. Post-1970 JOAs, following the Newspaper Preservation Act of that year, place circulation, production and advertising activities of the two newspapers under a single firm, either that of one of the two newspapers or a jointly owned subsidiary, thus eliminating competition in subscription and advertising pricing, but not wholly in quality, as editorial decisions remain independent. Treating a JOA as a single firm is appropriate if otherwise these papers would have merged, and not thereby induced additional entry, or one paper would have exited. In such cases we are measuring the degree of competition we would have seen without the JOA option. It is also appropriate if the major locus of competition is in pricing and not in editorial quality. Busterna

[3]The courts have also viewed the county as the appropriate market definition (Busterna and Picard, 1993, p. 79).

and Picard, 1993, point out that pre-1970 JOAs were rare and generally constituted only joint production facilities, without collusive pricing. So markets were arguably somewhat more competitive before 1970 than I report.

Table 0 shows the distribution of counties by market structure, with the mean ln population, by year. County population increases by about 5 percent per decade, nonetheless, the number of counties with two or more firms decreases steadily over the sample period.

Table 1 presents the results of the probit regressions, which is a preliminary step in constructing the entry thresholds. Panel A displays estimates from an ordered probit. In all years, population has a positive and significant effect. Assuming that potential profits are proportional to population, the coefficient on log-population measures the inverse of the standard deviation of per-firm profits, for given N. This is about .9 or 1, which is quite large.

Of course, it is possible that per-firm profits across similarly sized counties with the same market structure are less variable, but rather that profits increase less than proportionately with population. For example, there might be a lesser tendency to read newspapers in more populous counties. Yet, the relationship between circulation and population belies that argument. The bivariate regression of log circulation on log population for the sample of monopoly counties yields a coefficient of 0.93, 0.96 and 0.90 (with standard errors of .03, .025 and .02) in 1940, 1960 and 1980 respectively. Sample selection should make these estimates a lower bound to the true coefficient (since low population counties will be in the sample only if they have an abnormally large demand for newspaper circulation and advertising, while large population counties will be in the sample only if they have an abnormally small demand, and so not exhibit a second firm).

Panels B and C display the estimates from separately run probits of the outcomes "one or more newspaper firms" and "two or more newspaper firms", respectively. The noteworthy result here

is that the coefficient on log population differs in the two panels. The discrepancy admits two separate interpretations. Under the maintained hypothesis that profits are proportional to population, the coefficients are the inverse of the standard deviation of per-firm profits, and so imply that duopoly profits are more variable than monopoly profits, with a standard deviation 30-50 percent higher. That is a not unreasonable finding, given that duopoly profits are determined by a greater set of factors than are monopoly profits, namely the degree of differentiation and the toughness of competition. Bresnahan and Reiss obtained a similar result under the same maintained hypothesis.

An alternative interpretation of the difference between the population coefficients on population in the two panels is that duopoly profits (net of fixed costs) increase less with population that do monopoly profits. One explanation that would explain that is that duopoly engenders quality competition that leads to greater costs, with no concomitant increase in revenue. Sutton (1991) presents such a model, in which per firm demand demands upon relative quality only.

Table 2 presents the one and two firm entry thresholds, S1 and S2, in population levels, implied by the conditional probability estimates. Panel A shows the calculated entry thresholds from the ordered probit. The one-firm empirical entry threshold is quite stable around 30,000 from 1923 to 1950, then climbs at a mere 1.5%/year. In contrast, the two-firm entry threshold increases continuously at more than 3 percent per year over the entire period. Panel B displays the entry thresholds from the simple (non-ordered) probits. Although S1 is unchanged, S2 is about 10-20 percent higher - yet still increasing at similar rates across the decades.

Panel C reports values of S1 and S2 based on Kernel estimates (using the Epanechnikov kernel, with a bandwidth of 0.5 (so that populations more than 64% greater or smaller than the conditioning population are excluded), which impose neither an ordering nor a distributional assumption. The kernel estimates

themselves for 1923, 1930, 1940, 1950 and 1960 are shown in Figures 1 and 2. The basic pattern is the same: the probability of the event of one or more firms is quite stable, while the distribution for two or more firms is continually shifting to the right. However, the developments after 1950 are more extreme than what the probit results show.

Note that these findings are not simply an artifact of hysterisis, undoubtedly an important element in an industry whose core physical capital has a life of some forty years, and where many firms - or at least brands - are twice as old as that. Since population is increasing, a constant S1 and constant Prob[N ≥ 1 | S] implies that firms are appearing in counties where previously there were none. Furthermore, the decade to decade increase in S2 is much greater than population growth. As Table 0 shows, mean county population never grew more than 9 percent a decade over this time period. Total U.S. population does show a higher decennial growth rate, peaking at 18 percent for 1950-1960, but even this falls short of the 25 percent increase in S2 in both probit estimates in this period (and, of course, it is much less than the near doubling according to the Kernel estimates).

Section 3.A Transition Matrices

Tables 3.A-3.E are transition matrices for the probability that a county will have a certain market structure in a given year, given its market structure a decade previous. They provide additional evidence against a hysterisis explanation, as they show clearly that the results in the previous section are not being driven by changing population and a unchanging market structure. Theses tables also show that the increase in S2 reflects more a transition from competitive markets to monopoly markets (exit), than a slow down in transition from monopoly to competitive markets (entry). (. Table 3.z shows the average transition matrix for the 1934-1944 period. It looks very similar to the decennial transition matrices.)

These tables also emphasis how dramatic was the

consolidation process in the 1920s. In a period of only seven years, and seven prosperous years at that, one-third of the competitive counties switched to being monopoly counties

Section 4: Simple Demand and Supply Explanations

4.1 Supply

The usual explanation for the *level* of concentration in any market (and indeed a necessary condition for homogenous or horizontally differentiated, non-network, goods) is economies of scale, but this can not explain the *increase* in concentration. "First copy" costs - the costs of preparing the editorial and advertising material, which varies with the amount of such material alone, and not with the amount of circulation - have actually decreased with the introduction of photo-composition and computerization in the early 1960s through the 1980s.[4] [Cost figures - productivity increases, offset by wages.] This should lead to more firms, not less. Also, high and medium circulation firms use multiple presses, so economies there are limited, and at low circulation rates, technological change has led to smaller economies of scale.

More fundamentally, changes in fixed costs induce changes in not only S2, but in S1 as well. However, another type of change in the cost function does have the potential to change S2 without affecting S1: if the cost function remains unchanged around the point of monopoly output at initial S1, but shifts down at higher output levels, it will leave monopoly profits at and below S1, and so S1 itself, unchanged, but increase the population range of natural monopoly, i.e., increase S2. More formally, write monopoly profits as $W(1,S,e) = \max_x \{R(x;S,e) - C(x)\}$, where x is

[4]There are a number of industry studies that can illustrate that claim. Also, see Genesove, 2001.

the vector of outputs - advertising and subscription (the number of copies). Define x(S,e) to be the profit-maximizing vector, and make the very weak assumption that it is increasing in S. Then the considered technological change is one where C() shifts over time for output levels exceeding x(S1,0). Such a shift would obviously leave S1 unaffected, but would increase the range of a natural monopoly, thus increasing S2.

Having said that, I am unaware of any technological or cost change that took that form. Certainly, newsprint and ink costs could not be responsible for such a shift for they are proportional to the product of copies and content. Improvements in high output presses, with no concomitant improvement in low output presses, could lead to such a shift in the cost curve. The necessary information to assess that particular hypothesis over the whole 1923-1980 period has proved impossible to obtain. But two facts argue against this explanation. First, the most fundamental change in the nature of printing since the 1880s - the move to offset printing, which began in the early 1960s, and was mostly completed by the end of the 1980s - took, if anything the opposite form. In the beginning, only the smaller newspapers were able to adopt the new technology (see Genesove, 2001).

Second, although a shifting down of the cost curve at high output levels only can explain a constant S1 and an increasing S2, it can not explain an unchanging Prob[n ≥ 1 | S]. For had the cost curve fell over time in this manner, then latent monopoly profits would have increased at population levels exceeding 1923 S1, making entry viable for a range of e below zero, where it was not so previously, and thus increasing $\Pr\{N \geq 1 | S\}$ above 1923 S1.

4.2 Demand

A simple decrease in subscription or advertising demand can not explain the increased concentration, either. As Figure [not in this draft] shows, per capita circulation was slightly increasing until 1950; it has fallen since, but the .025 per decade decline is hardly enough to explain the increase in S2 of

at least about 22% per decade since 1950. Of course, we observe quantity demanded, not demand. But the observed quantity should overstate the shift of demand, for firm exit will typically lead to a more inelastic demand curve for the surviving firm, and so a price increase.

As to advertising, if we consider the obvious sources of a demand decrease - alternative media for news and entertainment, such as radio, television, FM radio, and cable - we run into problems of timing. The decline in competitive markets over the 1920s (and the almost certain declines over the previous decade[5]) precedes the introduction of radio, the first of these media, which only by the late 1920s was seen as a profitable advertising tool (see, e.g., Smulyan). Even the exits over the 1930s seem unlikely to be in response to radio only, given the long life of newspaper presses. Radio has also never managed to attract more than a quarter of the advertising expenditure earned by newspapers. Indeed, newspaper advertising has also grown in tandem with gross national product over our period, and so at a greater rate than population: from $27 per capita in 1923 (and $29 per capita in 1939), to $79 per capita in 1980 (1982-1984 Urban CPI).

The more fundamental difficulty with a demand contraction explanation, however, is, once again, that it can not account for S1's relative constancy. One needs a scenario in which the demand for the second newspaper, but not the first, declines - a decline in either the love of variety or consumer heterogeneity.

[5]Lee's (1937) tabulations show that the number of daily newspapers peaks in 1916, according to N.W. Ayer and Son's listings. Editor and Publisher begins in 1919, which is its peak year.

Section 5: Competition Based Explanations

5.1 Death in the Afternoon

One such explanation is a growing preference for morning papers. Afternoon papers are said to have failed because of changing work and reading patterns of the American public. In his book, "Death in the Afternoon", Benjaminson[6] offers both demand & supply causes: (a) a growing fraction of service workers, who rise later than industrial workers, (b) growing traffic congestion costs for afternoon deliveries.

Figure 3 shows that there has indeed been a decline in the fraction of afternoon papers. Morning papers were relatively rare (less than 20%) at the start of our sample, and, indeed, as a fraction of all newspapers declined slowly until 1960.[7] Thereafter the fraction increased, picking up speed in 1970, so that by 1998 (18 years after the end of out sample) they are nearly half of all newspapers. So, this story can, at best, explain the growth in the duopoly threshold from 1960 on only.

Second, industrial composition does not predict market structure as the thesis would have it. The fraction of non-agricultural workers employed in "service industries" -

[6]He writes: "Before World War II, most nonfarm employees in this country were industrial workers who went to work early in the morning and came home early in the afternoon [and who] wanted an afternoon newspaper to read. But service workers, who go to work later, have become much more numerous than industrial workers since the war. Early deadlines also hurt the big-city P.M.'s. Their staffs must write, print and deliver the newspaper during the busiest part of the day, while news events occur all around them. ... While delivery is easy enough for morning papers, which truck their editions to neighborhoods before dawn, .., afternoon newspapers are delivered during the busiest hours of every day, ..." (Benjaminson, ix)

[7]It is interesting to note that afternoon papers are more prevalent than morning papers in single newspaper areas. It might very well be that readers prefer getting that paper in the morning, but workers and managers would much rather work during the day, than late in into the night.

transportation, FIRE, government, and other service industries[8] - has a negative, and (marginally) significant effect in predicting two or more firms.

But more importantly, the transition data is inconsistent with the Benjaminson hypothesis. Of 186 cities with more than one independent firm in 1940, 40 maintained the same market structure, 32 had one independent firm publishing both an afternoon and morning paper (presumably as a result of a merger), 82 had one independent firm publishing an afternoon paper, and only 4 had one independent firm publishing a morning paper in 1950.

Thus the domain of the evening to morning shift as a possible explanation is restricted to the latter half of the period. Note that the explanation requires that head-to-head competition be sufficiently tougher than morning to afternoon competition that exit was preferable to moving to a morning format. (Almost without exception, head to head competition is observed only when there are three firms in the market; that is, the second firm enters at a different time of day.) Yet markets with head to head competition were common in the earlier decades. In 1940, for example, there were 47 *cities* with three or more firms, and so head to head competition in either the morning or afternoon.

To understand how tough head to head competition was, we need to calculate the three firm entry threshold. The simple probit yields an S3 estimate of 338,000 for 1940. Recall from Table 2 that S2 was estimated at 120,000 for that year. To get a feel for these numbers, note that were (a) margins unaffected by the entry of a third firm, and (b) firms equally sized, then given S2, we would expect S3 to be 50% greater, i.e., 180,000. The fall in margins and the third firm's lower market share

[8]The remaining occupations are mining, manufacturing and concentration. This variable is measured at the state level, and is available from 1940 only.

relative to second are evidently such as to demand a threshold 80% greater than that.

What does the observed value of S3 imply for the effect of a decline in the demand for evening papers? Assume the most extreme case in which evening demand falls sufficiently that in duopoly, both firms will publish in the morning. Certainly, we would expect the new S2 to be no higher than the old S3 - if a second morning firm is profitable in the presence of an evening firm, surely it will remain profitable in its absence.[9] Yet the simple probit estimates an S2 of 340,000 in 1980.

A tighter, although obviously much less robust, prediction can be had from a formal model of competition under product differentiation. Appendix A lays out a spatial model in which newspapers are differentiated along both time of day (x) and some other dimension (y), say the complexity of writing, or political position. Consumers are initially distributed uniformly over the square, with utility quadratic in a product's distance from them: Utility = v – price – (distance in x)^2 – δ(distance in y)^2 . Tabuchi (1994) shows that two firms will minimally differentiate on one dimension but maximally differentiate on the other, and earn profits of 1/2 times the coefficient for the dimension of their competition.[10] We know that to be time of day, and so profits are 1/2. If consumers' tastes shift so that an evening paper is no longer profitable, leaving only the (assumed unchanged) marginal distribution of consumers along y relevant, the firms will maximally differentiate along on y and earn profits of δ/2 (d'Aspremont et al, 1979). Thus the predicted percentage increase in S2 due to such a shift is (1/δ)-1.

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[9]Economies of scale should strengthen the argument. For then, S3 will reflect not only the lower differentiation coefficient but also the lesser output, and so higher average costs, of the marginal triopolist, compared to the marginal duopolist.

[10] This has been generalized to 3 dimensions, by Ansari, Economides and Steckel (1998), and to n dimensions, byile Irmen and Thisse (1998)

The Appendix's contribution is to identify δ. It first (numerically) derives pre-shift, variable, per-potential consumer profits for the least profitable triopolist (who will be in head to head competition) as a function of δ, assuming that firms can locate only at the corners or the midpoints along the y-dimension. A comparison of S3 to S2 in 1940, the pre-"Death in the Afternoon" period then identifies δ. Specifically, we find δ is about .82, and so conclude that such a shift from 1940 to 1980 would increase S2 by 22%, far less than the near tripping that we see in the simple probit estimates.

5.2 Multiple Newspaper Reading

A "variety" based argument holds that consumer taste for reading multiple newspapers has declined, perhaps with the availability of alternative media. This would leave S1 unchanged, while increasing S2.

A decline in multiple paper readership will affect duopoly profits in a number of different ways. Its most obvious effect is to decrease subscription demand. In itself, this effect can not suffice to explain the observed increase in S2. Consider the extreme case in which all readers bought two newspapers where offered in 1923, but only one in 1980. Were firms symmetric, this of itself would decrease profits by one-half only, and so only double S2. Even taking into account that the median share of the smaller duopolist in 1923 was 39%, and assuming that firm to be the less profitable, and so the marginal, one, this effect can at most explain a $1/.39 \simeq 150\%$ increase in S2.[11]

[11]Evidence on the extent of multiple readership is limited. Bogart (1981, p. 55) reports national studies showing the percentage of newspaper readers who read more than one paper (from *any* locality) on an average weekday as 34% in 1961, 32% in 1970 and 20% in 1979 (Bogart, p. 55). The percentage who read more than one newspaper published in the *same county* is 24% in 1961. Of course, part of the decline is supply driven - over time, fewer counties had more than one newspaper. Earlier national studies do not seem to exist. A Los Angeles Times study of 1942 shows 20% of readers who read two or more Los Angeles papers.

It is, of course, unlikely that everyone was reading both newspapers in duopoly markets in 1923. We can get an upper bound on the fraction of such readers by considering the percentage increase in circulation upon the introduction of a second newspaper firm. The increase will consist of individuals who were not previously readers who now subscribe because of the availability of a new good and a lower price, and of individuals who read the new paper as a second paper. Tabulation of yearly circulation growth (1934-1944 data)[12] show that circulation increases by 25% more in counties in which a new duopolist enters compared to those in which monopoly status continues unchanged. This is an upwardly biased estimate of the upper bound, due to the endogeneity of duopoly status - markets with large, unobservable demand (or low costs) are likely to have second firms.[13]

The extent of multiple readership also affects the degree of competition, however. Competition for a consumer who has a demand for a second newspaper is less intense than for one who will read only a single newspaper, for a duopolist is effectively a monopolist over a reader's "second" newspaper. Were all of a newspaper's revenue derived from subscription, the enhanced "competition" effect of a decrease in multiple newspaper readership could, in principle, be enough to drive S2/S1 to any possible value.

But newspapers also derive revenue from advertising, and, indeed, since at least 1919, have derived most of their revenue from that source (various Census of Manufactures). As multiple readership falls, newspapers becomes less substitutable in

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[12] It would be preferable to use 1923/1924 growth rates but those years have yet to be merged.

[13] Information from exits gives similar, though somewhat higher, results. One can also get estimates from the levels by considering the per-capita circulation rate by market structure. It is .21 for monopoly counties, and .34 for duopoly counties, which implies an upper bound of .34/.21-1=.62 on multiple paper readership, the same biases being relevant for the levels. (Per-capita circulation is .38 for triopoly and .38 for 4-9 newspaper firm counties.)

advertising demand, as for more readers there is only a single newspaper through which firms can reach them by advertising.

The maximum impact of this induced competition on the duopoly entry threshold can be assessed by making the extreme assumption that the complete elimination of multiple readership would make (a) competition for readers so tough that duopoly subscription prices would be reduced to zero, but (b) not affect per-reader advertising demand . Appendix B shows that, in such a case, the resulting increase in the log circulation level at the duopoly threshold level would be bounded from above by the inverse of the product of two terms: minus the log share of advertising in total revenue (in the initial period) times the difference between the percentage increase in advertising revenue and total costs from increased circulation. (The increase in costs reflects not only the circulation increase but also the induced advertising increase.) This bound is equal to 1.25, so that the percentage increase in circulation is bounded by exp(1.25)-1 or 250 percent. To this one must add the direct effect discussed above. One concludes that it would be quite unlikely that a decline in multiple readership could be solely responsible for the rise in S2.

An alternative approach is to measure the effect of the decline in multiple readership on circulation. If there is, indeed, a secular decline in the multiple readership over the period, then it should show up as a greater circulation growth in monopoly compared to duopoly markets. This argument implicitly assumes that any decline in multiple readership is smooth relative to exit and entry events, so that that the circulation declines show up before a firm exits. In contrast, in an environment in which each year some markets are hit with a permanent shock that decreases the tendency to multiple readership and which induces one of the firms in the duopoly market to exit, within the same year, we would have no hope of measuring the decline in this way. In such an environment, our methodology would not capture the multiple readership decline.

Since counties transit from one market structure to another, one runs into an obvious censoring problem. To limit this problem, we consider yearly growth rates and not, say decennial growth rates, so as to decrease the fraction of censored observations. Table 5 presents estimates of the circulation growth rate by the number of firms in the market in the previous period for the year 1934-1944. The first two rows shows the median and median growth rates for both monopoly and duopoly markets, and their difference, on the sample of counties and years in which there was no change in market structure. The differences are small and insignificant; an excess of as little as one percent in the yearly growth rate in the monopoly counties can be rejected by both estimators.

To address the censoring problem further, we assume that counties that lose one or more firms would have otherwise have had very low growth rates and that counties that gained at least one firm would have had very large growth rates, and recalculate the median under those assumptions (Table 3.z). Since, as Table 3.z shows, monopoly counties are slightly less likely to lose the firm as to gain one or more, the median for that group increases (although imperceptivity), whereas because duopoly counties are more likely to lose a firm than gain, that group's median falls. Nonetheless, the difference remains small and insignificant.

The table also shows Powell's symmetrically trimmed least squares estimator, which calculates the mean growth rate after, after dropping extreme observations so that censoring is equal at both ends of the distribution. For the continuing duopoly markets, this entails dropping the ([.008 + .14] - .04)/.81 X100% fastest growing counties; for the continuing monopoly markets, the ([.34+.006]-.035)/.93 X 100% slowest growing ones are dropped. Alone of all the estimators, the resulting means shows a substantially and significantly lower growth rate for the duopoly markets. However, the estimator is invalid; it requires that the latent distribution, and so also the trimmed distribution, be symmetrical - but the latter is clearly skewed (as a comparison between the median in the 3rd row and the mean

in the 4th row clearly show): to the right for the monopoly markets, and to the left for the duopoly markets.

Table 6 presents the same analysis, but for growth rates adjusted by one-tenth the difference between the log 1940 Census county population and the log 1930 Census county population. This changes the means and medians, but not their differences. It is clear that there is no evidence of any lesser circulation growth rate for duopoly markets, at least over the 1934-44 period.

5.3 Newspaper Chains

Mutual forbearance among newspaper chains is another possible explanation, that might at first glance seem particularly appealing given that newspaper chains[14] were growing over the period. In 1923, there were 31 chains, each with five newspapers, on average. By 1960 there were 109 chains, with an average of 5.5 papers a piece, while by 1976 there were 168 chains, each with 6.3 papers on average.

In principle, mutual forbearance might operate through either reduced entry or additional exit. A firm which competed with a chain in market A might be deterred from entering market B, in which the chain was incumbent, out of fear that the chain would retaliate through tougher competition in A. (Retaliatory entry is another option, but that would be available to an initial single newspaper firm as well.) The small number of newspapers per chain might seem to make it unlikely that the market of one's desire be occupied by a current competitor, but chains are geographical clustered. So as more chains appear, we would expect the rate of entry into monopoly markets to fall. (Of course, the better test is whether the presence of a chain makes entry less likely, but that test will have to wait for a more detailed data set.)

[14] A newspaper chain is defined as two or more newspapers that operate in separate markets and are at least partially owned by the same individual. The cited numbers come from Editor and Publisher International Yearbook, and take the `city' as the market definition, not the `county'.

The transition matrices do show that the rate of entry into monopoly markets falls from a decennial equivalent of .16 over the 1920s to .09 over the 1930s (although that decade saw no change in the prevalence in chains) to .04 over the 1940s. However, thereafter it remains essentially constant. So entry-based mutual forbearance is unlikely to have played any role after the 1940s. Its role in the earlier decades is also limited, because most of the growth in S2 is attributable to the initial gap, already present in 1923, between the exit rate from competitive to monopoly markets and the entry rate from monopoly to competitive markets, rather than the decline in the exit rate. Thus, for example, the Kernel estimates show that in 1930, the probability of observing two or more firms at a population level of 53,000, which is the 1923 level of S2, is only .33. Had the *only change* been the lower exit rate, and had that affected *only* counties with populations below 53,000 (and ignoring population changes) that probability would have been .50 - (.16 -.09) = .43, and the 1930 S2 would have been 63,000, rather than 73,000.

Of course, multi-market conduct could influence the two-firm entry threshold through exit as well. Since chains were growing over the period, the hypothesis suggests the surprising but not impossible scenario in which newspapers were purchased in anticipation of closing them. But mutual forbearance in exit is harder to coordinate than in entry. Consider firms 1 and 2 which both operate in markets A and B. Once firm 1 has exited from A, what incentive is there for firm 2 to fulfill its part of the bargain and exit from B? Firm 1 can not punish 2 in market B through tougher competition by more than the difference between the myopic deviation value and the value of exit. Only if there is a third market in which both operate, is there hope of sustaining a coordinated exit agreement; but with five or six papers per chain, there is unlikely to be any third market.

5.4 The Umbrella Theory

Rosse's umbrella theory, in which suburban papers compete with metropolitan papers, is yet another potential explanation

for the rise in S2. Applied to the decline in the number of competitive markets, it states that competition has shifted from within the central city to spatial competition, in which fewer papers - perhaps only one - occupies the central city, and the rest locate in suburban areas. The shift of population from central city to suburbs, along with the shift in the spatial distribution of income in these areas, has led to this new type of competition, according to this argument.

Most counties are outside of SMSAs, of course. It could nonetheless be the case that the changes in the Kernel estimates in Figures 1 and 2 are being driven by SMSA counties, according to the umbrella theory. That is not the case, however. The counties that undergo a change in market structure from decade to decade are predominantly non-SMSA counties. Of the 367 counties that are observed to go from zero newspapers to a single newspaper firm in the decennial transition matrices, only 25 are SMSA counties. Thirteen of these undergo the change between 1923 and 1930 (where we are relying on the 1940 SMSA definition, for lack of earlier definitions). The shift from competition to monopoly has a much larger SMSA component, but even here, only 148 of the 445 counties experiencing this transition are SMSA counties.

These observations have a couple of implications. First, whatever the degree of income and population shift to the suburbs, it did not results in many counties gaining their first newspaper firm. Second, the toughening of competition is apparently not restricted to SMSAs.

To address the more general criticism that cross county competition is ignored in the previous regressions, Table 7 adds to the set of regressors the log population of close counties that have smaller populations and those that have larger populations than the county of interest. The notion here is that the relationship between small and large counties are asymmetric. People living outside of the county of Los Angeles may read the Los Angeles Times, which may hinder the entrance of papers in

that county; but relatively few people in the county of Los Angeles read papers from outside the county.

The results (shown for 1923 and 1980 only) are generally consistent with the notion that neighboring larger counties draw away demand, and so reduce the likelihood of observing a first or second firm in the county, while neighboring smaller counties provide a pool of additional readers and so increase the probability. The magnitudes of the coefficients are however quite small in comparison to that on own population. In any case, the cut off estimates show that the ratio of S2 to S1 is unchanged in either year.

The Kernel estimates are also helpful here. The probability of observing two or more firms in a county with a population of 53,000 declines from 0.5 in 1923 to 0.33 in 1930, to 0.25 in 1940 to 0.18 in 1950 to 0.14 in 1960 and then to a mere 0.11 in 1980.[15] Figures 1 and 2 show a decline in the probability of observing two or more firms at even lower population levels, though no such decline for the probability of observing at least one firm. It is quite unlikely that the shift to the suburbs explains the decline in competition for such small counties.

6. Joint Product Production, Network Goods and Multiple Equilibria

A newspaper is a network good for its readers. A network good, in general, has the property that a consumers' direct utility from consuming it increases with the number of other consumers consuming it. For newspapers, the process works as follows. The more readers there are, the greater the amount of advertising, since the marginal cost of sending a message to a single reader increases with circulation, due to fixed composition costs. Either because readers value the greater number of advertisements itself (generally though to be true), or

[15] We are considering a hypothetical county that maintains a population of 53,000 over the time period. A county of that size in 1923 which then grew at the national annual growth rate of 1.5% per year, would have a probability of having two or more firms of 0.38 in 1930, and 0.24 in 1960 .

because they value more editorial material (news and commentary), which must be provided along with the advertisements to induce them to read the ads, readers are better off.

This aspect of newspaper implies that, all else constant, consumers will prefer large-circulation newspapers to small circulation ones. This, in turn, has a number of implications. First, this sort of process generates a more elastic perceived demand curve for newspapers, and so tougher competition. Second, there will be less space for a firm to survive in competition with a more efficient, and so larger and so higher quality, firm. Third, entry will be more difficult, since the network aspect introduces a coordination problem for consumers - no consumer will want to purchase the newspaper if no other consumer does.

Of course, by itself, this story does not predict a *growing* two firm entry threshold in the presence of a stable one firm entry threshold. But there is a fourth implication of a network good, and that is the possibility of multiple equilibria, as, e.g., Katz and Shapiro (1985) show.[16]

How does the possibility of multiple equilibria generate an increasing S2? Although both the configuration of two firms producing and that of one firm producing may be an equilibrium in, say, a Cournot model under the same primitive demand and cost parameters, in a fuller model in which firms may merge only the first is an equilibrium, since merger to monopoly is *always* profitable. At least that is so under full information; bargaining inefficiencies under asymmetric information may prevent the merger from taking place immediately, and that may explain why we do not see all duopolies merge into monopolies. The incentive is there however, and firms do merge (Markham showed that a quarter of all daily newspaper exits during 19??-19?? were by way of merger). Loosely speaking, the duopoly equilibrium is unstable, in that the firms have an incentive to merge, whereas the monopoly merger is stable, as there is no

[16] Demand side economies are not necessary for multiple equilibria; they can arise from supply side economies as well. But they do make multiple equilibria more likely.

countervailing force for the single firm to fragment itself. Thus the increase in S2 over the period may not reflect any underlying demand and cost shocks, but simply a slow movement from the duopoly equilibrium to the monopoly equilibrium.

7. Conclusion

One last explanation that has not been considered here is that income growth has been responsible for the increase in S2. Although we generally think of income growth as increasing demand and so decreasing the thresholds, various models of quality competition may have the. If as income grows, quality aspects become the more dominant aspect of product differentiation, then from Shaked and Sutton (1982) we should expect a more concentrated market.

Ideally, to test this one would include income in the probit regressions and see if that would effect. Unfortunately, the decennial Census did not ask respondents their income before 1940, and so county income is not available for the 1923 and 1930 cross sections. The regressions can be run for the later years, but I have yet to do so. I have run such regressions for the years 1972 and 1987 on a similar data set, based on Census of Manufactures micro data for the newspaper industry. In a probit regression for the event of seeing at least two daily newspaper firms in the industry with log population and log mean income as the only variables, the 1972 data yield a negative, but insignificant coefficient (p=.13) on mean income, whereas the 1982 data yield a positive but insignificant coefficient (p=.91). Furthermore, based on the estimated coefficients, the implied S2 at mean log 1970 income increases by 45% over the decade.

It bears reminding, as well, that income was not, in fact, generally growing during all the decades of the sample. There was a rather substantial depression between 1930 and 1940. And yet S2 continued to grow during those years.

Table 0.A Trends in Competitive Daily Newspaper Cities, 1880-1986

Year	Total Daily Cities	Cities with Competing Dailies	Percent of Total
1880	389	239	61.4
1909-10	1,207	689	57.1
1920	1,295	552	42.6
1930	1,402	288	20.5
1940	1,426	181	12.7
1944-45	1,396	117	8.4
1953-54	1,448	87	6.0
1960	1,461	61	4.2
1968	1,500	45	3.0
1986	1,513	28	1.9

From Busterna and Picard, Joint Operating Agreements

Table 0.B: Distribution of Counties by Number of Newspaper Firms

	1923	1930	1940	1950	1960	1965	1980
Zero	2068	2004	1950	1927	1915		1911
One	565	711	801	894	921		977
Two +	465	382	347	280	267		217
Total	3098	3097	3098	3101	3103		3103
Mean lnPOP	9.75	9.81	9.86	9.89	9.92	9.94	10.10
Exponent of Mean lnPOP*	17.2	18.2	19.1	19.7	20.3	20.7	24.3

* In thousands.

Table 1: Probit Estimates for Number of Firms

	1923	1930	1940	1950	1960	1965	1980
			A: Ordered Probit: Zero, One or Two Firms				
lnPOP	1.07	1.12	1.08	1.04	0.95	0.95	0.88
	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)	(.02)
Cut 1	11.10	11.50	11.15	10.67	10.21	9.86	9.22
	(.35)	(.33)	(.32)	(.30)	(.28)	(.27)	(.26)
Cut 2	11.99	12.73	12.52	12.32	11.96	11.61	11.00
	(.36)	(.35)	(.34)	(.32)	(.31)	(.30)	(.28)
			B: Probit: One or More Firms				
lnPOP	1.37	1.32	1.28	1.23	1.11	1.10	0.97
	(.05)	(.05)	(.05)	(.04)	(.04)	(.04)	(.03)
const	-14.01	-13.54	-13.11	-12.64	-11.45	-11.33	-10.10
	(.51)	(.47)	(.45)	(.43)	(.38)	(.37)	(.33)
			C: Probit: Two or More Firms				
lnPoP	.93	.98	.91	.83	0.80	0.75	0.72
	(.04)	(.04)	(.04)	(.04)	(0.04)	(.04)	(.035)
const	-10.48	-11.22	-10.63	-10.02	-9.82	-9.39	-9.20
	(.42)	(.44)	(.43)	(.42)	(.43)	(.40)	(.40)
N	3070	3104	3102	3105	3092	3099	3108

Table 2: Entry Thresholds (in 1,000s)

Thresholds	1923	1930	1940	1950	1960	1965	1980
A: Ordered Probit							
S1	30	29	29	30	31	31	35
S2	69	87	103	145	181	197	265
B: Probit							
S1	28	27	28	28	30	30	34
S2	76	96	120	184	231	257	340
C: Kernel							
S1	30	29	29	28	28		31
S2	53	73	101	156	359		628

Table 3A: Market Structure Transition Matrix (1923 to 1930)

	None	One	Two or More
None	.96	.04	.002
One	.04	.84	.11
Two or more	.009	.32	.67

(Gor approximate decennial equivalents, raise the diagonal to the 10/7 power, and multiply the off-diagonal by 10/7.)

Table 3B: Market Structure Transition Matrix (1930 to 1940)

	None	One	Two or More
None	.95	.04	.003
One	.05	.87	.09
Two or more	.01	.26	.73

Table 3C: Market Structure Transition Matrix (1940 to 1950)

	None	One	Two or More
None	.97	.03	.001
One	.05	.91	.04
Two or more	.006	.29	.70

Table 3D: Market Structure Transition Matrix (1950 to 1960)

	None	One	Two or More
None	.98	.02	.001
One	.03	.94	.04
Two or more	.01	.18	.81

Table 3E: Market Structure Transition Matrix (1960 to 1980)

	None	One	Two or More
None	.95	.03	.002
One	.04	.91	.05
Two or more	.003	.18	.82

Cell (i,j) denotes the fraction of counties with market structure i in the earlier decade that have market structure j in the later one. (For approximate decennial equivalents, take the square root of the diagonal and divide the off-diagonal by two.)

Market Structure Transition Matrices (City Level) Multi-Product Categorization

Table 3F: 1923 to 1930

	None	One	Two or More
One Newspaper			
1 Firm, >1 Newspaper			
Two or More Firms			

Table 3G: 1930 to 1940

	None	One	Two or More
One Newspaper			
1 Firm, >1 Newsp.			
Two or More Firms			

Table 3H: 1940 to 1950

	None	One	Two or More
One Newspaper	.97	.03	.001
1 Firm, >1 Newsp.	.05	.91	.04
Two or More Firms	.006	.29	.70

Table 3I: 1950 to 1960

	None	One	Two or More
One Newspaper	.98	.02	.001
1 Firm, >1 Newsp.	.03	.94	.04
Two or More Firms	.01	.18	.81

Table 3F: Market Structure Transition Matrix (1960 to 1980)

	None	One	Two or More
One Newspaper	.95	.03	.002
1 Firm, >1 Newsp.	.04	.91	.05
Two or More Firms	.003	.18	.82

Table 3Z: YEARLY Market Structure Transition Matrix (1934-1944)

	None	One	Two	Three or More
None	.99	.01	.004	.00
One.	.035	.93	.034	.006
Two	.008	.14	.81	.04
Three or More	.002	.04	.10	.87

Table 4: Probit Estimates for Number of Firms, with Fraction of Employed in Service Industries

	1940	1950	1960	1980
A: Ordered Probit: Zero, One or Two Firms				
lnPOP	1.15	1.07	1.01	0.88
	(.04)	(.03)	(.03)	(.02)
Fraction	1.80	0.70	.82	0.44
Services	(.30)	(.33)	(.37)	(.49)
Cut 1	12.73	11.43	10.85	9.54
	(.44)	(.41)	(.40)	(.43)
Cut 2	14.08	13.07	12.60	11.31
	(.46)	(.43)	(.42)	(.45)
B: Probit: One or More Firms				
lnPOP	1.38	1.31	1.15	0.98
	(.05)	(.05)	(.04)	(.03)
Fraction	2.74	1.80	1.56	1.35
Services	(.35)	(.39)	(.43)	(.57)
const	-15.57	-14.36	-12.75	-11.10
	(.62)	(.57)	(.53)	(.54)
C: Probit: Two or More Firms				
lnPoP	.95	.84	.80	0.72
	(.05)	(.04)	(.04)	(.04)
Fraction	.74	-.69	-.28	-1.40
Services	(.44)	(.52)	(.60)	(.82)
const	-11.39	-9.82	-9.71	-8.33
	(.58)	(.56)	(.58)	(.65)
N	2821	3013	3103	3108

Table 5: Yearly Logarithmic Growth Rates of Total Circulation

	Number of Firms			
	Two	One	Diff.	Sample
Median	.035	.028	.007	Counties with unchanged market structure
	(.002)	(.001)	(.002)	
Mean	.041	.043	-.002	
	(.004)	(.002)	(.005)	
Median	.027	.028	-.001	Counties with unchanged market structure minus trimmed observations
	(.002)	(.001)	(.002)	
Mean	.012	.048	-.036	
	(.004)	(.002)	(.004)	

The variables is the year to year difference in the log of the county's total circulation. Standard errors on the mean are adjusted for clusters on the cross sectional unit (county)

Table 6: Population Adjusted Growth Rates of Total Circulation

	Number of Firms			
	Two	One	Diff.	Sample
Median	.029	.023	.006	Counties with unchanged market structure
	(.001)	(.001)	(.002)	
Mean	.034	.036	-.003	
	(.004)	(.002)	(.005)	
Median	.021	.023	-.002	Counties with unchanged market structure minus trimmed observations
	(.001)	(.002)	(.002)	
Mean	.005	.041	-.036	
	(.004)	(.002)	(.004)	

The variable is the year to year difference in the log of the county's total circulation minus one-tenth the difference between log 1940 Census population and log 1930 Census population. Standard errors on the mean are adjusted for clustering on the cross sectional unit (county).

Table 7: Probit Estimates for Number of Firms, with surrounding population

Year (N)	1923 (3070)	1980 (3102)	1923 (3092)	1980 (3102)
Distance	≤30 Miles		≤ 120 Miles	
A: Ordered Probit: Zero, One or Two Firms				
lnPOP	1.05	0.85	1.06	.86
	(.04)	(.03)	(.04)	(.03)
lnPOP of smaller	.002	.01	.01	.02
nearby counties	(.006)	(.005)	(.01)	(.01)
lnPOP of larger	-.03	-.03	-.003	-.003
nearby counties	(.005)	(.004)	(.008)	(.008)
Cut 1	10.64	8.77	11.01	9.17
	(.36)	(.27)	(.40)	(.29)
Cut 2	11.55	10.56	11.91	10.94
	(.37)	(.30)	(.41)	(.31)
Dif in Cuts (exp(Dif))	.91 (2.5)	1.79 (6.0)	.89 (2.4)	1.77 (5.9)
B: Probit: One or More Firms				
lnPOP	1.36	.94	1.31	.88
	(.05)	(.03)	(.06)	(.04)
lnPOP of smaller	-.006	.015	.03	.08
nearby counties	(.006)	(.006)	(.015)	(.02)
lnPOP of larger	-.04	-.04	-.05	-.08
nearby counties	(.005)	(.005)	(.01)	(.01)
constant	-13.6	-9.55	-13.2	-9.07
	(.53)	(.34)	(.55)	(.36)
C: Probit: Two or More Firms				
lnPoP	.91	.72	.96	.76
	(.04)	(.04)	(.05)	(.04)
lnPOP of smaller	-.006	.003	-.01	.006
nearby counties	(.007)	(.009)	(.01)	(.02)
lnPOP of larger	-.02	.002	.016	.04
nearby counties	(.006)	(.007)	(.01)	(.01)
constant	-10.13	-9.22	-10.88	-10.23
	(.44)	(.42)	(.49)	(.48)

BIBLIOGRAPHY

(NB: Not all papers are referenced in the current draft of the paper.)

Ansari, A., N. Economides and J. Steckel, "The Max-Min-Min Principle of Product Differentiation", Journal of Regional Science, 38(2):207-230, 1998.

Bagdikian, The Media Monopoly, Beacon Press, Boston, 1983.

Benjaminson, P. Death in the Afternoon: American's Newspaper Giants Struggle for Survival. Anderson, McMeel & Parker New York, 1984.

Berry, S. and J. Waldfogel, "Free Entry and Social Inefficiency in Radio Broadcasting" *RAND Journal of Economics*, 30(3), Autumn 1999, pages 397-420.

Berry, S. and J. Waldfogel, "Public Radio in the United States: Does it Correct Market Failure or Cannibalize Commercial Stations?" *Journal of Public Economics*, 71(2), February 1999, pages 189-211.

Blair, R.D. and R.E. Romano, "Pricing Decisions of the Newspaper Monopolist" *Southern Economic Journal*. 59(4), April 1993, 721-32.

Bogart, Leo. Press and Public: Who Reads What, When, Where and Why in American Newspapers. Lawrence Erlbaum Associates, Publishers, Hillsdale, New Jersey, 1981.

Bresnahan, T. and P. Reiss "Measuring the Importance of Sunk Costs" *Annales d'Economie et de Statistique* 0(34) April-June 1994, 181-217.

_____ "Entry and Competition in Concentrated Markets" *Journal of Political Economy*, 99(5),

October 1991, 977-1009.

_____ "Empirical Models of Discrete Games" *Journal of Econometrics*, 48(1-2) April-May 1991, 57-81.

_____"Entry in Monopoly Markets", *Review of Economic Studies*, 57(4), October 1990, 531-553.

_____"Do Entry Conditions Vary across Markets?" *Brookings Papers on Economic Activity*, 3(0), 1987, 833-871.

Brody, J.H. and R. G. Picard. The Newspaper Publishing Industry, Boston, Allyn and Bacon, 1997.

Bucklin, R.E., R.E. Caves, and A.W. Lo, "Games of Survial in the U.S. Newspaper Industry", *Applied Economics*, 21(5), May 1989, 631-49.

Busterna, J. C. and Picard, R. G. Joint Operating Agreements: The Newspaper Preservation Act and its Application. Ablex Publishing Corporation, Norwood, New Jersey, 1993.

Carrol, G. R. Publish and Perish: The Organization Ecology of Newspaper Industries, Monographs in Organization Behavior and Industrial Relations Series, Greenwich, JAI Press, 1987.

Compaine, B., ed. Who Owns the Media? Concentration of Ownership in the Mass Communications Industry, Knowledge Industries Publications, Inc., White Plains, New York, 1979.

d'Aspremont, C. J.J. Gabszewicz and J. –F. Thisse, "On `Hotelling's Stability in Competition'" Econometrica 47:1145-1150, 1979.

Dertouzos, J.N. and W.B. Trautman, "Economic Effects of Media Concentration: Estimates form a Model of the Newspaper Firm" *Journal of Industrial Economics* 39(10 September 1990, 1-14.

Djankov, S., C. McLiesh, T. Nenova and A. Shleifer, "Who Owns the Media?", NBER Working Paper 8288, 2001.

Fee, C. Edward and C. J. Hadlock, "Management Turnover and Product Market Competition: Empirical Evidence from the U.S. Newspaper Industry", *Journal of Business*, 73(2), April 2000, 205-403.

Ferguson, J.M. The Advertising Rate Structure in the Daily Newspaper Industry, Prentice-Hall, 1963.

_____. "Newspaper Advertizing Rates" in Weiss, L.W., ed. Concentration and Price. Cambridge, MA, MIT Press, 1989, 149-154.

_____. "Daily Newspaper Advertising Rates, Local Media Cross-Ownership, Newspaper Chains, and Media Competition, *Journal of Law and Economics*, 26(3), October 1983, 635-54.

Geroski, P. A. What Do We Know About Entry?" *International Journal of Industrial Organization*, 13(4), December 1995, 421-40.

Heckman, J. and Vytlacil, "Local Instrumental Variables", in C. Hsiao, K. Morimune and J. Powell, eds., Nonlinear Statistical Inference: Essays In honor of Takeshi Amemiya, Cambridge University Press, Cambridge, forthcoming, 2000.

Hynds, Ernest C. American Newspapers in the 1970s. Communication Arts Books, Hastings House, Publishers, New York, 1975.

Irmen, A. and J. –F. Thisse, "Competition in Multi-characteristics Spaces: Hotelling Was Almost Right", Journal of Economic theory, 78:76-102, 1998.

Katz, M. and C. Shapiro, "Network Externalities, Competition, and Compatibility ", *American Economic Review* 75 (1985) 424-440.

Lacy, S. and T. F. Simon, The Economics and Regulation of United States Newspapers, Ablex Publishing, Norwood, 1993.

Lee, The Daily Newspaper in America, 1937.

Mathewson, G. F. "A Note on the Price Effects of Market Power in the Canadian Newspaper Industry", *Canadian Journal o Economics*, 5(20, May 1972, 298-301.

Neiva, E. M. "Chain Building: The Consolidation of the American Newspaper Industry, 1953-1980. *Business History Review*, 70(1), Spring 1996, 1-42.

Newey, W.K., J.L. Powell, and F. Vela, "Nonparametric Estimation of Triangular Simultaneous Equations Models", *Econometrica*, 67(3), May 1999, 565-603.

Picard, R., ed., Press Concentration and Monopoly: New Perspectives on Newspaper Ownership and Operation, Communication and Information Science Series, Norwood, NJ, 1988.

Powell, J.L. "Symmetrically Trimmed Least Squares Estimation for Tobit Models", Econometrica, 54(6): 1435-1460, 1986.

Busterna, J. and Picard, R. Joint Operating Agreements: The Newspaper Preservation Act and its Application.

Rosse, James N. "Daily Newspapers, Monopolist Competition, and Economics of Scale", American Economic Review Papers and Proceedings, 57 (2), 1967, 522-533.

Rosse,James N. "Estimating Cost Function Parameters without Using Cost Data: Illustrated Methodology" *Econometrica*

Shaked, A. and J. Sutton, Natural Oligopolies, *Econometrica*, 51(5), September 1983, 1469-83.

_____ "Multiproduct Firms and Market Structure" *RAND Journal of Economics*, 21(2), Spring 1990, 45-62.

_____ "Product Differentiation and Industrial Structure" *Journal of Industrial Economics*, 36(2), December 1987, 131-46.

_____ "Relaxing Price Competition through Product Differentiation", *Review of Economic Studies*, 49(10, January 1982, 3-13.

Smulyan, S. Selling Radio: The Commercialization of American Broadcasting, 1920-1934. Smithsonian Institution Press, Washington and London, 1994.

Sutton, J. Sunk Costs and Market Structure: Price Competition, Advertising and the Evolution of Concentration, Cambridge, MA, MIT Press, 1991.

Tabuchi, Takatoshi, "Two-Stage Two Dimensional Spatial Competition between Two Firms, Regional Science and Urban Economics, 24:207-227, 1994.

Udell, Jon G., The Economics of the American Newspaper. Communication Arts Books, Hastings House, Publishers New York 10016, 1978.

Appendix A

Assume that consumers' preferences are distributed uniformly on a square on which the horizontal axis (x) represents time of day, with the leftmost point "Morning" and the rightmost point "Evening"[17], while the vertical direction (y) represents some other element of taste (e.g. political leanings, high brow vs. low brow). In line with theory since d'Aspremont et al, assume that consumer (x,y) pays utility cost of $t(f-x)^2+\delta(g-y)^2$ for consuming a newspaper located at point (f,g). Assume that δ < t so that time of day differentiation dominates (to use Thisse et al's term) the other element. Normalize t=1. Firms simultaneously choose locations, then prices. Marginal cost is assumed constant. Finally, assume that firms can locate at only "Morning" or "Evening", and not at mid-day.

With two firms in the market, each firm locates at the mid-point of the y-axis, and each earns the usual Hotelling profits of t/2=1/2 (Tabuchi, 1994). I have no theoretical paper on which to rely for the equilibrium with three firms in the market. Thus, at least for this draft, I will assume that firms can only locate on the y-axis at the zero, one-half and unitary points. That is, firms can be either low-brow, mid-brow or high-brow. Then for three firms, calculations show that there is an equilibrium with an evening paper at (1,1/2), and two mornings paper, one each at (0,0) and (0,1), and in which both morning papers charge the same price.

In this equilibrium, the morning papers are the less profitable firms. They earn profits that are concave and

[17]This setup need not imply that (almost) all consumers prefer a paper in the middle of the day (when some of them are expected to be working) over either a morning or evening paper. A point might indicate, instead, the fraction of the time that a consumer prefers a morning over an evening paper, given some technological (e.g. delivery arrangements) or taste based constraint that prevents a consumer switching daily between a morning and evening paper.

increasing in δ on [0,1] with, for S=1, a range of [0,.188]. The profits are closely approximately by $m(\delta) = [.003 + .336\delta - .151\delta^2]$ (with a maximum error of .003, at δ=0). Setting (1/2)S2 = $m(\delta)$S3 and noting (from the text) that in 1940, S2/S3=120/338=.355, we obtain a δ of about .82.

Appendix B

The maximum impact of this induced competition on the duopoly entry threshold can be assessed by assuming that, in the absence of multiple readership, competition is so tough that duopoly subscription prices are reduced to zero. Let ϕ parameterize the degree of multiple readership, q and A signify circulation and advertising, S indicate both the generic population size and the initial duopoly threshold level $R^{k,z}(\phi,S),\ k=A,C;z=M,D$ signify equilibrium (advertising or circulation) revenue in the (monopoly or duopoly) case, under the obvious nomenclature, and $C(q_\phi(S),A_\phi(S))$ the cost function. Then at the 1923 two firm entry threshold, we have

$$\begin{aligned} 0 &= R^{C,D}(\phi,S)+R^{A,D}(\phi,S)-C(q_\phi(S),A_\phi(S)) \\ &< R^{C,D}(\phi,S)+R^{A,M}(q_\phi(S))-C(q_\phi(S),A_\phi(S)) \end{aligned} \tag{B.1}$$

$$R^{C,D}(\phi,S)+R^{A,M}(q_\phi(S))<C(q_\phi(S),A_\phi(S)) \tag{B.1'}$$

where the inequality follows from the fact that a monopolist newspaper provider will earn more revenue than a duopolist with the same circulation, since there is no advertising price competition. Let ϕ' indicate the new degree of multiple readership and S' the duopoly threshold it would imply. Then

$$\begin{aligned} 0 &= R^{C,D}(\phi',S')+R^{A,D}(\phi',S')-C(q_{\phi'}(S'),A_{\phi'}(S')) \\ &< R^{A,D}(q_{\phi'},S')-C(q_{\phi'}(S'),A_{\phi'}(S')) \end{aligned} \tag{B.2}$$

If we set $\phi'=\infty$, meaning no multiple readership, we obtain

$$R^{A,D}(\phi',S')=R^{A,M}(q_\infty(S')) \tag{B.3}$$

this follows from the duopoly newspaper being a monopolist for its readers' attention in the advertising market, in the absence of multiple readership. Thus we obtain

(B.4) $$R^{A,M}(q_\infty(S')) > C(q_\infty(S'), A(q_\infty(S')))$$

Applying a logarithmic transformation to both sides of both (B.1') and (B.4), subtracting the latter from the former, and taking a first order approximation, we obtain

(B.5)

$$\ln\left(\frac{R^{C,M}(\phi,S)}{R^{A,M}(\phi,S)}+1\right)+\frac{\partial \ln R^{A,M}(q)}{\partial \ln q}[\ln q_\phi(S)-\ln q_\infty(S')] > \left\{\frac{\partial \ln C}{\partial q}+A'(q)\frac{\partial \ln C}{\partial A}\right\}[\ln q_\phi(S)-\ln q_\infty(S')]$$

so that

(B.7)

$$[\ln q_\infty(S')-\ln q_\phi(S)] < \ln\left(\frac{R^{C,M}(\phi,S)}{R^{A,M}(\phi,S)}+1\right)/\left\{\frac{\partial \ln R^{A,M}}{\partial \ln q}-\frac{\partial \ln C}{\partial \ln q}-\ln A'(\ln q)\frac{\partial \ln C}{\partial \ln A}\right\}$$

This says that the percentage increase in the second firm's circulation at the duopoly entry threshold will be bounded by initial total revenue as a percentage of advertising revenue divided by a measure of the degree of the economies of sale.

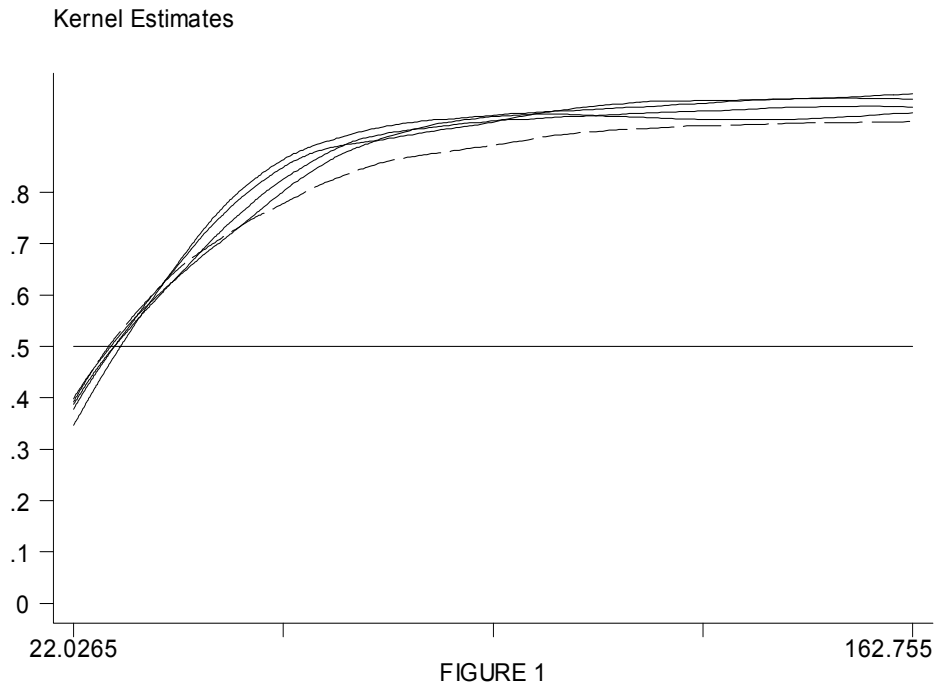


FIGURE 1
PROBABILITY OF OBSERVING ONE OR MORE FIRMS

Figure 1

The 1960 curve is shown by a dashed line.

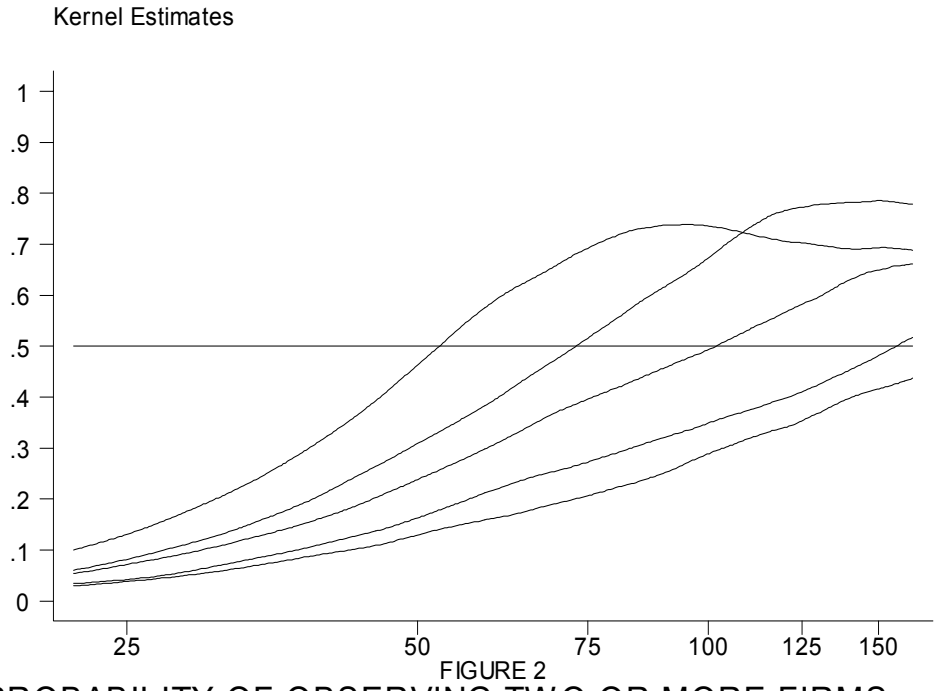
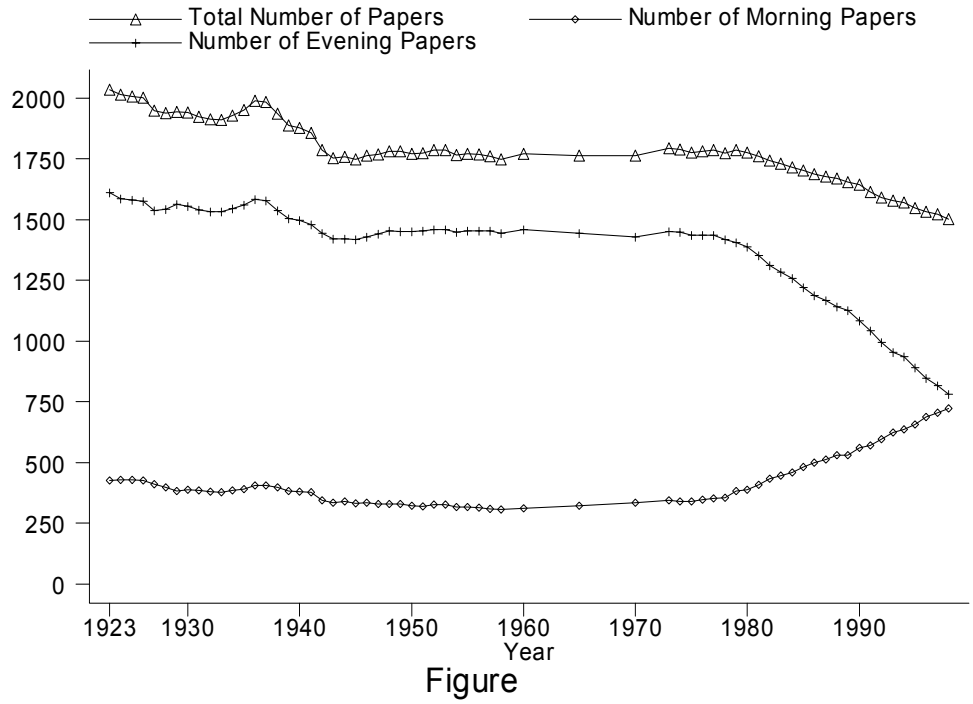


Figure 2

The leftmost curve is for 1923, next is 1920 then 1940, 1950, and finally 1960. The graph for 1980 is not shown.



Figure

Figure 3

Source: The Ready Reckoner, Editor and Publisher International Yearbook, various years.