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ABSTRACT

Pricing of subscriptions and single copies has historically been arbitrary. Evidence indicates that the newspaper industry has tended to overestimate the elasticity of demand for newspaper circulation. This study analyzed price changes, circulation changes, and population changes for all daily newspapers in the United States between 1970 and 1975. Results strongly supported the hypothesis that the demand curve is highly inelastic and that newspapers have been grossly undercharging for their product in relation to the market. The estimate of elasticity for all newspapers during the six-year period studied indicated that a 50% increase in price resulted in only a 1.25% decrease in circulation, with percentage change in population of the publishing city or metropolitan area held constant. Projected potential loss to the newspaper industry because of past reluctance to raise per-copy price from 10 to 15 cents is estimated at more than one billion dollars a year. There appears to be no evidence that daily newspapers have yet approached the point of diminishing returns from price increases to the audience consumers of the industry. (Author)

CIRCULATION PRICE ELASTICITY IN THE DAILY NEWSPAPER INDUSTRY

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Circulation Price Elasticity

In the Daily Newspaper Industry

Almost 20 years ago, Landau and Davenport stated that, "The sales price of a newspaper, therefore, is expressed neither by the interaction between Supply and Demand nor by a relationship to production cost factors. Price determination is purely arbitrary."[1] (emphasis added) They concluded:

> The forceful influence on this arbitration seems to be a belief that a newspaper must be sold at an insignificant price in order to have mass appeal.
>
> Both single copy and home delivery prices rise slowly, are rather indifferent to currency value fluctuations, are decidedly reluctant, are at comparatively great intervals, and, in general, rise only under pressure from spiraling costs.[2]

During the early 1970's, newsstand and subscription prices rose, apparently in response to "pressure from spiraling costs" compounded by an economic slump which affected advertising revenues. The increases were indeed made reluctantly, in spite of mounting evidence of a highly inelastic demand: As early as 1961, Gallup advised newspaper publishers that a majority of their readers were receptive to a 15-cents-a-copy price, although most newspapers then charged only 5 cents.[3] Yet as recently as the beginning of 1971, only 148 of the 1,742 daily newspapers in the United States were charging the price that Gallup had assured them was "safe" ten years before. It was not until 1974 that a majority of the daily newspapers finally reached the 15-cent price.

Mansfield has stated:

> Most businessmen intuitively are aware of the elasticity of demand for goods they make, although they may not have a detailed, precise estimate. Nevertheless, some firms tend to be conservative and underestimate elasticity of demand.[4]

The opposite appears to be true of the newspaper industry. Newspaper managers seem to overestimate the elasticity of demand for newspaper subscription and per-copy prices. The concept of elasticity is shown in Figure 1.

FIGURE 1 ABOUT HERE

Two hypothetical demand curves are show in Figure 1, De, a relatively elastic demand curve, and Di, a relatively inelastic demand curve. With a given price of P1, circulation would be C1. If price is increased to P2, the circulation would decrease to C2 on the inelastic demand curve, but it would drop to C3 if the demand curve is relatively elastic.

There is some evidence that the demand for newspaper copies is inelastic, similar to curve Di in Figure 1, but the evidence has been largely based on isolated examples. In 1976, Clark reported results of circulation and price changes for a random sample of 202 daily newspapers. He found that in 59.4% of the cases, circulation continued to increase as subscription rate increased, and in only 39.3% of the cases did circulation decrease.[5] He concluded:

> Obviously, there is a point of diminishing return in increasing subscription rates, but this point apparently has not been reached by most newspapers in the United States, particularly by newspapers with circulations of 50,000 or less.[6]

The Problem

The potential economic magnitude of "underpricing" is striking. Consider the effect of the reluctant increase from 10 to 15 cents a copy. Based on a total daily newspaper circulation of 62,000,000, the gross effect of the increase is more than $3,000,000 a day, or more than <u>$1 billion a year</u>. This is an average of some $500,000 for each of the 1,750 or so daily newspapers in the country. In times of economic problems, the magnitude of "lost revenue" from arbitrary pricing is disturbing.

The Hypothesis

This study was conducted as an initial step toward determining the elasticity of demand for newspaper circulation, in an attempt to provide more precise economic data for decision-making in the newspaper industry. It was hypothesized that the demand curve for circulation would be highly inelastic, *i.e.*, a given percentage increase in price would *not* lead to a corresponding percentage decrease in circulation.

Baumol explains the demand function as follows:

> The most obvious piece of information we desire of a demand function is an indication of the effect on the "dependent" variable of a change in the value of one of the other variables. In the case of the demand curve, this involves measurement of the response in quantity demanded which can be expected to result from a given change in the price of the commodity.[7]

In this study, we examined the changes in circulation that resulted as price increased for newspaper copies.

Methodology

Data on changes in circulation, per-copy price and population of the area in which the newspaper is published were collected for all daily newspapers published in the United States in both 1970 and 1975.[8] Although home-delivery prices were not available, it was assumed that there is a close relationship between changes in per-copy price and home-delivery price. Changes in population were included as a concomitant variable, to control for population changes as an influence on circulation changes. The raw data were converted to percentage changes for the analyses.

The data were subjected to both descriptive and regression analyses, using computer program SPSS.[9] Analyses were first made on all newspapers, and then separate runs were made on morning, evening, Sunday and all-day newspapers to determine if elasticity estimates varied among the various types of newspapers.

Results

The hypothesis received strong support. In all cases, population changes correlated positively with circulation changes, as was expected. This means that as population increased, circulation tended to increase. Price changes tended to correlate negatively with circulation changes, indicating that circulation decreased as price increased, with population changes held constant. However, none of the correlations were significant at the 0.05 level.

More important, though, the correlation between percentage price change and percentage circulation change was very low in all analyses. This indicates that a relatively large percentage increase in price resulted in a much smaller percentage decrease in circulation.

All Newspapers

A total of 2,194 newspapers published in both 1970 and 1975 were analyzed as a group. The number is higher than the usual figure of about 1,750 because newspapers with the same name with morning, evening, and/or Sunday editions were counted as separate papers for the analyses. The total included 290 morning newspapers or editions, 1,334 evening, 546 Sunday, and 24 all-day.

A summary of changes for all newspapers is presented in Table 1.

TABLE 1 ABOUT HERE

During the six-year period, circulation mean increase was 9.9%, population increase was 6.0% and price increase was 41.1%. If the demand for newspaper circulation had unitary elasticity, we would expect to find a 41.1% decrease in circulation with 41.1% increase in price. Obviously, this was not the case. Although total circulation did increase, however, when population change is held constant, the increase in price resulted in a minor decrease in circulation.

Data next were subjected to multiple regression analysis to determine the relationship between price change and circulation change. Results of the regression for all newspapers are presented in Table 2.

TABLE 2 ABOUT HERE

The formula for the regression equation can be expressed:

$$Y' = A + x1B1 + x2B2$$

where Y' is the predicted change in circulation, A is a constant, x1 is the regression coefficient for population change (B1) and x2 is the regression coefficient for price change (B2).

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The regression technique used in this analysis was step-wise, with the computer determining first the predictor accounting for the greater variance in the criterion variable (circulation change) and then the predictor variable accounting for the lesser variance. In every case, circulation change accounted for the greater amount of variance.

The variable entered in Step 1 was "percent change in population." Multiple R was 0.08279 and R^2 (variance accounted for) was only 0.00685. With 1 and 2192 degrees of freedom, the F-value of 15.12816 was not significant at the 0.05 level.

"Percent change in price" was entered in Step 2. Multiple R was 0.08788 with both variables entered in the equation, with an R^2 of 0.00772. Thus, "percent change in price" added only 0.00087 variance accounted for, with an F-value of 1.919 ($p > 0.05$).

Values for the equation are:

$$Y' = 0.10404 + 0.10621 \text{ (population change) } +$$
$$(-)\ 0.02718 \text{ (price change)}$$

If we hold population change constant at zero, the equation becomes:

$$Y' = 0.10406 - 0.02718 \text{ (price change)}$$

Solving for a 50% increase in price, we obtain a predicted circulation change of only 1.25% decrease.

Applying this formula to a hypothetical newspaper with 100,000 circulation and a price of 10 cents per copy, we would find that raising the price 50% to 15 cents would result in a 1.25% decrease in circulation, or 1,250. With 100,000 circulation at 10 cents per copy, daily gross revenue from circulation would be $10,000. At 15 cents a copy and a circulation of 98,750, daily gross revenue from circulation would be $14,812.50, or an increase of <u>$4,812.50 per day</u>. On the basis of 312 issues per year, this amounts to

$1,304,940. In addition, of course, there would be some reduction in newsprint and other costs, further increasing economic benefits.

The demand curve derived from these data is shown in Figure 2.

FIGURE 2 ABOUT HERE

Changes by Type of Newspaper

In terms of circulation change during the 1970 to 1975 period, Sunday newspapers had the greatest circulation gain (12.6%) followed by morning newspapers (+10.7%), evening newspapers (+8.8%) and all-day newspapers (-3.9%). Although all-day newspapers had the greatest change in price (+52.0%), for the other three types of newspapers circulation change was inversly related to price change; i.e., Sunday newspapers, which had the greatest circulation growth, also had the greatest price increase (+48.0%), followed by morning newspapers (+40.8%) and evening newspapers (+38.1%).

A summary of changes by type of newspaper is presented in Table 3.

TABLE 3 ABOUT HERE

In the multiple regression analyses, all-day newspapers actually had a positive regression coefficient for percentage price change (+0.12536), indicating that price increase clearly was not associated with circulation decrease. The other regression coefficients for price change were: morning newspapers (-0.01976), evening newspapers (-0.02823), Sunday newspapers (-0.04145).

The multiple R, R^2, R^2-change, and regression coefficients by type of newspaper are summarized in Table 4.

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TABLE 4 ABOUT HERE

The regression equations by type of newspaper were as follows:

Morning: Y' = 0.10744 + 0.18788 (percent population change) + (-) 0.01976 (percent price change)

Evening: Y' = 0.09391 + 0.06841 (percent population change) + (-) 0.02823 (percent price change)

Sunday: Y' = 0.12777 + 0.35618 (percent population change) + (-) 0.04145 (percent price change)

All-Day: Y' = 0.01074 + 0.03963 (percent population change) + 0.12536 (percent price change)

Solving for a 50% price increase and holding percentage population change constant at zero, we derive the following elasticity estimates:

Morning: 0.88% circulation decrease.

Evening: 1.32% circulation decrease.

Sunday: 1.95% circulation decrease.

All-Day: 6.29% circulation increase.

This does not suggest that raising the price on an all-day newspaper would cause a circulation increase, but it does demonstrate dramatically that the price increases during the 1970-1975 period were not related to the actual circulation declines. We must search for deeper, more complex explanations of circulation changes than price and population changes, either alone or in combination.

The final phase of the study involved comparing circulation changes of those daily newspapers which increased price from 10 to 15 cents with those which remained constant at 10 cents during the 1970-1975 period.

A total of 942 newspapers increased price from 10 to 15 cents during this period. For these newspapers, the 50% price increase was accompanied by an 8.3% circulation increase. The 536 newspapers which maintained the 10-cent price throughout the period experienced a 12.1% increase in circulation. Thus, the constant price resulted in a 3.8% greater increase in circulation.

These data were subjected to SPSS subprogram PEARSON CORRELATION. For the combined 1,478 newspapers, mean percentage price increase was 31.87% and mean circulation increase was 9.68%. The correlation coefficient between percentage price change and percentage circulation change was -0.0568, which was significant at the 0.03 level. The negative correlation indicates that newspapers which increased copy price 50% did have a slightly lower percentage circulation increase, as we would expect. However, the difference of only 3.8% means that the demand curve still was highly inelastic and that the price increase would lead to substantially higher total revenue for the newspapers which increased price.

It is revealing to speculate on the potential differences in revenue for the two groups of newspapers. For the newspapers which increased price from 10 to 15 cents, the mean circulation in 1975 was 38,781.7. The additional 5 cents, ignoring carrier percentage of the increase, amounts to $1,939.08 per day, or, on the basis of a 312-day calendar year for a six-day daily newspaper, increased revenue of $604,994.52 for the year. Even recognizing that the newsstand price is not identical to subscription price, the contrast is striking.

Carrying the comparison one step farther, the newspapers which remained constant at 10 cents, circulation for the average newspaper was 25,728.2 in 1970 and 26,841.9 in 1975. At a full 10 cents per copy per day, gross circulation revenue would have gone from $802,719.84 in 1970 to $837,467.28 in 1975, an increase of 4.3% in gross circulation revenue. For the newspapers which increased price from 10 to 15 cents, the gross circulation revenue would have risen for the average newspaper from $1,195,880.40 in 1970 to $1,814,983.56, or an increase of 51.7% in gross circulation revenue.

The contrast between an increase of 4.3% and an increase of 51.7% in gross circulation revenue vividly demonstrates the economic penalty of overestimating the elasticity of demand for newspaper circulation.

Summary and Conclusions

Results of this study offer strong support for the hypothesis that the demand for newspaper circulation from 1970 to 1975 was highly inelastic. Although per-copy prices rose 41.1% during the six-year period, total circulation actually increased 9.9%. Controlling for changes in population, the correlation between circulation and price change was slightly negative, indicating a small decrease in circulation with a much greater increase in price.

It can be concluded that at least during this time period, newspapers were grossly underpriced and newspapers lost a tremendous amount of potential revenue. Although we cannot predict with confidence that future price increases will continue to remain inelastic, there is no evidence that newspapers have yet approached a point of diminishing return from price increases.

It is possible, of course, that there might be a kink in the demand curve, perhaps a psychological barrier that would result in greater elasticity beyond some point. Indeed, some newspaper managers have specualted that further price increases will lead to greater decreases in circulation.

However, another possibility needs to be explored. Perhaps we are approaching the point where price increases might be a <u>catalyst</u> for subscription cancellations, rather than the <u>cause</u>. In other words, it might be an excuse to cancel a newspaper that has long since lost its relevance to some readers.

If this is true, we will need to greatly expand our efforts to define the relevant role of the newspaper in our fast-changing, complex society.

As Gallup stated 15 years ago, people will continue to be receptive to price increases so long as the newspaper is worth the price to them.[10]

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Footnotes

1. Edmund Landau and John Scott Davenport, "Price Anomalies of the Mass Media," Journalism Quarterly, 36:291-4, 1969, p. 292.
2. Ibid.
3. "90% in Survey Receptive to 15¢ a copy, Gallup Says," Editor & Publisher, April 24, 1971, p. 11.
4. Edwin Mansfield, Managerial Economics and Operations Research (New York: W. W. Norton & Co., 1966), p. 52.
5. Jeff Clark, "Circulation Increase Despite Higher Subscription Price," Editor & Publisher, February 14, 1976, p. 32.
6. Ibid.
7. William J. Baumol, Economic Theory and Operations Analysis, (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1965), p. 172.
8. All data were compiled from Editor & Publisher International Year Book, 1970 and 1975 editions.
9. Norman H. Nie et. al., Statistical Package for the Social Sciences, (New York: McGraw-Hill Book Co., 1975).
10. "90% in Survey Receptive to 15¢ a copy, Gallup Says," op. cit.

Table 1. Changes in Mean Circulation, Price and Population for All Daily Newspapers, 1970-1975

Variable	1970	1975	Total	Percent
Circulation	47,808.687	48,718.156	+909.469	9.9
Population	134,319.750	135,987.250	+1,658.500	6.0
Price	12.004	16.864	+4.860	41.1

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Table 2. Regression Coefficients in Percentage Circulation Change for Percentage Changes in Population and Price, All Newspapers.

	Multiple R	R^2	R^2 Change	Regression Coefficient
Population	0.08279	0.00685	0.00685	0.10621
Price	0.08788	0.00772	0.00087	-0.02718

Table 3. Changes in Mean Circulation, Price and Population by Types of Newspapers, 1970-1975

	1970	1975	Total	Percent
Morning Newspapers:				
Circulation	80,411.312	82,645.75	2,234.438	10.7
Population	318,172.5	327,146.937	8,974.43	3.8
Price	9.938	13.759	3.82	40.8
Evening Newspapers:				
Circulation	25,936.148	26,104.277	168.12	8.8
Population	75,510.437	75,530.875	120.43	6.8
Price	9.749	13.351	3.6	38.1
Sunday Newspapers:				
Circulation	81,389.25	83,710.375	2,321.12	12.6
Population	174,512.25	176,956.5	2,444.25	5.1
Price	18.62	26.949	8.32	48.0
All-Day Newspapers:				
Circulation	102,005.25	99,640.5	-2,364.75	-3.9
Population	272,225.125	277,831.0	5,605.87	6.3
Price	12.292	19.375	7.08	52.0

Table 4. Regression Coefficients on Percentage Circulation Change for Percentage Changes in Population and Price, by Types of Newspapers.

	Multiple R	R^2	R^2 Change	Regression Coefficient
Morning:				
Population	0.10928	0.01194	0.01194	0.18788
Price	0.11119	0.01236	0.00042	-0.01976
Evening:				
Population	0.07167	0.00514	0.00514	0.06841
Price	0.07893	0.00623	0.00109	-0.02823
Sunday:				
Population	0.14197	0.02015	0.02015	0.35618
Price	0.14756	0.02177	0.00162	-0.04145
All-Day:				
Population	0.10378	0.01077	0.01077	0.03963
Price	0.13074	0.01709	0.00632	0.12536

Figure 1. Elastic and Inelastic Demand Curves.

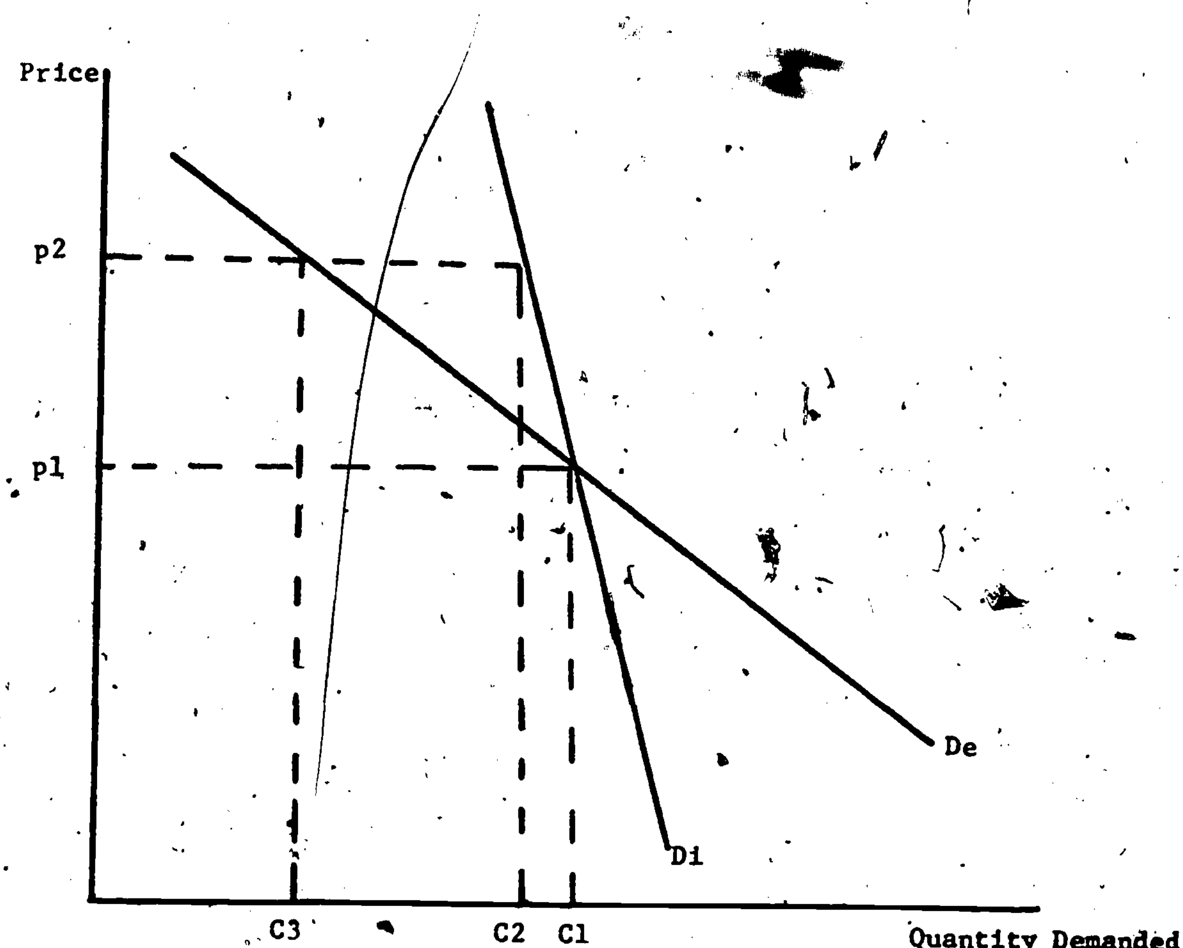

Figure 2. Estimated Demand Curve for All Daily Newspapers, 1970-1975.