Prices, Margins and Liquidity Constraints:

Swedish Newspapers 1990-1992[*]

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Abstract

A firm that faces liquidity constraints may increase its price to exploit captured customers in an attempt to boost short run profits, see Chevalier and Scharfstein (1996) and Gottfries (1991). We find support for such behavior in this study of Swedish local newspapers during a deep recession. Newspapers sell both subscriptions and advertising space, and arguably buyers of the latter are less locked-in. Newspapers with low solvency raised their subscription prices relative to others. In contrast, advertising price changes were independent of the newspapers' financial positions. Hence, financial constraints affected firms' pricing behavior only when customers are locked-in.

Introduction

Liquidity constraints may cause firms to sacrifice long-term profits for short run gains. One instance where firms may be able to improve their short run performance is in their price setting. In markets where customers respond slowly to price changes, due to e.g. switching costs, addiction, or habits, firms face a trade-off between raising price to exploit locked-in customers and lowering price to build a future customer stock. Hence, liquidity constrained firms that try to avoid default would raise their prices; see Chevalier and Scharfstein (1996) and Gottfries (1991). An implication of these models is that competition is less intense when firms have low cash flows to cover debt payments, or in periods of tight credit markets. Recessions are often associated with low cash flows, and the mechanism could therefore, if quantitatively important, cause an amplification of economic fluctuations. The recession we study also coincides with a tight credit market.

Chevalier and Scharfstein (1996) provide empirical support for their model, using samples of supermarkets in the U.S. in economic downturns. The sharp fall in oil prices in 1986 had a negative effect on the economy in the oil producing states. They show that in these states, prices increased more in cities where regional supermarkets were dominating. This supports their prediction in so far as the national chains, with operations also in areas that were unaffected by the oil price fall, had less binding liquidity constraints than regional chains. They also examine price changes during the economic recession 1990-1991. Prior to this recession, a number of supermarket chains had undertaken leveraged buyouts (LBO), something that presumably increased their financial exposure. They find that price levels tend to rise more in regions where LBO firms had large markets shares, and that within a market, LBO chains had higher price increases than others. One distinguishing feature of our study is that we use direct

accounting information from firms, rather than proxies, to measure the extent of liquidity constraints.

We examine price adjustments by Swedish local newspapers during a sharp recession 1990-1992, which was characterized by both a large fall in GDP and tighter credit markets. There are two main reasons for why this industry is suitable for a test of the predictions. First, accounting information is available by which we can broadly categorize firms as being more or less liquidity constrained. Firms with low solvency (i.e. the ratio of own equity to total assets) are likely to be the ones most affected in the event of a tightening of credit markets.[1] Second, it is only in the presence of switching costs[2] that firms can increase their short run profit by raising prices. This gives us a unique opportunity as the newspapers sell two products, subscriptions and advertising space, which are markedly different with regard to the importance of switching costs. We argue that the average buyer of advertising space is much less attached to a particular newspaper than the average subscriber. This is motivated by the ease with which advertisers can change advertising channel in response to a change in the cost of reaching consumers.[3] The reader, on the other hand, has grown accustomed to a newspaper's content and style, and is therefore unwilling to switch because of a modest increase in the subscription price. The importance of switching costs for daily newspapers is supported by empirical studies, which usually find a highly inelastic relation between circulation and subscription price in the short run; see references quoted in Lewis (1995).

Our most important result is that newspapers with low solvency had the highest increases in subscription price during the recession. The same firms also showed a sharp improvement in their gross profit margins. Solvency did not have any impact on price changes for advertising space, however. This suggests that newspapers with liquidity constraints raised short-term profits by exploiting readers' high switching costs, but could not improve their profitability at the expense of advertisers. These results are consistent with the predictions of Chevalier and

Scharfstein (1996) and Gottfries (1991). The fact that we observe a firm setting prices for two products, one with substantial switching costs and one without indicates that it is the presence of switching costs that drives the results rather than some unobserved characteristic of the liquidity constrained firms.

I. Data

In 1990, Sweden entered its deepest recession after World War II, with a falling real GDP for three consecutive years and an increase in unemployment from two to eight percent. The defense of the fixed exchange rate also lead to high real interest rates and made credits more expensive. Economy wide, bankruptcies increased threefold and all major banks suffered considerable credit losses (in total 5 percent of GDP in 1992). Indeed, all major banks faced a large *ex ante* probability of bankruptcy and the government had to intervene to save some from collapse. Figure 1 shows the macro economic development for Sweden.

[FIGURE 1 ABOUT HERE]

The volume of newspaper advertising is known to be highly cyclical, while sales of newspaper subscriptions are stable. As seen in Figure 2, the recession hit newspapers mainly through advertising sales.[4]

Thus, the recession resulted in lower cash flows for newspapers due to the fall in demand for advertising, the tightening of the credit market made the raising of new funds expensive/difficult. Both effects would lead to more binding liquidity constraints.

[FIGURE 2 ABOUT HERE]

We restrict our attention to local morning newspapers with three or more issues per week.[5] To measure the development of real prices during the two periods, we use the annual subscription price (source: Swedish Association for Newspaper Publishers) and the price per millimeter for ads with non-specified placement as of January 1 (source: Swedish Audit Bureau of Circulation). Although newspapers offer a large menu of advertising possibilities depending on the size and place of the advertisement, and often also sell subscriptions of different duration, these are the prices on which people in the industry rely in their comparisons. The dependent variables are the growth rates of the two real prices *PSUBGROWTH* and *PADVGROWTH*, defined as $100 \times (P[1992]-P[1990])/P[1990]$. Prices are measured January 1, and deflated by CPI for January for each year.

Importantly, the data includes information from newspapers' income statements and balance sheets, (source: Press Subsidies Council). There are a number of newspaper groupings but in most cases accounting data are broken down by newspaper. Where this is not the case, we assume solvency and margins to be the same for newspapers that are jointly reported. Of course, one could instead have considered the group's solvency, or even the owner's (or owners') financial resources, to measure liquidity constraints. We have experimented with defining solvency at the group level and the results do not change qualitatively.[6] Due to lack of data we are not able to examine the possibility that an owner can draw on other resources if its newspapers would be liquidity constrained.

As the theory predicts that liquidity constraints should only play a role for newspapers facing a bankruptcy risk, we use a dummy variable, *LOWSOLVENCY*, defined as a solvency below 15 percent. We have experimented with other levels between 10 and 20 percent and the results reported below are robust, unless otherwise stated. Solvency is measured as of the end of 1989. For newspapers with a local competitor there might be interaction in the pricing decisions

(e.g., if a liquidity constrained newspaper raises its subscription price this may also give its rival the opportunity to raise price). This is captured by the variable *RIVAL_LOWSOLVENCY,* which takes the value one if the newspaper competes in the same market as a newspaper with solvency below 15 percent.

The dummy variable *BANKRUPT* denotes four newspapers, which had low solvency in 1989 and were bankrupt by 1992. They are still published in 1992 and quote prices for this year, but as no accounting data are available they are missing in the regression with profit margins as dependent variable. These newspapers were reconstructed in 1993, but had substantially lower circulation afterwards. Bankrupt newspapers may face different demand conditions due to consumer uncertainty regarding future publication and quality of the newspaper. Analogous to the argument above, we use *RIVAL_BANKRUPT* to capture the possibility that the behavior may change for a newspaper that competes with a rival that has gone bankrupt.

The income statement gives a measure of newspapers' economic performance over the period. We use the change in operating margin, *MARGDIFF*, defined as $100 \times (\text{PM}[1992]-\text{PM}[1990])$, where PM is total revenues minus total costs, divided by total revenues.[7,8] This measure is admittedly crude but it can give an indication of whether short run performance improved or deteriorated over the period.

We use some control variables to capture differences in local market conditions. Our definition of a market follows the standard Swedish municipal classification. We define a newspaper's home market as the municipality where it has its largest circulation (source: Swedish Audit Bureau of Circulation). The median newspaper has 62 percent of its total circulation in its home market. We use the categorization of market structures provided by the Press Subsidies Council. All markets are monopolies or duopolies, with the exception of one municipality where three newspapers compete. Several theoretical models suggest that the

intensity of competition varies over the business cycle in oligopolistic markets (see e.g. Rotemberg and Saloner, 1986). However, predictions on the direction of the effect are often sensitive to fine details in assumptions (see e.g. Bagwell and Staiger, 1997). Nevertheless, it is clear that any strategic effects are absent in monopoly markets and we therefore include the dummy variable *MONOPOLY*.

In markets with switching costs, firms have an incentive to price low to capture unattached customers (see Bils, 1989), and therefore a change in the inflow of new customers is expected to cause a change in prices. We measure this with the difference in the percentage of inward migration to total population from 1990 to 1992, *IMMIGDIFF*.

We use the municipality level growth rate in disposable income per capita from 1990 to 1992, *INCGROWTH*, to capture relative differences across municipalities in the severity of the recession.[9]

[TABLE 1 ABOUT HERE]

As seen in Table 1, the sample contains 22 newspapers whose solvency was below 15 percent in 1989, four of which were bankrupt by 1992. With a cut-off level of 10 (20) percent solvency, 14 (30) newspapers would have been in the category. Low solvency newspapers are relatively less common among the monopolies (9/62 compared to 13/33 among the duopolies) but they do not stand out in terms of circulation. It is striking that the newspapers that eventually go bankrupt decrease their real subscription price by 2.2 percentage points, compared to an average increase of 6.0 percentage points. The other newspapers with low solvency in 1989 exhibit subscription price increases of 8.9 percentage points, but advertising price increases close to the average. A mirror image is that the group with low solvency managed to increase their margins by 4.3 percentage points, or 1.8 percentage points more than the sample average.

Part of the substantial improvement in margins overall may be have been caused by a 19 percent decline in real prices for newsprint, which constitutes around 10 percent of costs in 1990.[10]

A maintained assumption in the analysis is that readers have switching costs and that circulation is relatively insensitive to price in the short run, such that it is possible to, temporarily, improve margins. Although our data is insufficient to estimate demand functions for the newspapers, as we lack measures of their quality, it is still possible to use information about circulation to provide some evidence to support the claim. The correlation coefficient for growth in the subscription price and the change in circulation was -0.31 (excluding the four bankrupt newspapers that had a dramatic decline in circulation). In the same period, the correlation between the change in profit margins and the growth in subscription price was 0.33. This suggests that price sensitivity was indeed low and newspapers that increased their subscription prices the most were able to improve their margins substantially.[11]

II. Results

Before turning to the econometric results we need to address the relationship between sales of subscriptions and advertising space. As advertisers have a preference for newspapers with a large circulation, increasing the subscription price will involve a loss of advertising revenue. However, as circulation is price insensitive in the short run, a subscription price increase will not lead to a large reduction of circulation and therefore need not be accompanied by a reduction of the price of advertising. This motivates our empirical specification, which treats the growth rate of the subscription price as independent of the growth rate of the advertising price.[12]

[TABLE 2 ABOUT HERE]

Table 2 shows the results from least squares regressions with *PSUBGROWTH*, *PADVGROWTH*, and *MARGDIFF* as dependent variables. Newspapers with low solvency raised their real subscription prices 4.1 percentage points more than others did. At the same time their margins increased by 3.9 percentage points more than the newspapers with solvency above 15 percent.[13,14] In the advertising market there is no significant difference between the groups. Thus the sharp relative improvement in margins for newspapers with low solvency should be attributed to the higher subscription prices. Taken together this is evidence that firms with weak financial standings can, and do, exploit their customer base to raise short run profits. This, in turn, leads to softer competition in that newspapers with rivals with low solvency also exhibit significantly larger increases in subscription prices. The effects of liquidity constraints in the three regressions support the models of Chevalier and Scharfstein (1996) and Gottfries (1991). This is the main result of this paper, but there are also some other results worth commenting on.

The newspapers that went bankrupt in 1992 had real price decreases, for subscriptions as well as for advertising space. This relates to the evidence in Borenstein and Rose (1995) that airlines in (or close to) bankruptcy tend to lower their prices (see also Kennedy, 2000). The demand for subscriptions will drop if it becomes clear to readers that a newspaper will likely become bankrupt in the near future. In order to keep some circulation, it may be forced to lower the subscription price. The fall in circulation will also trigger a reduction in the price of advertising space. A closer examination of subscription price changes for the periods 1990-1991 and 1991-1992 suggest that it is in the latter year that the bankrupt newspapers behave differently. Between January 1 1991 and January 1 1992, the bankrupt newspapers decreased their real subscription prices by 1.6 percent compared to an increase of 5.4 for the sample average, and

7.1 for those with low solvency that avoided bankruptcy. In the year before, there were no marked differences in pricing behavior between different types of newspapers. For the full sample, circulation fell by on average one percent in both 1990-1991 and 1991-1992. The circulation for the newspapers that went bankrupt in 1992 fell by 14 percent and 15 percent in each of the two years, respectively. Taken together, this indicates that readers may already have realized in 1990-1991 that some newspapers would not survive, and that these were therefore forced to limit price increases in 1991-1992. The relative decline in advertising prices for bankrupt newspapers was more evenly distributed over the two years, 3.5 and 4.4 percent, which is in line with advertising prices being closely related to current circulation.

The estimated coefficient on *INCGROWTH* is negative in the *MARGDIFF* regression. Taken at face value, it would suggest that margins tend to increase more for newspapers in markets most adversely affected by the recession. However, there is no significant effect of *INCGROWTH* on prices, thus the source of any effects on margins is unclear, and caution is needed before drawing any conclusions. We have tried an interaction term between *INCGROWTH* and *LOWSOLVENCY*, in order to test whether the severity of the recession affected prices and margins differently for firms with high and low solvency. We did not obtain any significant differences between the groups, which might be attributed to the fact that the regional differences in the severity of the recession were relatively small.

The econometric results in Table 2 show no support for the hypothesis that a large inflow of new customers induces firms to cut prices. A possible explanation is that new subscribers are targeted with discounted introductory offers, making it unnecessary to cut the regular price to capture the relatively few new subscribers. This conjecture is supported by the results in Asplund et al. (2002), where we show that the fraction of circulation sold at a discount, usually between 3 and 10 percent, is slightly higher in areas with large inward migration.

We find no significant differences between monopolies and firms facing competition in any of our regressions, which is seemingly at odds with predictions from e.g. Rotemberg and Saloner (1986) and Bagwell and Staiger (1997). However, their models build on the assumption that a firm that cuts its price will be able to gain sales on the expense of competitors over a non-trivial period. This does not describe newspaper markets, where firms are able to immediately detect, and respond to, any subscription price change by rivals. For the advertising price in our data (per millimeter, non-specified placement) it is unlikely that newspapers have any incentive to offer any secret discounts on the list price to the typically small local business that use that type of advertisements. According to people familiar with the industry it is common that large advertisers get secret discounts, but we cannot verify this with the data at hand.

III. Conclusions

In this paper, we have used data from Swedish newspapers during a sharp economic downturn to examine the effects of liquidity constraints on product market prices. This link has been analyzed in models by Chevalier and Scharfstein (1996), and Gottfries (1991). They model price setting, in markets where consumers have switching costs, as containing an element of investment in future markets shares. In general, liquidity constraints force firms to invest less. In the case of product prices, a smaller investment in future market share corresponds to a higher price. An advantage of the newspaper industry is that firms set two prices, for subscriptions, where switching costs are high, and for advertisement, where switching costs are low. Hence, theory provides a very specific prediction: liquidity constraints should affect subscription prices, but not advertising prices.

We use newspapers' solvency to obtain a measure of liquidity constraints. Newspapers with a low solvency before the recession are more likely to become liquidity constrained when the economy enters the recession. Our results confirm the predictions obtained from the models of Chevalier and Scharfstein (1996), and Gottfries (1991). Relative to others, the newspapers facing liquidity constraints during the downturn do increase their subscription prices, but not their advertising prices. The effects of liquidity constraints on subscription prices are economically significant; the point estimate for the relative price increase by liquidity constrained newspapers is four percent. Further, we find the same pattern in the price setting by local competitors of the firms with liquidity constraints, which is also in line with the theories.

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Notes

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[1] Studies of investment behavior have used profit margins, dividend payments and solvency to measure the extent of liquidity constraints, for references see Hubbard (1998).

[2] "Switching costs" is often taken to be a (fixed) cost of changing from one supplier to another, which will imply that customers that have previously bought from a firm will be locked-in. In general, these costs can be due to e.g. physical investments, transaction costs, or brand loyalty (Klemperer, 1995). Addictions would also have the effect that quantities respond less in the short run than in the long run to price changes, but here customers may be thought of as switching to some outside good. In this paper, the term "switching costs" is taken to include also loyalty and addictions.

[3] Advertisers in national newspapers and on TV, usually producers of branded consumer products and large retail chains, are likely to have more long-term relationships that are costly to terminate, for instance due to quantity discounts. However, the advertising content of local newspapers is dominated by occasional promotions by local businesses, which suggests a reliance on short-term contracts.

[4] At the industry level, advertising constituted 56 percent of total revenues in 1990 (source: Press Subsidies Council).

[5] As of 1992 there were 122 Swedish morning newspapers quoting subscription and advertising prices. Newspapers with less than three issues per week are typically read as a local or political additive to a regular newspaper and viewed as distinctly different by people involved in the industry. We exclude those, national morning newspapers, and two newspapers involved in mergers during the 1990-1992 period.

[6] We calculated a weighted average of the newspapers' solvencies as a measure of group solvency. Only three newspapers with low individual solvency belonged to groups with high overall solvency and only two with high solvency belonged to groups with low solvency, so in our data the issue is of minor importance.

[7] Revenues include government subsidizes to 15 newspapers with a market coverage of less than 40 percent in the municipality where the newspaper has its official seat, in almost all cases where it has its largest circulation. The average subsidy was 18 percent of costs in 1990. Newspapers have very limited exposure to

other lines of businesses – 91 percent of their revenues came from sales of subscriptions and advertising space in 1990 (source: Press Subsidies Council).

[8] We use gross (operating) profit margin rather than net profit margin, which includes interest payments. The net margin would tend to deteriorate for firms with high debt levels (i.e. low solvency) in a period with increasing interest rates and thereby partly offset the improvement of short-run profits that can be achieved by raising prices.

[9] The mean of *INCGROWTH* is 6.2 percentage points out of which five percentage points of the increase can be attributed changes in the definition of per capita income (source: Statistics Sweden).

[10] An alternative explanation to why subscription prices rose during the recession is that newspapers are inferior goods i.e. a fall in income leads to higher demand, holding prices constant. A profit-maximizing firm would therefore raise prices when incomes fall (holding costs levels constant) but the total effect on quantity would be positive (for standard demand functions). First, note that this would not explain differences across newspapers. Second, the fact is that circulation actually fell during the period, as described below. This is particularly striking given the decrease in the price of newsprint, which would give an incentive to lower prices and further increase quantity.

[11] We lack a disaggregate measure of advertising volume. At an aggregate level (including national newspapers), advertisements fell gradually from about 1.1 million meters in 1990 to 0.9 million meters in 1992. This corresponds to a fall of 18 percent, which can be compared to the almost zero change in the real advertising price shown in Table 1.

[12] There is mixed evidence on the relation between subscription price and advertising sales. Thompson (1989) and Dertouzos and Trautman (1990), among others, have estimated systems of equations for cross section data. Dertouzos and Trautman used a cross-section of U.S. newspapers and found some effects of subscription price on sales of advertising. On the other hand, Thompson fails to find a clear price-quantity relationship for either subscription or advertising price with British and Irish data. In our data the correlation between the two prices is 0.06, and excluding the bankrupt newspapers it is -0.09.

[13] The effect of a low solvency on changes in profit margin loses its significance for some alternative cut-off levels for low solvency between 10 and 20 percent.

[14] With the net profit margin, which deducts net interest payments from the operating profit, as the dependent variable results in *LOWSOLVENCY* being insignificant (coefficient 2.51 with a standard error of 1.56). This

suggests that the subscription price increases which firms with high debt levels (i.e. low solvency) undertook was insufficient to fully offset higher interest payments and give an improvement of net margins relative to other firms.

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Figure 1. Development of GDP, unemployment, real interest rate, and bankruptcies.
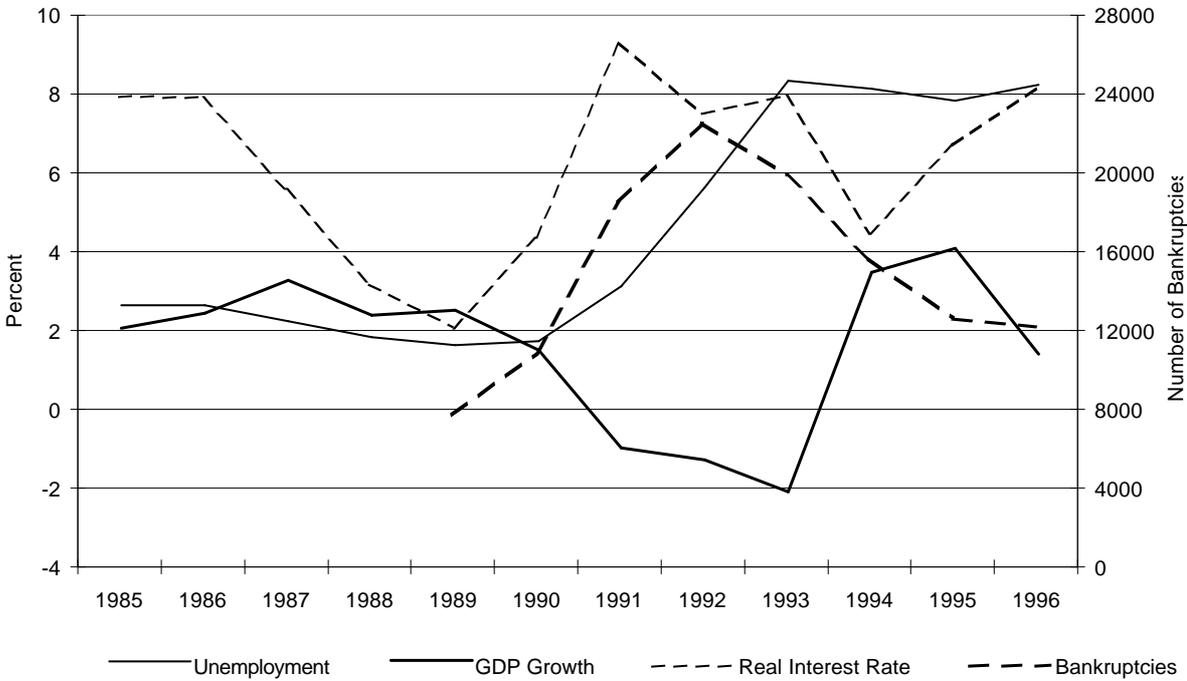
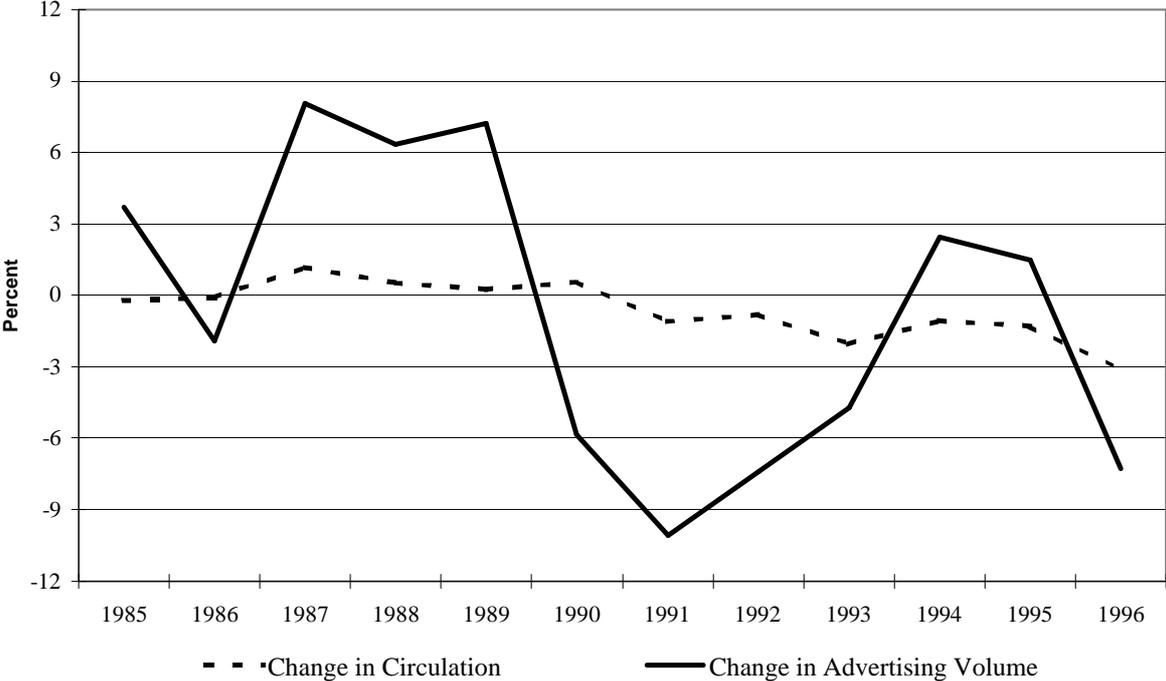Figure 2. Percent change in circulation and advertising volume 1985-1996

Table 1. Descriptive statistics. (Standard deviation in parenthesis)

	All newspapers	LOWSOLVENCY=1 (Solvency 1989<15%)			LOWSOLVENCY=0 (Solvency 1989>15%)	MONO-POLY=1	MONO-POLY=0
		All	BANKRUPT=1	BANKRUPT=0			
Total number of observations	95	22	4	18	73	62	33
LOW-SOLVENCY	22	22	4	18	0	9	13
BANKRUPT	4	4	4	0	0	0	4
RIVAL_LOW-SOLVENCY	13	1	0	1	12	0	13
RIVAL_ BANKRUPT	6	1	0	1	5	0	6
PSUBGROWTH	6.02 (5.51)	6.91 (6.00)	-2.19 (3.28)	8.93 (4.33)	5.76 (5.37)	6.10 (5.31)	5.88 (5.94)
PADVGROWTH	-0.0114 (4.22)	-1.39 (5.40)	-7.63 (6.96)	-0.00142 (4.05)	0.403 (3.73)	0.384 (3.23)	-0.753 (5.62)
MARGDIFF	2.52 (5.35)	4.27 (5.11)		4.27 (5.11)	2.08 (5.35)	2.44 (5.62)	2.70 (4.81)
MARGFINDIFF	3.38 (5.81)	3.77 (5.49)		3.77 (5.49)	3.28 (5.93)	3.61 (5.97)	2.91 (5.55)
IMMIGDIFF	-0.490 (0.42)	-0.480 (0.456)	-0.125 (0.302)	-0.559 (0.452)	-0.493 (0.409)	-0.622 (0.381)	-0.241 (3.71)
INCGROWTH	6.16 (1.36)	6.50 (1.36)	6.31 (1.06)	6.55 (1.44)	6.06 (1.35)	5.82 (1.33)	6.82 (1.16)
Change in circulation (in percent)	-1.55 (7.49)	-6.66 (12.5)	-27.0 (11.0)	-2.14 (7.24)	0.103 (4.11)	-0.703 (4.48)	-3.19 (11.2)
Circulation	27700 (33300)	27500 (56100)	13000 (4400)	30700 (61900)	27800 (22700)	19200 (14500)	44200 (49800)

Table 2. Regression results.

Variable	PSUBGROWTH	PADVGROWTH	MARGDIFF
CONSTANT	5.53*	0.682	7.66**
	(3.00)	(2.70)	(3.68)
LOWSOLVENCY	4.15***	0.423	3.87***
	(1.32)	(1.23)	(1.45)
RIVAL_LOWSOLVENCY	4.73*	-0.466	5.80***
	(2.59)	(2.10)	(1.78)
BANKRUPT	-11.2***	-7.74**	
	(1.86)	(3.38)	
RIVAL_BANKRUPT	-4.62**	0.196	-3.37*
	(2.29)	(1.58)	(2.01)
IMMIGDIFF	1.89	0.245	2.14
	(1.38)	(1.09)	(1.88)
INCGROWTH	-0.0726	-0.181	-1.09**
	(0.406)	(2.75)	(0.493)
MONOPOLY	1.57	0.0210	1.88
	(1.73)	(1.83)	(1.56)
Adjusted R-squared	0.138	0.079	0.079
Number of observations	95	95	89

Standard errors, using White's robust covariance matrix, in parenthesis.
Variables starred *** are significant at the 1% level, with ** at the 5% level and with * at the 10% level.