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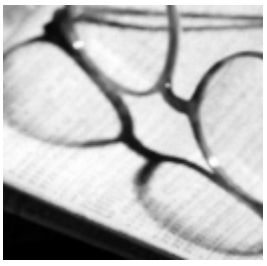


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The Effect of Product Market Competition on Capital Structure: Empirical Evidence from the Newspaper Industry

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Abstract

This paper analyzes whether the extent of product market competition that a firm faces affects its capital structure. We study the effect of competition on leverage for firms acting in the US newspaper industry. Potential endogeneity between market structure and capital structure is addressed by exploiting the exogenous development of other mass media to instrument for the decline in the number of cities with competing newspapers. The results suggest that oligopolies have higher debt ratios than monopolies, controlling for other determinants of leverage. We also study the effect of capital structure on prices. For oligopolies, debt ratios show a significant and positive effect on advertising rates. The effect is not significant for monopolies.

JEL: G32, L11, L13, L82
Keywords: market structure, capital structure, newspaper industry, prices.

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1. Introduction

In their famous survey published ten years ago, Harris and Raviv (1991) summarized our knowledge on the theory of capital structure. They also surveyed the empirical evidence that lends or denies support to the different theories. In their concluding tables showing the available empirical evidence for each theoretical result, there were some empty cells. The validity of some of the theories had not been evaluated by any empirical study. One of these empty cells showed the lack of empirical evidence on the effect of the extent of strategic interaction in the product markets on firms' capital structure.[1] Ten years later, this vacuum still remains.

Brander and Lewis (1986, 1988) and Maksimovic (1988) pioneered the analysis of the use of financial structure as a strategic variable in product market competition. These authors find that leveraging leads firms to aggressive competition. On the contrary, more recent papers by Showalter (1995), Damania (1997), Dasgupta and Titman (1998) and Faure-Grimaud (2000) obtain that firms can use leverage to sustain more collusive equilibria.[2] If firms in situations of imperfect competition have strategic incentives to take on debt that are absent for monopolistic or (perfectly) competitive firms, we would expect the extent of competition faced by firms to affect their financial structure. Thus, the strategic-use-of-debt models predict that market structure affects capital structure. They also predict that leverage affects product market prices.

[1] See Harris and Raviv (1991), Table V. Panel A or Table VII. Panel C.

[2] Glazer (1994) and Chevalier and Scharfstein (1996) also find that leveraged firms price higher, although they consider debt levels as exogenous rather than as strategic variables in market interaction.

These models typically have a first stage, in which firms in imperfect competition set their capital structure, and a second stage, in which those firms compete in the product markets. The available empirical evidence has focused on the second-stage effects of leverage on prices finding results that contradict the pioneer models. Chevalier (1995), Phillips (1995) and Chevalier and Scharfstein (1996) show that leveraged firms reduce output relative to non-leveraged ones. This evidence helps to answer the question of whether leveraging leads firms to sustain higher or lower prices, but it does not shed light on whether the competitive conditions that firms face in the product markets affect their financial decisions.

Why does such an important question lack empirical analysis? An extensive body of research has identified stylized facts on the determinants of capital structure, i.e. the relative proportions of debt and equity financing. Several firm characteristics -size, growth opportunities, profitability, non-debt tax shields, or the proportion of fixed assets, for example- have been shown to affect financial structure. Intra-industry similarities in capital structure have also been repeatedly found. However, the empirical evidence on the effect of product market characteristics on firms' capital structure is very small. Titman and Wessels (1988)'s study of the effect of product uniqueness, Kovenock and Philips (1995, 1997)'s analyses of recapitalization decisions, and Showalter (1999a)'s study of the effect of cost and demand uncertainty represent scarce exceptions to the underexploration of the effect of the conditions that firms face in the product markets on their capital structures. In particular, we are not aware of previous studies considering the extent of product market competition as a determinant of leverage.

A possible explanation for this lack of empirical analysis is potential endogeneity. Even though the strategic-use-of-debt-models predict an effect of competition on capital structure, a profuse literature, initiated by the "long-purse" stories of predatory pricing, considers the effect of capital structure on market structure through predation against financially constrained firms (Telser, 1966; Benoit, 1984; Fudenberg and Tirole, 1986; Poitevin, 1989; Bolton and Scharfstein, 1990) or through the use of debt for entry deterrence (McAndrews and Nakamura, 1992; Stenbacka, 1994; Fulghieri and Nagarajan, 1996; Showalter, 1999b). A crucial feature of our analysis is that we address this endogeneity concern by exploiting an exogenous source of change in the extent of strategic interaction to study the effect of competition on capital structure.

The US newspaper industry is particularly appropriate for our study not only because there has been significant variation in the extent of competition that firms face, but, mainly, because a major component of this variation, the decline in the number of cities with competing newspapers, is associated with an exogenous factor, the development of other mass media (AM and FM radio, and open and cable TV). We exploit this exogeneity in instrumental-variable regressions to address potential endogeneity concerns. The results suggest that the extent of product market competition affects capital structure: debt ratios are reduced as the extent of competition (i.e., the degree of strategic interaction) falls, controlling for other determinants of leverage.

In addition, we explore the effect of capital structure on newspaper advertising rates. If oligopolistic firms take on debt for strategic reasons, we would expect capital structure to affect prices. Previous studies have analyzed this issue considering only oligopolistic industries: Chevalier (1995) and Chevalier and Scharfstein (1996) analyze the supermarket industry, while Phillips (1995) studies the fiberglass, tractor-trailer, polyethylene, and gypsum industries. As mentioned, they found that leveraging leads firms to increase prices (although Phillips reports the opposite result for the gypsum industry).

Our contribution to this previous research is to examine whether debt has a different effect on prices under oligopolistic than under monopolistic conditions. We are able to perform this study because the newspaper industry is populated by firms acting in monopolistic and oligopolistic markets. We exploit our results on the determinants of leverage to alleviate endogeneity concerns on the effect of capital structure on prices. For monopolies, our findings suggest that debt ratios have a non-significant effect on prices. For oligopolies, debt ratios show a significant and positive effect on prices. The oligopoly results coincide with the previous literature.

Our findings contribute to fill Harris and Raviv (1991)'s empty cell by suggesting that the extent of strategic interaction that firms face in the product markets affects their capital structure. However, the results do not lend empirical support to the pioneer strategic-use-of-debt authors, but to the models that show that leveraging allows firms to coordinate towards more collusive equilibria (Showalter, 1995; Damania, 1997; Dasgupta and Titman, 1998; and Faure-Grimaud, 2000).

In the rest of the paper, Section 2 discusses the advantages of the newspaper industry for our study. Section 3 analyzes the effect of the extent of product market competition on capital structure, and Section 4 studies the effect of capital structure on prices. Section 5 presents our conclusions, and discusses suggestions for future research. The Appendix provides data definitions, sources, and summary statistics.

2. The Newspaper Industry

The strategic-use-of-debt models show that capital structure can be used as a value-increasing device under imperfect competition. These incentives for taking on debt are only present in situations of strategic interaction. If oligopolistic firms have strategic incentives that affect their financial decisions that are not present for monopolistic or competitive firms, we would expect market structure to affect capital structure. Implicitly, these models predict that the extent of competition that firms face in the product markets affects their capital structure. In particular, they predict that, controlling for other determinants of leverage, oligopolistic firms have higher debt levels than monopolistic or competitive firms. Our purpose is to study the effect on firms' capital structure of the extent of product market competition that they face. We investigate this issue by analyzing the effect of competition on leverage for firms acting in the US newspaper industry.

For several reasons, the newspaper industry provides an appropriate setting for our study. First, the local-market feature allows us to consider firms in the same industry under different market structures, avoiding the problem of cross-industry comparisons. This is

important because significant intra-industry similarities in capital structure have been reported (Bowen, Daley, and Huber, 1982; Bradley, Jarrell, and Kim, 1984; Harris and Raviv, 1991).

Second, there is significant over-time variation in the extent of competition that our newspaper firms face. This variation arises, in part, from a continuing decline in the number of cities with competing newspapers. The number of cities with competing newspapers dramatically decreased from 502 in 1923, 109 in 1948, and 70 in 1958, to less than 20 in 1995. As our newspaper firms are parent companies that usually publish newspapers in more than one city, over-time variation also arises from mergers and acquisitions among newspaper chains. The development of newspaper chains persisted during the period of analysis (Dertouzos, 1982; Dertouzos and Trautman, 1990; Neiva, 1996). There is also cross-sectional variation in the extent of competition faced by the sample firms, but this factor is less relevant as we will use firm fixed effects.

Third, the reduction in the number of competing newspapers is associated with an exogenous factor, the development of other mass media (AM radio, FM radio, TV, cable TV), which has reduced newspapers' share of advertiser and consumer demand (Rosse, 1978; Compaine, 1980). Rosse and Dertouzos (1978) report that a 1% increase in TV's share of aggregate advertising expenditure reduces newspapers' advertising revenue by nearly 1%.[3] In an industry with high fixed costs, a demand reduction promptly induces exit.

[3] The decline in the number of competing newspapers is also associated to the process of suburbanization, which has affected central-city newspaper demand; and to a greater social integration in American society, which has reduced the ability of newspaper firms to offer products differentiated by, for example, political, social, or ethnic characteristics (Rosse, 1978).

The exogenous development of radio and TV is correlated with the reduction in the number of competing newspapers, providing an instrument for the extent of competition that newspaper firms face.

Fourth, newspapers are only published in monopolistic or oligopolistic (mainly duopolistic) markets.[4] Monopolies and oligopolies are sharply different market structures. In this industry, not only does there exist variation in the degree of competition that firms face, but this variation is significant and related to an exogenous factor. This feature is also useful because we additionally study the effect of capital structure on prices, comparing whether this effect is different for oligopolies than for monopolies.

3. The Effect of Competition on Capital Structure

We start by considering all the US parent companies included in the COMPUSTAT database whose major line of business is daily newspaper publication. This results in a sample of 441 firm-year observations corresponding to 27 parent companies that were active at some point between 1957 and 1995. We lose one observation per firm because we will use lagged variables. We also lose 75 observations because of missing information in COMPUSTAT.[5] We drop 18 observations for which COMPUSTAT reports

[4] Out of hundreds of cities in which the firms in our sample publish newspapers, New York, Chicago, and Washington are the only ones which, at some point in time during the period of observation, had more than two competing newspapers.

[5] Most of these missing observations correspond to missing stock prices (used to obtain firm market values) which are not available because the firm's stock was not publicly traded at that time.

a zero debt level.[6] The final sample has 22 firms and 321 firm-year observations in an unbalanced panel from 1964 to 1995.

To analyze the effect of the degree of competition on capital structure, we regress debt ratios on a measure of the extent of product market competition and on variables controlling for size, profitability, growth opportunities, and non-debt tax shields. This approach follows previous studies of the determinants of leverage that show that these control variables affect capital structure (Bradley, Jarrell, and Kim, 1984; Titman and Wessels, 1988; Harris and Raviv, 1991; *inter alia*). It is also plausible to argue that current shocks to capital structure affect these controls. For example, the strategic-use-of-debt models predict that debt levels affect profitability. We alleviate these endogeneity concerns by lagging our control variables (Rajan and Zingales, 1995). We also include firm fixed effects and a time trend. Our main regression is:[7]

$$Debt_{it} = \beta_1 \mathrm{Pr}ofitability_{it-1} + \beta_2 GrowthOpportunities_{it-1} + \beta_3 Size_{it-1}$$
$$+ \beta_4 NonDebtTaxShield_{it-1} + \beta_5 PMC_{it} + T_t + \Gamma_i + u_{it}$$

where for firm i in period t:

$Debt_{it}$ = Total Debt/Total Assets

$Profitability_{it-1}$ is alternatively defined as:

$Retained\ Earnings_{it-1}$ = Retained Earnings/Total Assets

[6] We interpret these values as missing information. The results are robust to including these zero-debt observations. All results reported but not presented are available upon request.

[7] Sources and summary statistics are presented in the Appendix.

Return on Assets $(ROA)_{it-1}$ = Operating Income/Total Assets

Return on Sales $(ROS)_{it-1}$ = Operating Income/Sales

$Size_{it-1}$ = ln(Sales in constant dollars)

Growth Opportunities$_{it-1}$ = Market Value of Common Equity/Book Value of Common Equity

Non Debt Tax Shield$_{it-1}$ = Depreciation and Amortization/Total Assets

Γ_i = Firm fixed effect

T_t = Linear time trend

PMC_{it} measures the extent of product market competition as:

$$PMC_{it} = \frac{\sum_{j=1}^{J} pop_{jt} d_{jit}}{\sum_{j=1}^{J} pop_{jt}}$$

where: d_{jit} = 1 if firm i is the only firm publishing daily newspapers (of general interest and English language) in city j at time t.[8,9,10]

d_{jit} = 0 if firm i is not the only firm publishing daily newspapers (of general interest and English language) in city j at time t.[11]

$j = 1,...,J \equiv$ cities in which firm i publishes daily newspapers (of general interest and English language) at time t.

pop_{jt} = population of city j at time t.

[8] Newspapers published by the same firm in the same city (for example, morning and evening editions) are not considered competing newspapers.

[9] Markets under joint operating agreements (JOA's) are considered monopolistic markets. JOA's are agreements between publishing firms which allow two newspapers in the same city to pool their advertising, circulation, production and business operations while maintaining separate editorial departments. JOA's are exempt from antitrust law by the Newspaper Preservation Act of 1970.

[10] The national newspapers, *Wall Street Journal* and *USAToday*, are not considered.

As described above, our firms are parent companies that typically participate in more than one market. This measure of competition is a weighted average of the degree of competition that firms face in the markets in which they participate. The weights are given by the size of the cities. The measure equals 0 for a pure oligopolist and 1 for a pure monopolist. Each city is considered an individual newspaper market.[12] Although newspapers from different cities may compete for national advertisers, they do not compete for readers and local advertisers.[13] Daily newspapers also face competition from suburban newspapers, less-than-daily newspapers, shoppers and other media (radio and TV). However, in agreement with the literature on newspaper competition and antitrust case law (Rosse, 1978; Simon, Primeaux and Rice, 1986; Busterna, 1988; Bucklin, Caves and Lo, 1989; Fee and Hadlock, 2000; *inter alia*), our measure considers that, although these other media reduce newspapers' demand, they represent imperfect newspaper substitutes. There is a significant difference in the degree of competition that a daily newspaper faces when there is another daily newspaper published in the same city. The negative and significant effect of the presence of competing newspapers on advertising rates presented in the next

[11] No difference is made for oligopolies with different numbers of firms. As mentioned above, in the sample there are very few cases of cities with more than two competing newspapers.

[12] City boundaries are confused in some metropolitan areas. For competition in New York City, newspapers in the five boroughs are considered competitors of each other (Rosse, 1978). For competition in Los Angeles, the *Daily News* in San Fernando Valley is not considered a competitor of the central-city newspapers *Times Mirror* and *Herald-Examiner* (Tillinghast, 1988).

[13] Newspaper firms collect revenues from circulation and advertising. Advertising revenues are obtained from three categories: local display, national display, and classified. Display advertising appears throughout the paper and often involves illustrations. Local (or retail) display is sold to local advertisers, and national (or general) display is sold to national advertisers. Classified advertising appears on special pages ordered by item. Rosse (1978) calculates that in a typical newspaper in 1977, 57% of revenues came from display advertising (50.1% from local display, and 6.9% from national display), 18.4% from classified advertising, and 24.6% from circulation.

section confirms how relevant it is for a newspaper to face competition from another newspaper in the same city.

It is important to notice that if a firm becomes a monopoly through the exit of a rival, we would expect its profitability, its size and its growth opportunities (its stock price) to increase. Through the effect on these variables, we would then expect market structure to show an effect on capital structure. However, this would not be the direct effect of competition on capital structure that we try to capture. The problem is less severe for size and growth opportunities. According to the literature, the increase in these variables raises debt ratios. Thus, controlling imperfectly for firms' size and growth opportunities would spuriously render a positive relationship between our *PMC* variable and debt ratios (the opposite sign to the prediction of the strategic-use-of-debt models). Instead, the literature on the determinants of capital structure predicts a negative effect of profitability on leverage, as firms prefer to raise capital from internal sources rather than from outside investors (the "pecking order" theory of Myers and Majluf, 1984). Thus, failure to properly control for profitability may induce a spurious correlation between monopolization and low debt levels, which could be erroneously interpreted as support for the predictions of the strategic-use-of-debt models. To properly evaluate these theories, we need to be particularly careful in controlling for profitability in our study. We consider three different *Profitability* proxies. First, as theory predicts that leverage levels are negatively related to the amount of retained earnings, we consider the accounting variable that best represents this theoretical concept: *Retained Earnings* (scaled by Total Assets). Alternatively, we

also consider *ROA* (Return on Assets) and *ROS* (Return on Sales) as measures of current profitability.

The OLS results are presented in Table 1. Using any of the three profitability proxies or the three together, the results show a negative and significant coefficient for the *PMC* variable. Controlling for size, profitability, non-debt tax shields and growth opportunities, oligopolies show higher debt levels than monopolies. As the extent of product market competition falls (as *PMC* increases), debt ratios are reduced. The control variables are significant and have the same sign as in previous empirical studies (Harris and Raviv, 1991). The positive time trend coincides with the systematic increase in leverage for US corporations since World War II (Taggart, 1985). The results are robust to restricting attention to a balanced subpanel, which addresses potential survivorship bias; to the use of different proxies for the controls and the dependent variable;[14] to the inclusion of the zero-debt observations; and to the introduction of the profitability proxies in pairs.

These first results are vulnerable to the possibility that firms' financial situation may affect the degree of competition that they face. For example, financially healthy firms could use their deeper pockets to prey on rivals and eventually become local monopolies (Telser, 1966; Benoit, 1984; Fudenberg and Tirole, 1986; Poitevin, 1989; Bolton and Scharfstein, 1990), or firms can strategically design their capital structure to deter potential entrants (McAndrews and Nakamura, 1992; Fulghieri and Nagarajan, 1996; Stenbacka, 1994; Showalter, 1999b). Furthermore, the mergers and acquisitions that affect the extent of

[14] We have alternatively defined the debt ratio as Total Debt/Book Value of Equity, and Total Debt/Book Value of the Firm.

product market competition could depend on the firms' financial situation. We address this endogeneity concern by estimating a 2SLS regression instrumenting for *PMC*.

As discussed above, the decline in the number of cities with competing newspapers is associated with the development of other media. We instrument for *PMC* using the number of TV stations, AM and FM radio stations, and cable TV subscribers to measure the development of these mass media.[15] For being valid instruments, we need the evolution of these media to be truly exogenous to our firms' financial situation. We have two concerns here. First, the choice of the markets in which our newspaper chains expand through mergers and acquisitions may be affected by the firms' financial conditions. If we consider the number of other media in all the markets in which a newspaper chain participates at each time, we will face the following problem. Even if the development of new media in two cities is absolutely exogenous to the firm's financial structure, when its financial situation makes preferable for the chain to acquire a newspaper in a city with a certain media development rather than in the other, the capital structure will be affecting the set of cities over which we define our instruments. Second, the entry of new media in a metropolitan market might be affected by the financial condition of the firms that publish newspapers in that city. These two issues could invalidate the exogeneity of the instruments.

We use two alternative definitions to address these problems. First, we use the total number of AM radio, FM radio and TV stations, and of cable TV subscribers for the whole US for every firm. This strategy is exaggeratedly safe in guaranteeing exogeneity (any effect

of the financial condition of a given firm on entry by other media in its city markets is negligible at the country level), but it has the shortcoming that the instruments do not vary cross-sectionally. Alternatively, we use for each firm the total number of AM radio, FM radio and TV stations, and of cable TV subscribers for the state in which the firm had its headquarters at the time the firm is incorporated into our sample.[16] The headquarters are always located in the city in which the firm publishes its flagship newspaper.[17] In this case, exogeneity is provided by the fact that the potential effect of the financial condition of a given firm on entry in its city markets could only be very small at the state level. On the other hand, these instruments now vary cross-sectionally. In both cases, our instruments are not affected by changes through mergers and acquisitions in the set of markets in which our firms operate. In the first case, our instruments are defined at the country level. In the second, the state that we consider for each firm is fixed and, therefore, mergers and acquisitions do not affect our geographical definition for each firm.

In Table 2 the instruments are defined at the country level. Using any of the profitability proxies or the three together, the joint F-statistics for the four instruments in the first stage regressions are always highly significant. In Table 3, for each firm the instruments are defined at the state level for the state in which the firm had its headquarters. Again, in the first stage regressions the joint F-statistics for the four instruments are highly significant. Using either set of instruments, the 2SLS results in Tables 2 and 3 confirm our previous findings. Controlling for potential endogeneity by using the development of other media to

[15] Note that the period under consideration is previous to the Internet explosion.

[16] The number of radio and TV stations is normalized by state surface. The number of cable TV subscribers is normalized by state population.

instrument for changes in the extent of competition, our results hold: as the degree of competition falls, debt ratios are reduced. Again, the results are robust to restricting attention to a balanced subpanel, which addresses potential survivorship bias; to the use of different proxies for the controls and the dependent variable, to the inclusion of the zero-debt observations, and to the introduction of the profitability proxies in pairs.

These results suggest that the extent of competition that firms face in the product markets affects their capital structure. In particular, oligopolies show higher debt ratios than monopolies, controlling for other determinants of leverage. The evidence is consistent with the reduced-form predictions of the strategic-use-of-debt models that find that leveraging can be used as a value-increasing strategy in product market competition. If oligopolistic newspaper firms take on debt for strategic reasons, as these models suggest, we would additionally expect to observe an effect of capital structure on prices. We now turn to analyze this issue.

4. The Effect of Capital Structure on Prices

We start by considering all the newspapers included in the Top 50 according to circulation for at least one year between 1984 and 1993. The analysis starts in 1984 because since July 1 of that year advertising prices for all the newspapers are expressed in the same space units, the Standard Advertising Unit (SAU). The publication of our data source (American Association of Advertising Agencies, several issues) was interrupted after 1993. As this publication only appeared in odd years, we maintain a biannual data

[17] For example, we consider California for Times Mirror Co. and McClatchy, Illinois for Tribune Co., New York for New York Times Co., Dow Jones and Gannett, and so on.

structure. We restrict our attention to newspapers published by US public parent companies, for which there is financial information available from COMPUSTAT.

From the initial sample, newspapers published for more than one market,[18] and newspapers published under Joint Operating Agreements are excluded.[19] We also exclude newspapers published by firms that do not have newspaper publication as their major line of business as we will use our intra-industry results from Section 3 to instrument for debt levels.[20] The use of these instruments makes us lose four observations because of missing information in COMPUSTAT.[21] Two editions of the same newspaper or two newspapers published by the same firm in the same city are considered one newspaper (and the combination advertising rate is used). We concentrate on display advertising rates (local and national), which represent the main source of newspaper revenues and are uniformly reported by our data source.[22] The final sample has 27 newspapers and 105 newspaper-year observations from 1985 through 1993.

[18] It is not possible to define comparable market variables for these newspapers. This criterion excludes the national newspapers *USA Today* and *Wall Street Journal*; and *New York Newsday*, which was published for both the Long Island and New York City markets.

[19] This criterion excludes all the newspaper-year observations for *Times*, Seattle; *Free-Press* and *News*, Detroit; and *Press*, Pittsburgh; and some newspaper-year observations for *Herald*, Miami.

[20] This criterion excludes *News*, Buffalo, published by Berkshire Hathaway Inc.; and *Star-Telegram*, Forth Worth, and *Star-Times*, Kansas City, published by Capital Cities/ABC.

[21] See footnote 5.

[22] There is strong price discrimination by newspaper firms between local and national advertisers (see American Association of Advertising Agencies). Prices for national advertisers are about double those for local advertisers.

We analyze the effect of capital structure on prices, controlling for demand and supply conditions, by running the following reduced-form regression for both local and national advertising rates:[23]

$$Rate_{it} = \lambda_1 Population_{it} + \lambda_2 Wage_{it} + \lambda_3 Paper_t + \lambda_4 Ink_t + \lambda_5 GroupSize_{it}$$

$$+ \lambda_6 Oligopoly_{it} + \lambda_7 Debt_{it} + \lambda_8 (Oligopoly_{it} * Debt_{it}) + \Gamma Fixed_i + \varepsilon_{it}$$

The equation states that advertising prices for newspaper i at time t are a function of variables affecting advertising space demand and supply: demographic variables (city population, which instruments for circulation),[24] cost variables (labor, paper, and ink),[25] chain size, market structure (oligopoly or monopoly), and parent company's capital structure.[26] We also include newspaper fixed effects.

The strategic-use-of-debt models predict that firms use capital structure to affect market equilibria in situations of strategic interaction. As monopolies would not have such an incentive to take on debt, we allow the effect of debt on prices to be different for monopolies than for oligopolies by including as explanatory variables both the debt ratio, and the interaction between debt ratio and market structure. Our interest is focused on the

[23] Data definition, sources and summary statistics are presented in the Appendix.

[24] The results are robust to the inclusion of squared city population, income and income per capita, besides population; and to the definition of these demographic variables at the metropolitan statistical area or at the city level. All these variables show a high degree of collinearity among them.

[25] The cost variables *Paper* and *Ink* correspond to commodities priced at the national level.

[26] It is not necessary to control for multimarket contact between the newspaper chains in the sample because it is negligible. There were only two cases in which firms met in more than one market: Chicago Tribune Co. and News America Pub. Co. (R. Murdoch) met in Chicago and New York in

last two coefficients, which measure the effect of capital structure on prices under monopolistic and oligopolistic conditions.

The OLS results in the first two columns of Table 4 indicate a negative coefficient for the *Debt Ratio* variable (although it is not significant for the national rates), and a positive and significant coefficient for the interacted *Debt Ratio*Oligopoly* variable. However, we again have to deal here with endogeneity concerns. Just as firms' debt levels may affect their prices, demand or supply shocks may affect their financial positions. We address this problem by estimating our regression in 2SLS using our results from the previous section to instrument for debt ratios. We use parent company's *PMC*, *Profitability*,[27] *Size*, *Non Debt Tax Shield*, *Growth Opportunities*, and the time trend as instruments for debt. As discussed before, these instruments could also be affected by current supply or demand shocks. We alleviate these problems by lagging the instruments.[28] These endogeneity concerns are further mitigated by the fact that our balance sheet data are at the parent company level, while our prices are at the newspaper level. For most of the newspapers in our sample, each of these newspapers represent only a portion of the businesses of the parent company, and therefore we expect that current shocks affecting these prices only have a moderate effect on the parent company accounts.

1985, and New York Times Co. and News America Pub. Co. met in Boston and New York in 1993.

[27] We present the results using *Retained Earnings*, rather than *ROA* or *ROS*, to proxy for profitability because it reflects past profitability and, thus, is less likely to be affected by current shocks. The results are robust to considering the other profitability proxies.

[28] For prices as of July 1 of year *t*, we use instruments as of December 31 of year *t*-2.

We present the 2SLS results in the second two columns of Table 4.[29] They indicate a non-significant coefficient for the *Debt Ratio* variable, and a positive and significant coefficient for the interacted *Debt Ratio*Oligopoly* variable. For both rates, we reject the hypothesis that the sum of these two coefficients equals zero at standard confidence levels. For monopolies, debt ratios have a non-significant effect on prices for both local and national advertising rates. For oligopolies, debt ratios show a positive and significant effect on prices for both local and national rates. These results lend support to the view that leveraging allows firms to achieve higher equilibrium prices in situations of product market interaction. They coincide with previous findings for oligopolistic industries by Chevalier (1995), Phillips (1995), and Chevalier and Scharfstein (1996). The control variables show that labor costs have positive effect on prices, and that monopolies charge higher rates than oligopolies.[30]

We perform some robustness checks of our results in Table 5. First, we control for local business-cycle fluctuations that could be affecting both prices and financial conditions (Chevalier and Scharfstein, 1996). In the first two columns, we include the local unemployment rate in our regressions without affecting our results. Second, we control for newspaper quality, which may be affected by financial conditions and related to prices. In the second two columns of Table 5, we proxy for newspaper quality using the number of personnel in titled editorial positions (Bucklin, Caves and Lo, 1989). Our results are robust to this specification. Similar results are obtained when including other quality proxies, such as the number of special sections, special editions, supplements and

[29] In the first stage, the joint F-statistic for the instruments is highly significant.

magazines, or a dummy variable indicating whether the newspaper publishes zoned editions. Our results are also robust to the inclusion of time schedule and tabloid dummies, to the exclusion of the time trend as an instrument, and to the inclusion of the time trend as a control. The results also hold when our robust standard errors are clustered by firm-year, in order to correct for potential lack of independence in the error term for different newspapers simultaneously owned by the same parent company.

5. Conclusions

The strategic-use-of-debt models show how leveraging can be used as a value-increasing device in imperfect competition. This strategic incentive to take on debt will be absent for monopolistic or competitive firms. Implicitly, these models predict that oligopolistic firms have higher debt levels than monopolistic or competitive firms. Our main contribution is to assess the effect of the extent of competition that firms face in the product markets on their capital structure. In the newspaper industry, we find that debt ratios decrease as the extent of product market competition falls. Controlling for other determinants of leverage, oligopolies show higher debt ratios than monopolies.

We also explore the effect of capital structure on prices. For monopolies, debt ratios have a non-significant effect on prices. For oligopolies, on the contrary, this effect is significant and positive. Taken together, our empirical findings are consistent with the predictions of the strategic-use-of-debt models that argue that firms engaged in situations of strategic

[30] The negative and highly significant coefficient for the *Oligopoly* dummy confirms how relevant it is for a newspaper whether another daily newspaper is published in the same city.

interaction can use leverage to sustain more collusive equilibria (Showalter, 1995; Damania, 1997; Dasgupta and Titman, 1998; and Faure-Grimaud, 2000).

The US newspaper industry is particularly appropriate for our study of the effect of competition on capital structure because there were significant and exogenous changes in the extent of competition that newspaper firms face. We exploit the exogenous development of other mass media to address potential endogeneity concerns in our capital structure regressions. For the study of the effect of capital structure on prices, the variation in financial conditions in this industry cannot be directly associated to exogenous shocks, like the leveraged buyouts and recapitalizations considered in Chevalier (1995) and Phillips (1995), or, even safer, the effect of business cycles in Chevalier and Scharfstein (1996). However, by exploiting our results on the determinants of capital structure and the fact that our newspapers represent only a fraction of the businesses of their parent companies, we have been able to obtain satisfying results in instrumental-variable regressions. It is also reassuring that these price results coincide with previous findings in the literature.

The strategic-use-of-debt models show that, under imperfect competition, firms may have strategic incentives to take on debt. Monopolistic or (perfectly) competitive firms will not have similar incentives. Graphically, these theories predict an inverted U-shaped relationship between concentration and debt levels, i.e., that oligopolistic firms have higher debt levels than monopolistic or competitive firms. We have explored one part of this prediction by comparing debt ratios of monopolies and oligopolies. It would be interesting to compare leverage levels for a sample considering monopolistic,

oligopolistic, and competitive firms. Since it seems unlikely that there exists an industry with firms acting in such a variety of market structures, this should probably be performed as an inter-industry study. This inverted U-shape would coincide with similar findings for the relationship between concentration and other strategic variables, such as advertising or R&D expenditure levels.

Appendix

Data Definition and Sources

Variable	Definition	Source
Debt	Total Debt/Total Assets	COMPUSTAT
PMC	See text	*Editor & Publisher* (*E&P*) *International Yearbook*
Retained Earnings	Retained Earnings/Total Assets	COMPUSTAT
ROA	Operating Income/Total Assets	COMPUSTAT
ROS	Operating Income/Sales	COMPUSTAT
Growth Opportunities	Market Value of Common Equity/Book Value of Common Equity	COMPUSTAT
Size	Ln(Sales in constant dollars)	COMPUSTAT
Non Debt Tax Shield	Depreciation and Amortization/Total Assets	COMPUSTAT
US AM Radio	US AM radio stations	*Television & Cable Factbook*
US FM Radio	US FM radio stations	*Television & Cable Factbook*
US TV	US television stations on air	*Television & Cable Factbook*
US Cable	US cable TV subscribers (in thousands)	*Television & Cable Factbook*
State AM Radio and *State FM Radio*	AM or FM stations/Surface in square miles (at the state level).†	*Broadcasting*, *Broadc. & Cablecasting*, *Broadc. & Cable Market Place*, *Broadc. & Cable* Yearbooks
State TV	TV stations/Surface in square miles (at the state level).†	*Broadcasting Yearbook*, *Broadc. & Cablecasting Yearbook*, *Television & Cable Factbook*, *State and Metropolitan Area Data Book*
State Cable	Cable TV subscribers/Population (at the state level).†	See *State TV*, and *US Census Bureau*
Local and *National Rate*	Rate per inch for a 1,000 inch-annual bulk contract (most representative contract according to A.A.A.A.) for local or national advertisers (combination rate for two editions of the same newspaper or two newspapers published by same firm in same city)	*Newspaper Rate Differentials: A.A.A.A. Study of General and Retail Advertising Rates*, American Association of Advertising Agencies
Population	City population	*E&P Market Guide*
Wage	Publication industry (SIC 2711) wage at the state level	*Employment and Wages -Annual Averages-*, *Employment and Earnings*, Bureau of Labor Statistics (BLS)
Paper	Newsprint price index	*Producer Price Indexes*, BLS
Ink	Printing ink price index	*Producer Price Indexes*, BLS
Group Size	Number of newspapers published by the chain	*E&P International Yearbook*
Unemployment	Metropolitan statistical area unemployment rate	*Unemployment in States and Local Areas*, BLS
Editors	Total number of personnel in titled editorial positions (news executives, editors and managers)	*E&P International Yearbook*
Oligopoly	Dummy=1 if newspaper is a central-city oligopolist, =0 if newspaper is a central-city monopolist	*E&P International Yearbook*

† For some years for which state level data are not available, the series were completed using the evolution of the national data for extrapolation.

Summary Statistics
Debt Study

Variable	Mean	Std. Deviation	Min	Max
Debt	0.20179	0.12855	0.00011	0.55727
PMC	0.62989	0.40816	0	1
Retained Earnings	0.48438	0.15474	0.09132	1.00170
ROA	0.20700	0.06221	0.06353	0.50099
ROS	0.20174	0.06092	0.05150	0.54983
Growth Opportunities	2.59079	1.71352	0.36009	16.07037
Size	5.43905	1.00893	2.71621	7.07791
Non Debt Tax Shield	0.04309	0.01264	0.01603	0.09745
US AM Radio	4749.804	205.887	4126	4990
US FM Radio	5012.607	1275.939	1597	7240
US TV	1196.645	241.6426	668	1533
US Cable	30927.01	19391.39	1275	60280
State AM Radio	0.01033	0.02636	0.00019	0.10294
State FM Radio	0.01711	0.04821	0.00013	0.20588
State TV	0.00947	0.03064	0.00007	0.11764
State Cable	0.10874	0.07401	0.00688	0.28072
Year	1982.766	7.925	1964	1995

Price Study

Variable	Mean	Std. Deviation	Min	Max
Local Rate	76.43219	41.10419	24.87	197.85
National Rate	156.7704	84.33644	55.89	412
Population	1283845	1914985	129990	7635041
Wage	456.1905	101.7461	260	858
Paper	107.9578	5.71111	100	115.11
Ink	116.977	11.22427	100	128.5572
Group Size	17.09524	21.36115	1	83
Unemployment	5.54761	1.53423	2.7	9.8
Editors	56.6	24.02146	22	147
Oligopoly	0.35238	0.48000	0	1
Debt	0.25355	0.12012	0.00618	0.55727
Year	1989.324	2.83011	1985	1993
Retained Earnings	0.45359	0.14853	0.09132	0.92983
Growth Opportunities	2.94173	1.52991	1.47346	16.07037
Size	6.21683	0.75127	4.62230	7.07791
Non Debt Tax Shield	0.04750	0.01136	0.01961	0.09745
PMC	0.54120	0.38674	0	1

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Table 1

Dependent Variable: Total Debt/Total Assets

Variables	(A)	(B)	(C)	(D)
PMC	-0.14986***	-0.09950***	-0.11543***	-0.14226***
	(-4.39)	(-2.82)	(-3.16)	(-3.98)
Retained	-0.36193***			-0.34851***
Earnings	(-8.45)			(-7.79)
ROA		-0.44722***		-0.15884
		(-3.68)		(-1.02)
ROS			-0.25803	0.18048
			(-1.59)	(0.91)
Growth	0.01099***	0.01867***	0.01589***	0.01144***
Opportunities	(4.11)	(6.53)	(5.46)	(3.74)
Size	0.02760	0.05416**	0.03664	0.03240
	(1.13)	(1.99)	(1.32)	(1.30)
Non Debt Tax	-0.75691	-1.07331*	-1.46747**	-0.61247
Shield	(-1.33)	(-1.83)	(-2.37)	(-1.08)
Time trend	0.00423***	0.00235	0.00471***	0.00330*
	(2.75)	(1.37)	(2.80)	(1.87)
Fixed effects	YES	YES	YES	YES
Observations	321	321	321	321
Method	OLS	OLS	OLS	OLS

Robust t-statistics are in parentheses. The controls Retained Earnings, ROA, ROS, Growth Opportunities, Size, and Non Debt Tax Shield are lagged. * Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

Table 2

Dependent Variable: Total Debt/Total Assets

Variables	(A)	(B)	(C)	(D)
PMC	-0.77494***	-1.04090***	-1.09150***	-0.91723***
	(-4.39)	(-3.69)	(-4.26)	(-3.69)
Retained	-0.47190***			-0.57237***
Earnings	(-6.40)			(-5.09)
ROA		-0.10095		0.71832**
		(-0.45)		(1.97)
ROS			-0.39447	-0.52975
			(-1.12)	(-1.24)
Growth	0.00347	0.00503	0.00639	-0.00212
Opportunities	(0.96)	(0.85)	(1.07)	(-0.35)
Size	-0.03811	-0.06051	-0.06314	-0.07652
	(-1.01)	(-1.06)	(-1.17)	(-1.56)
Non Debt Tax	-1.66224*	-2.97763**	-3.25169**	-2.34569*
Shield	(-1.71)	(-2.13)	(-2.24)	(-1.89)
Time trend	0.01397***	0.01880***	0.02042***	0.01952***
	(4.33)	(3.24)	(4.19)	(3.54)
Fixed effects	YES	YES	YES	YES
Observations	321	321	321	321
Method	OLS	OLS	OLS	OLS

Robust t-statistics are in parentheses. The controls Retained Earnings, ROA, ROS, Growth Opportunities, Size, and Non Debt Tax Shield are lagged. The instruments are at the country level: US AM Radio, US FM Radio, US TV, and US Cable. * Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

Table 3

Dependent Variable: Total Debt/Total Assets

Variables	(A)	(B)	(C)	(D)
PMC	-0.61903***	-0.47721**	-0.79338***	-0.79173**
	(-3.26)	(-1.97)	(-2.92)	(-2.45)
Retained	-0.44447***			-0.53612***
Earnings	(-6.32)			(-4.46)
ROA		-0.30828**		0.57626
		(-2.09)		(1.43)
ROS			-0.35280	-0.41472
			(-1.28)	(-1.02)
Growth	0.00534	0.01320***	0.00929*	0.00007
Opportunities	(1.51)	(3.05)	(1.85)	(0.01)
Size	-0.02172	0.00815	-0.03266	-0.05888
	(-0.60)	(0.19)	(-0.70)	(-1.05)
Non Debt Tax	-1.43643*	-1.83737**	-2.70673**	-2.06500*
Shield	(-1.70)	(-2.13)	(-2.29)	(-1.70)
Time trend	0.01154***	0.00895*	0.01562***	0.01689**
	(3.24)	(1.88)	(3.09)	(2.39)
Fixed effects	YES	YES	YES	YES
Observations	321	321	321	321
Method	OLS	OLS	OLS	OLS

Robust t-statistics are in parentheses. The controls Retained Earnings, ROA, ROS, Growth Opportunities, Size, and Non Debt Tax Shield are lagged. The instruments are at the state level: State AM Radio, State FM Radio, State TV, and State Cable for the state in which the firm's headquarter is located. * Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

Table 4

Dependent variable: Advertising Rates

Variables	OLS		2SLS	
	Local Rate	National Rate	Local Rate	National Rate
City Population	0.00001	0.00003	0.00001	0.00003
	(1.66)	(1.18)	(1.37)	(0.91)
Wage	0.15737***	0.40462***	0.18702***	0.50178***
	(5.10)	(5.89)	(4.43)	(4.95)
Paper	0.22599	0.07278	0.11930	-0.24090
	(1.56)	(0.21)	(0.52)	(-0.40)
Ink	0.28267*	0.63671*	0.13183	0.15643
	(1.72)	(1.91)	(0.63)	(0.32)
Group Size	0.84391	0.20069	0.18520	-1.75752
	(1.38)	(0.15)	(0.16)	(-0.64)
Oligopoly	-47.48826***	-86.25231***	-69.08393***	-160.8721***
	(-5.94)	(-4.42)	(-3.74)	(-3.68)
Debt Ratio	-26.99676**	-18.8446	-29.32155	-35.49809
	(-2.23)	(-0.66)	(-1.10)	(-0.52)
Debt Ratio*	57.9507***	81.26863**	123.0824**	305.6095**
Oligopoly	(3.32)	(2.05)	(2.31)	(2.45)
Fixed effects	YES	YES	YES	YES
F-stat.†	4.52**	3.65*	3.38*	5.20**
Observations	105	105	105	105

Robust t-statistics are in parentheses. The 2SLS instruments are lagged PMC, lagged Retained Earnings, lagged Growth Opportunities, lagged Size, lagged Non Debt Tax Shield, and time trend. † Null hypothesis: *Debt Ratio* + *Debt Ratio*Oligopoly* = 0. * Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

Table 5

Dependent variable: Advertising Rates

Variables	Local Rate	National Rate	Local Rate	National Rate
City Population	0.00001	0.00003	0.00002	0.00003
	(1.42)	(0.96)	(1.51)	(0.93)
Wage	0.18627***	0.49860***	0.17176***	0.49250***
	(4.35)	(4.56)	(4.17)	(4.76)
Paper	0.10838	-0.27254	0.13838	-0.22478
	(0.49)	(-0.49)	(0.64)	(-0.38)
Ink	0.15401	0.30001	0.20303	0.20160
	(0.66)	(0.48)	(1.00)	(0.40)
Group Size	0.26245	-1.09545	0.45480	-1.56645
	(0.21)	(-0.33)	(0.43)	(-0.59)
Oligopoly	-69.14517**	-166.5258***	-62.2081***	-157.2897***
	(-3.80)	(-3.69)	(-3.37)	(-3.42)
Unemployment	-0.22117	-1.34702		
	(-0.22)	(-0.49)		
Editors			0.14681*	0.09139
			(1.85)	(0.52)
Debt Ratio	-30.77945	-54.51228	-26.2401	-34.86285
	(-1.14)	(-0.73)	(-1.03)	(-0.50)
Debt Ratio*	123.2259**	321.6231**	112.0883**	300.771**
Oligopoly	(2.33)	(2.46)	(2.13)	(2.35)
Fixed effects	YES	YES	YES	YES
F-stat.†	3.00*	3.98**	3.05*	5.01**
Observations	105	105	105	105
Method	2SLS	2SLS	2SLS	2SLS

Robust t-statistics are in parentheses. The instruments are lagged PMC, lagged Retained Earnings, lagged Growth Opportunities, lagged Size, lagged Non Debt Tax Shield, and time trend. † Null hypothesis: *Debt Ratio* + *Debt Ratio*Oligopoly* = 0. * Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

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