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

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Section 1: Introduction

Average local concentration in the daily newspaper industry in the United States has 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. The purpose of this study is to document the nature of that increase and provide an explanation for it.

The increasing concentration rate is well known. What is striking, and yet not heretofore noted, is that the increase has not been accompanied by any significant change in the incidence of monopoly markets, conditional on population. The method of Bresnahan and Reiss (1990) shows that 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. After remaining constant until at least 1950, the one-firm entry threshold increased to 35,000 by 1980, while in a continuous climb the two-firm threshold reached at least 265,000. This is not what one would expect from a simple demand contraction or an increase in scale economies.

The increased concentration would seem, therefore, to be the result of a change in the nature of competition. This paper, in its final state, will carefully examine a number of possible mechanisms of this sort. These include changes in price competition, mutual forbearance among newspaper groups (chains), consumer taste for afternoon newspapers, entry barriers, quality competition (Sutton, 1991), and the joint production of advertising and circulation.

The daily newspaper industry is a useful one to study. 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. This is an impossible exercise for most industries, whose markets are at the regional, national or international level. It is 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. It is also useful as a paradigm of other media industries, where advertising is the main revenue generator.

Section 2: Entry Thresholds: Specification

Bresnahan and Reiss showed that one can measure the degree of competition, armed with data on market demographics and the number of firms only. Their interest was in forming scale free indices of competition, called relative entry thresholds, such as the ratio of the market size necessary to support at least two firms, relative to the market size necessary to support at least one firm. The more 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 firm needs in order to cover its fixed costs. However, the (absolute) entry thresholds are useful in themselves in comparing entry conditions over time.

We will consider a slight variation of the model which Bresnahan and Reiss presented. Per-firm profits are (approximately) Ð(N,S)= S^{ä}ð(N) - S^{ä}F, where S is market size, N is the number of firms, ð(N) is per-firm, per-person variable profits, and F is fixed costs. Proportionate increases in S correspond to proportionate increases in demand. For a homogenous product of unalterable quality produced under constant marginal cost, ã=1 and ä=0. Decreasing average

variable costs can be accommodated by ã>1, while diseconomies of scale imply ã<1. Alterable quality that increases fixed cost, when optimally chosen, leads to ã>1, ã > ä > 0.

Market size S is essentially a proportional demand shifter, and is a function of population, income and the like. For much of our analysis, we will consider S solely as a function of population. To be specific, let $S = AX^{â}$, where X is population and A and â are positive constants. When observed differences in population are independent of differences in the distribution of income or tastes, and the product is homogenous, and of unalterable quality produced under constant marginal cost, then â=1.

Under the weak assumption that ð(N) is decreasing in N, the free entry condition implies that at least N firms will be observed if $S^{ã}ð(N) - S^{ä}F > 0$. If we assume a random component to profits, exp(-å), proportionate to either variable profits or fixed costs, or both, we can rewrite this condition as

$$(ã-ä)\ln S + \ln ð(N) - \ln F > å$$

so that, letting G be the distribution of å,

$$\text{Prob}\{n \$ N|S\} = G((ã-ä)\ln S + \ln ð(N) - F)$$
$$= G(k + â(ã-ä)\ln X - á_N)$$

where $k = (ã-ä)\ln A - \ln F + \ln ð(1)$

$á_0 = 0$

$á_N = \ln ð(1) - \ln ð(N)$

Note that k is the log of monopoly profits when population is of size one, and is more generally per-capita profits when â=1 and ä=0, while $á_N$ is the percentage decrease

in per-firm profits for an N-firm oligopoly relative to monopoly profits, for given market size. We will call this the theoretical N-firm relative entry threshold, rN*. Note that the proportionate error is assumed to be the same for all N. In other words, the ratio of potential per-firm profits with N firms in the market to potential monopoly profits is assumed identical for all markets with the same observable determinants of market size. This generates an ordered probability model.

If we assume that å has a normal distribution, with mean zero and standard deviation ó, and letting Ö stand for the standard normal distribution, we obtain the ordered probit model

$$\text{Prob}\{n \$ N|S\} = Ö\,(k/ó + [â(ã-ä)/ó]\ln X - [á_N/ó])$$

This shows clearly that the parameters (k, [â(ã-ä), $á_N$) are identified only up to scale.

The N-firm entry threshold, S_N, is the value of S such that Prob{n $ N|S} = 0.5. The one firm entry threshold (in logs) is

$$S1 = -k/[â(ã-ä)]$$

The two-firm entry threshold (in logs) is

$$S2 = S1 + á_2/[â(ã-ä)]$$

The empirical relative entry threshold for duopoly is

$$r2 = \exp(á_2/[â(ã-ä)])$$

This equals the theoretical counterpart when â=1, ã=1 and ä=0, which holds in the baseline case in which the market size is properly specified, marginal cost is constant and quality is exogenous.

Of these three issues, only that of non-constant marginal cost is discussed in Bresnahan and Reiss. Their specification, allows for non-constant average variable cost, but it is not identified in practice by their data. In their set of markets - plumbers, dentists, doctors, druggists and tire dealers - quality is relatively exogenous, at least compared to newspaper markets. Finally, because they assume that the error term is an additive component of fixed costs, the identifiability of $á_N$ is unimpaired by misspecification in market size. This assumption is perhaps appropriate for their set of cities (county seats in isolated counties, mostly in Texas) where the variation in fixed costs is primarily rent and the willingness to live in that location (especially for dentists and doctors, who typically come from elsewhere, often the military). It seems less tenable for a study of newspaper markets across nearly the full set of U.S. counties. Surely the variance in potential profits across observably identical is much lower at counties with populations of 10,000 than at 300,000.

Section 3: Entry Thresholds - Results

I estimate this model on data on county population and the number of newspaper firms per county in the United States. Information on newspapers comes from Editor and Publisher International Yearbook (1923-2000), 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.

I drop the state of Alaska from the analysis, as well as counties in New York City, and Westchester county in New York State, where many local newspapers are printed in a single plant, and advertising is sold in combination. Newspapers operating under Joint Operating Agreements are treated as belonging to a single firm. Table 0 shows the distribution of counties by market structure, with the mean ln population, by year.

Table 1 models the number of firms, coded as 0, 1 and 2 or more as a function of the log of the county population. 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 (i.e., â=1, ã=1 and ä=0), 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. It is doubtful that allowing for deviations from this base case will bring down the spread in profits by much. â will be less than one if, say, the tendency to read newspapers is lower among populations in more populous counties; but any reasonable value for â will still imply a large ó. Furthermore, any diseconomies of scale in this industry are likely to be overshadowed by the tendency to increase quality in larger markets (i.e., increase the number of pages, hire better writers), so that ã - ä is likely to exceed one, thus implying an ever larger value of ó.

Panel B presents a simple probit for the event of one or more firm in the market. Panel C presents estimates for two or more firms in the market. Were the ordered probit model correct, the coefficients on log-population would be equal. Instead, the implied standard error for duopoly profits (holding â(ã-ä) constant) is 30 to 50 percent higher than that for monopoly profits. Thus, under this assumption, potential duopoly profits are more dispersed than potential monopoly profits, implying unobserved variables that determine circulation or revenue for duopoly firms but not monopolists, such as the extent of diversity in tastes. More generally, the results suggest that the degree of potential competition varies across markets. This has implications for the ability to correct for endogeneity (see below).

An alternative interpretation of the difference between the population coefficients on population in the two panels is that duopoly profits 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. One way to check this interpretation would be to estimate a more general model in which the theoretical relative entry thresholds $á_N$ interact with market size, following Sutton (1991). This thesis can also be checked directly by considering the dependence of proxies for quality on market size and competitive status.

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 separate 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 (not in pdf file). The basic pattern is the same, although the developments after 1950 are more extreme.

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, are presented in Tables 3A-D. They 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).

Section 4: Simple Demand and Supply Explanations

In this section, I outline simple demand and supply explanations for the increase in the two-firm entry threshold. The arguments in this and the following section are fragmentary at this point.

The usual explanation for the level of concentration in any market (and indeed a necessary condition for homogenous and horizontally differentially goods) is economies of scale, but this can not explain the increase. “First copy” costs have actually decreased with the introduction of photo-

composition and computerization.[1] 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. But these facts need to be documented precisely.

More fundamentally, changes in fixed costs induce changes in not only S2, but in S1 as well. Changes in the slope in the marginal cost curve can change S1 but not S2, as when the marginal cost curve rotates clockwise around the monopoly point, leaving optimal monopoly output and price the same, but reducing duopoly profits. That seems a rather non-generic outcome. And marginal costs - whether short run (newsprint and ink) or long run (newsprint, ink and presses) - are essentially constant. There *are* economies of density in distribution, however, and that may play some role in the increase in S2.

Neither can a simple decrease in subscription or advertising demand explain the increased concentration. Until 1950, per capita circulation was slightly increasing; it has fallen since, but the .025 per decade decline is hardly enough to explain the increase in S2.[2] Advertising has also grown in tandem with gross national product, and so at a greater rate than population. Furthermore, if we consider the obvious sources of a demand decrease - alternative media for news and

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[1]There are a number of industry studies that can illustrate that claim. Alternatively, the temporal pattern of these costs can be inferred from changes in the intercept in the regression of advertising price on circulation.

[2]Of course, we observe quantity demanded, not demand. But the decline in the first should overstate that of the latter, for firm exit will typically lead to a price increase.

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 of earlier decades) precedes the introduction of radio, the first of these media, which only by the late 1920s was seen as a profitable advertising tool. Even the exits over the 1930s seem unlikely to be in response to radio only, given the long life of newspaper presses.

The more fundamental difficulty with a demand contraction explanation is that it can not account for S1's relative constancy. One needs an 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.

Section 5: Competition Based Explanations

A demand side explanation that fits this requirement 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 suggests both demand & supply causes:

> 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)

To evaluate this claim, we need to check whether (a) afternoon newspapers were more likely to exit, (b) industrial composition predicts exit and S2, (c) these processes also operated before 1941, and (d) head-to-head competition was sufficiently tougher than morning to afternoon competition that exit was preferable to moving to a morning format. Two facts that casts some doubt on this theory are that monopoly newspapers are more likely to be evening than morning papers, even today, and that markets with three competing newspapers were common in the earlier decades.

As a first pass at this hypothesis, Table 4 adds the fraction of non-agricultural workers employed in "service industries" - transportation, FIRE, government, and other service industries. The remaining occupations are mining, manufacturing and concentration. This variable is measured at the state level, and is available from 1940 only. The ordered probits show a positive effect - opposite to the hypothesis - for 1940, 1950 and 1960, and an insignificant effect for 1980. Measured at the mean of this variable, the absolute entry thresholds are quantitatively very close to those presented in Table 2. (These are not shown). However, when one looks at the simple probits, we see that the variable positively and significantly effects the probability of observing at least one firm, but has a negative, and (marginally) significant effect in predicting two or more firms. It is possible that the variable is also proxying for educational level, and so overall demand. Then we should expect that only this effect should operate in predicting S1, while the "afternoon" effect will also operate in predicting S2.

A "variety" based argument holds that consumer taste for reading multiple newspapers has declined, perhaps with the availability of alternative media. Such habits have clearly

declined, but that may be more the *effect* of newspaper exits than the *cause*. However, there is a countervailing effect that the more that consumers read more than one newspapers, the greater the substitutability of competing newspapers to advertisers, as either can be used to access consumers. Where there are alternative media, the newspapers will still be substitutes through chain effects, but this should be a second order effect. Unless the excess advertising profits from monopoly provision of access to non-cross over readers are fully competed away in competition over circulation, this mechanism will limit the direct effect on the profitability of a second newspaper. Evaluating this requires period by period estimates of the market structure effect on per-circulation advertising rates, which must await another draft.

Yet another explanation is increased quality competition due to decreasing "first copy" costs from the late 1950s on can provided a mechanism for this increased quality. The number of pages has certainly increased since then. The earlier rise in S2 is more difficult to explain, both because "first copy" costs were unchanged, and, as Table 5 shows, because the number of pages barely changed over that period, at least in the "23 leading cities". Nonetheless, as Table 6 shows, there is a strong relationship between the average number of pages and income, that may prove to be the key to understanding quality competition in this market. (The relationship between the number of pages and population is much less robust, depending on the inclusion of a time trend, which obviously has a one to one - and nearly linear - relationship with log population.)

Mutual forbearance among newspaper chains is another possible explanation. Note that it must rely on mutual forbearance in exit, rather than entry. The threat here is

that if firm 1 does not exit from market A, firm 2 will not exit from market B, when both firms are initially present in both markets. Since chains were growing over the period, it suggests that newspapers were purchased in anticipation of closing them. Given that most chains were small in the early years, my guess that the likelihood that two firms met in more than one market was actually quite small; but the hypothesis is worth checking.

Rosse's umbrella theory, in which suburban papers compete with metropolitan papers, is yet another explanation for the rise in S2. Applied to the decline in the number of competitive markets, it states that competition has shifted from within 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 has led to this new type of competition, according to this argument.

The umbrella theory is more convincing in explaining the rise in the number of suburban dailies than in the decline in the number of city papers. We should certainly expect an increase in the number of suburban papers due to the increased competition, and perhaps even a fall in the number of city papers, due to the change in the distribution. But the rise in S2 is of such a degree that the shift to the suburbs seems unlikely to explain the rise. Measuring how likely on that basis requires an explicit mathematical model of competition, with price elasticities, etc. But some sense can be gotten within the framework of the Bresnahan and Reiss model by including measures of population of neighboring counties.

In table 7 we model cross-county competition by adding 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.

[Table 7 and discussion to be added for talk.]

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. (If we consider a county of 53,000 in 1923 whose population grows at the national annual growth rate of 1.5% per year, will have a probability of 0.38 in 1930, and 0.24 in 1960 (at 1.3% per year). Figures 1 and 2 show that we see such a decline for the probability of observing two or more firms at even lower population levels, though no such decline for the probability of observing one or more firms. It is quite unlikely that the shift to the suburbs explains the decline in competition for such small counties.

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Table 0: Distribution of Counties by Number of Newspaper Firms

	1923	1930	1940	1950	1960	1965	1980
Zero			1950	1927	1915		1851
One			801	894	921		989
Two +			347	280	267		268
Total			3098	3101	3103		3108
Mean lnPOP	9.75	9.81	9.86	9.89	9.92	9.94	10.10

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 (1930 to 1940)

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

Table 3B: 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 3C: 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 3D: 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

(Note: to compare values along the diagonal to those in previous tables, take the square root. For off-diagonal values, divide by two to get the approximate equivalent value.)

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: Average Number of pages Printed in Newspapers of Over 100,000 Circulation in Twenty-One Cities of the United States

Year	Daily	Sunday
1920	23	79
1921	23	80
1922	25	89
1923	27	97
1924	28	103
1925	29	109
1926	31	111
1927	30	107
1928	30	104
1929	31	104
1930	29	91
1931	27	82
1932	24	72
1933	24	70
1934	26	78
1935	26	82
1936	28	85
1937	28	87
1938	26	81

Source: Guthrie, The Newsprint Paper Industry, Harvard University Press. page 11.

Table 6: Average Number of Pages in 23 Leading Cities as Function of GNP, Population and Time Trend

	(1)	(2)	(3)	(4)
	lnPages in Dailies		lnPages on Sunday	
lnGNP	.64	.56	.96	.86
	(.10)	(.05)	(.14)	(.10)
lnPOP	-.25	3.25	-1.58	2.88
	(.22)	(.51)	(.32)	(.99)
year		-.04		-.05
		(.005)		(.01)
const	-1.05	32.62	12.15	55.13
	(2.29)	(4.93)	(3.35)	(9.60)
R2	.74	.94	.76	.90
N	19	19	19	19

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

	1923	1940	1960	1980
A: Ordered Probit: Zero, One or Two Firms				
lnPOP				
lnPOP of smaller nearby counties				
lnPOP of larger nearby counties				
Cut 1				
Cut 2				
B: Probit: One or More Firms				
lnPOP				
lnPOP of smaller nearby counties				
lnPOP of larger nearby counties				
constant				
C: Probit: Two or More Firms				
lnPoP				
lnPOP of smaller nearby counties				
lnPOP of larger nearby counties				
constant				
N	3070	3102	3092	3102