

Branding News with Political Opinion*

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Abstract

Does the political opinion of the consumers in a market influence newspaper sales? A demand model is estimated using different two-step instrumental techniques that allow us to account for the potential endogeneity arising from the editor's strategic choice of political line. We also account for the two-sided market effect stemming from advertising. Our results suggest that political newspapers face a higher demand than independent newspapers all other things equal. The likelihood of buying a newspaper increases by 8-10 percentage points when the market characteristics allows for a political newspaper, and the potential profits increase. We also show that by neglecting the endogeneity of political branding we halve the estimated political demand effect.

Keywords: demand analysis, product mix choice, product differentiation, monopoly, two-sided markets

JEL codes: C33, D42, L19, L82

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"The binding between the newspaper press and the political parties lasted longer in Norway than in most other countries."

Ottosen et al. (2002)

1 Introduction

Opinion, not fact, is often the substance of political views. A newspaper can therefore consistently support political views without misreporting facts or leaving out information. We call this branding the news with political opinion. Consumers will recognize the branding since other sources of information will provide different angles on the information. Some readers will like the editors political flavor, others will not.¹ Our results suggest that after controlling for other factors, the consumers' average likelihood of buying a local newspaper increases by as much as 8-10 percentage points when market conditions allow for a political newspaper.

We address the empirical question of newspapers' political branding by estimating a demand model of differentiated products for Norwegian local newspaper markets.² When estimating these models, it is common to assume that product characteristics are exogenous and this may be a fair assumption.³ For instance, if the markets have a small fraction of the product's total sales, it is less likely that firm tailors the product to these markets. The assumption of exogenous characteristics is less credible for newspaper monopolies. In fact, markets where we find political newspapers are likely to be systematically different from markets of the independent newspapers. Mullainathan and Shleifer (2005) argue that this might be the case and assumes that newspapers can slant stories towards such differences in beliefs.

¹Political branding is also referred to as political slanting or bias in the sense that newspapers slant or bias the news to cater to the preferences of their audiences. See for instance Mullainathan and Shleifer (2005), Gentzkow and Shapiro (2006) or DellaVigna and Kaplan (2007).

²Discrete choice assumptions are reasonable for models of newspaper demand. Consumers in Norway subscribe to 1.6 newspapers on average. If one excludes the national newspapers which are in a different market, most consumers keep only one local newspaper. The decision is therefore to subscribe or not to subscribe. Argentesi (2009) and Kaiser (2006) are papers that use a similar approach. Genesove (2003) chooses estimate entry level thresholds for newspapers in the US rather than demand. He finds an increasing newspaper concentration over time.

³There are exceptions. For instance Mazzeo (2002) estimates a model where the firm's quality is endogenous in an empirical study of motels along the U.S. interstate highways.

They suggest that this slanting could be the result of news providers' profit-maximizing choice to cater to the preferences of their customers. Another study by Gentzkow and Shapiro (2006) show that firms will distort information to make it conform with consumers' prior beliefs in a signalling model of media bias. Our empirical model is consistent with these two models and assume that the editor will look to demographic variables and in particular the political distribution of the potential consumers in her market.

Newspapers are different from most other consumer commodities in that they are sold twice, first to the advertisers and then to the readers.⁴ This 'two-sidedness' of the newspaper market is important to accommodate in a demand model since it may create externalities between consumers and advertisers. In 2000, advertising revenue of '*alone newspapers*' was about 1.6 times higher than subscriber and retail revenue, clearly showing that it is not enough to consider subscription fees and retail prices alone.⁵ Including advertising prices in the demand model allow us to account for the effect of advertising on consumers.

In this market subscriber and advertising prices and political branding are thus endogenous variables, and instrumental techniques are used to account for this. Whereas appropriate instruments for subscription price can be found among more standard cost shifters, both advertising price and political branding pose more of a challenge. We use numbers for readership, a figure that is used by advertisers and newspapers to measure coverage as an instrument for advertising price. As instruments for the editors' choice of political differentiation we use local electoral results in the municipal monopoly market.⁶

To accomodate that political branding also is a qualitative endogenous characteristics, we apply different estimation techniques to obtain consistent estimates. In addition to the standard instrumental variables approach,

⁴See in particular Gabszewicz et al. (2001, 2002, 2007) for a discussion of the two-sided nature of media markets. Also Rochet and Tirole (2006) discuss the two-sided market effects, and give several examples of market structures where this effect occurs.

⁵The term '*alone newspaper*' refers to newspapers that do not face strong competition from other newspapers in their local market. The advertising figures are aggregated numbers based on the classification made by *MedieNorge*, (a research center affiliated to the University of Bergen, Norway). Their classification of 'alone' newspapers is approximately the same as our local newspaper monopolies.

⁶Other characteristics such as broadsheet versus tabloid could of course be endogenously chosen by the newspaper. However, as opposed to political line where the editor has easy access to information about peoples' political opinion through public elections and polls, market information on other characteristics is more difficult to obtain and evaluate. Furthermore, political line is obviously more important than any of these more "aesthetical" characteristics.

we use both a control function approach where we include the generalized residuals from a first step probit estimation in the second step demand estimation, and we estimate a model where the predicted probabilities from a first step is used as instruments in the demand estimation (Wooldridge, 2002). To contrast the effects from neglecting endogeneity in political branding we also estimate a naive model where only the prices are treated as endogenous. We find that by ignoring the endogeneity of political branding we underestimate this demand effect by a factor of more than one (0.17 for the naive model compared to 0.34-0.41 when branding is endogenous).

Our paper relates to at least two literatures: On the one hand the empirical literature on differentiated products, monopolistic competition and product mix, and on the other hand to the more general theory around strategic behavior in media markets.^{7, 8} George and Waldfogel (2003) looked at newspapers and potential consumer externalities due to different local composition of race.⁹ Their idea is that newspapers will tailor their content to the dominant group if similar consumers have similar preferences. They show that this seems to be true, and thus provides evidence for product positioning according to demographic composition. Compared to our analysis they use a reduced form approach, comparing econometric correlations across local newspaper markets in the US. Our results are complimentary to George and

⁷Gabszewicz et al. (2001) and Gabszewicz et al. (2002) model duopoly newspaper markets and strategic effects of advertising. They show for instance that advertising revenue induces the editors of newspapers to moderate the political message they display to their readers in order to maximize profits. Related to this, Nilssen and Sørsgard (1998) and Anderson and Renault (2006) look at television market program content, advertising and their strategic interaction.

⁸Both the study of Mullainathan and Shleifer (2005) and Gentzkow and Shapiro (2006) are addressing the effects of slanting of news and how this interacts with competition effects and consumer heterogeneity and news verification. In Mullainathan and Shleifer (2005) competition will not reduce news slanting, but consumer heterogeneity will. Gentzkow and Shapiro (2006) present anecdotal evidence suggesting that competition does in fact reduce slanting effects, something they also find when news are more easily verified *ex post*. However, since we are only looking at monopoly markets these effects are not addressed here.

⁹A related problem is the effect from newspapers and media on political voting. See for instance Besley and Burgess (2001) who look at how the Indian government policy takes account of newspaper content to increase votes in elections. Besley and Prat (2006) who analyze the effects of collusion between government and media. DellaVigna and Kaplan (2007) analyze the effect of media bias on election results in the US from the entry of Fox news in local cable network markets. They find that republicans gain 0.4 – 0.7 percentage points in the towns which broadcast Fox news. Other empirical papers related to product mix and competition include Salvanes et al. (2005) and Borenstein and Netz (1999) that analyze airlines' choice of flight localization.

Waldfogel (2003), indicating that the firms may indeed expand markets by choosing the right product differentiation in terms of political profile. Our results suggest that political newspapers face a higher demand than independent newspapers all other things equal. This implies that if the political composition allows for a political newspaper, potential profits increase.

2 Newspapers, Markets and Politics

2.1 The Municipal Elections

The Norwegian municipalities are quite small in terms of population. Very often they have only one city center with their population spread around this center. Our monopoly markets constitute single municipalities rather than multiple municipalities. This also allow us to combine local electoral information and newspaper characteristics in our empirical analysis.

Municipal politics is one of the main sources of news for local newspapers. The elections, which occur every four years, are a major event. The budget debates that occur every year in late November and early December are also important events. The budget decides on the financing of very many aspects of everyday life: education, health care, local communications, local infrastructure and cultural activities. But also in general, the municipal politics is important for local newspapers. Roppen and Høst (1990) study local newspapers and reports that municipal politics is the most important category. It has 18 percent of the available space, while sports is the second most important category with 14 percent of the available space.

It is difficult to say whether the debates are more engaging in Norway than other places, but it is a fact that there are many political parties. This is a consequence of the electoral system that is closer to proportional representation than the 'first by the post' system used in Great Britain and the United States. Since there is one ballot per party and the parties decide on the list of representatives on ballot, the parties are more important than the politicians. This has probably made the relationship between newspapers and parties stronger in Norway.

2.2 A Short History

In Norway, editors have been party member, they have attended party meetings and parties have financed and managed newspapers. In short, editors have been closer to the political parties than is usual.

Newspapers were not always political. Before the midnineteenth Century,

there were no political parties and most newspapers were independent. As late as the early 1870's, the politically independent newspapers were dominant (Høyer 1977 citing Verdens Gang, p. 110). But this changed during the following decade when the parliament started to debate whether ministers should be allowed to meet in parliament. The underlying issue was whether the government depended on the parliament for legitimacy. In 1883, the process of forming the national party *Left* was started. In 1884, the government was tried and impeached. In the ensuing period the political party *Right* was formed as a national party. By the time of the parliamentary election in 1885, 88 of the 99 newspapers had taken a political stance. Further four newspapers tried to position themselves between the two political parties under the label moderate, leaving only seven independent. Politics was of high common interest. Politics were perhaps as engaging as sports are today, and newspapers became 'supporter clubs'. Balanced reporting was not in fashion so to speak. The middle ground of balanced reasoning was therefore probably hard to hold. The parties had no funding or organization to take an official role in the newspapers. The political affiliation of the newspaper was a matter of editorial opinion and not the result of ownership or financial support.

Newspapers were often started by idealistic individuals. Here the start of the labor press might serve as an illustrative example. Christian Holtermann Knudsen founded the first labor newspaper *Vort arbeide*¹⁰. He was also one of the founders of the political labor movement in Norway through the Socialist Democratic Association.¹¹ This organization was predecessor to the labor party and to one of the most important unions in Norway, The Norwegian Confederation of Trade Unions (LO). *Vort Arbeide* was initially an independent newspaper with a clear political voice, but less than a year after founding it in May 1884, Holtermann Knudsen gave the newspaper to the Socialist Democratic Association. At the same time, he continued to finance the newspaper, as the Socialist Democratic Association did not have any funds.

In the late nineteenth Century, two more political parties were established. The parties started their own press offices to capitalize on the political newspapers. And the competition hardened in the local markets where size allowed for more than one newspaper.

Høyer (1977) finds a high correlation between political newspapers and the distribution of votes in their home market. In places where votes went to the party *Left*, the newspapers tended towards the left. In places where

¹⁰Translation: Our Labor.

¹¹*Den socialdemokratiske Forening*

Table 1: Voting in markets where two political newspapers were present in 1885

| Newspaper established | | Share of Right votes | | | |
|-----------------------|----------|----------------------|---------|---------|----------|
| First | Second | 0%-33% | 34%-55% | 56%-75% | 76%-100% |
| Independent | Right | | | | 1 |
| Right | Moderate | | | | 1 |
| Right | Left | 3 | 3 | 3 | |
| Left | Right | | | 1 | 2 |
| Left | Moderate | 1 | 1 | | |
| Left | Left | 1 | | | |

the votes went to the party *Right*, the newspapers tended towards the right. His results are shown in Table 1.

The Second World War marked a suspension of the free press in Norway. Many of the newspapers were stopped; the rest collaborated with the occupying forces. When the war was over in May 1945, the work to get newspapers in print started. In particular the labor press newspaper had been shut down and the new labor government therefore allocated import licenses to labor newspapers. Partly as a result of this, the labor press was by far the most successful and the strongest by the end of the fifties. In this period, one saw an increasing degree of collusion between the parties and the newspapers.

The first time one saw a significant change in the attitude of readers to the party press was the 1972 referendum on whether to join the European Community. The main political parties advocated a yes-vote¹² and the political newspapers followed loyally the party line. The outcome of the referendum was 'no', to the surprise of journalists and politicians alike. As compared to the fairly balanced reporting on the referendum by the state TV monopoly, a new dissonance between the newspapers and their readers was revealed.

During the 1970's, political parties reduced the political agitation and the newspapers opened themselves to opinions from other political parties. Several newspapers now changed their branding by downplaying their political profile. Some editors went even further and took the step towards declaring the newspaper independent.

This change went hand in hand with the changes in the political landscape. We got more new parties and the usual dominance of the labor party fell significantly across all municipals in Norway. To illustrate the change in political diversity we have constructed a political concentration index. One

¹²The main exception being *Senterpartiet*, the center-conservative party with strong support from farmers.

measure of concentration that is much used, especially in antitrust, is the Herfindahl-Hirschman index (HHI). It is calculated as the sum of the squared market shares. The HHI measures the concentration independently of where it is on the political spectrum (left or right), and is therefore well suited to capture the concentration of voters' opinions in the elections, e.g., a political HHI index. And it is calculated using the share that each political party gets of the total votes ms instead of the market shares used in a conventional Herfindahl-Hirschman-index ($PHHI_2 = \sum_i ms_i^2$ where i indicated the different political parties in each municipality). In Figure 1 we have shown the development in this concentration index for the municipals constituting the Norwegian newspaper monopoly markets we analyze.



Figure 1: Political Herfindahl-index 1945-2008

Clearly, the concentration is decreasing significantly over time. To some extent this is due to the decline of the Labor party over the same period, making the shares of the political parties more equal (ref. figure 1). The

Table 2: The number of political newspapers in Norway

| | 1966 | 1972 | 1978 | 1984 | 1987 | 1990 |
|----------------------|------|------|------|------|------|------|
| Political newspapers | 128 | 119 | 103 | 99 | 87 | 77 |
| Independent | 64 | 78 | 106 | 117 | 127 | 123 |
| Total | 192 | 197 | 209 | 216 | 214 | 200 |

newspapers follow the same trend. We do not have a specific overview of exactly when each newspaper changed their status, but we know that in 1966 33.3 % were independent, while in 1990 the number had doubled to 61.5 % newspapers (see table 2). The equalization of the shares of the political parties and the decline of the political newspaper appear to be two concurrent historical trends.

2.3 Data and the definition of local newspaper markets

We use two datasets. The first contains newspaper data on prices, quantities, characteristics and the number of readers for the years 2001 to 2003 from the trade organizations published under the name *Aviskatalogen*. The second dataset is municipal election data from Statistics Norway going back to 1940. The variable definitions are given in Table B1 in Appendix B.

The product market is local newspapers. We define a newspaper as a paper that has a printing frequency of more than one copy per week and which is a member of the trade organization *Mediebedriftenes landsforbund*.

We need to define the newspapers that are alone in their local markets. We use information on all newspapers in Norway, also those that are in competitive markets, to define these monopoly markets. Our data set includes data on all newspapers that are members of *Mediebedriftenes landsforbund*.

The geographical markets are now defined as municipalities where we observe that one newspaper is the single most important one, and where the fringe competition is small in terms of subscriptions. The latter qualification is necessary because local newspapers are widely dispersed beyond their home market, presumably to libraries and to people that have moved away from the area. The result is a total of 33-34 markets, all of which are single municipalities. *Mediebedriftenes landsforbund* reports political branding for each newspaper. In our monopoly markets, 9 newspapers are defined as political, for which we set the political dummy, $pd = 1$. For some of these we have missing observations on different variables, leaving us with 24-26

markets over three years.¹³

The newspaper sales have a very asymmetric distribution across municipalities. As much as one fourth of the sales for the representative monopolist goes to its local market. But as soon as we move to the neighboring markets, the sales share falls dramatically to a level around 5% – 6%. This suggests that local news interests are closely related to the number one market. The representative monopoly newspaper has a market share close to 70%, whereas the closest competitor has only between 16% – 18% of the market.¹⁴ Contrasting our monopoly markets with the duopoly markets, we see a more symmetric market share distribution, where the number one newspaper has a median around 40%, whereas number two has more than 25%.

3 The effect of two-sided markets

In their many studies, Gabszewicz, Laussel and Sonnac note that newspapers are different from other consumer commodities in that they are sold twice, first to the advertisers and then to the consumers.¹⁵ The two-sided character of the newspaper market introduces some strategic considerations not present in other markets and it can be argued that this makes concentrated markets more likely.¹⁶ As discussed in Gabszewicz et al. (2002), the presence of advertising revenue may lead the editor to profile the newspaper closer to the rival, expecting the increase in advertising revenue to more than compensate the loss of sales revenue. Of course, advertisers can choose which newspaper to use, and may prefer the one with the larger sales. This may be a spiral which leads to the monopolization of the market, as argued in Gabszewicz et al. (2007), and may explain the US decrease in two-newspaper towns found in Genesove's (2003) study. In contrast to the above cited research, we look at monopolies only. In this case, the presence of a two-sided market can be accounted for by also including advertising volume in the demand model.

¹³The missing observations express no systematic pattern. We have different variables that have missing observations, and we exclude different independent and political newspapers in all years.

¹⁴In the few cases when the number two firm is large (30% – 40%) we look at regional newspapers that do not compete "head-to-head" with the number one newspaper on local news.

¹⁵Rochet and Tirole (2006) discuss the two-sided market effects, and give several examples of market structures where this effect occurs.

¹⁶Advertisement income accounted for 55% of newspaper income on average in Norway in 2000, whereas subscriber income represented 30%. The remaining 15% was related to other income such as kiosk sales etc. Source: Norwegian Institute of Journalism (<http://medienorge.uib.no>)

In lack of advertising volume or area, we account for this effect by using advertising prices. For instance, if advertising is an annoyance to readers, a high advertising price and thereby lower advertising volumes will increase the number of subscriptions. As long as we look at monopolies, other strategic considerations – competing newspapers’ advertising prices etc. – are not a concern.¹⁷

4 Econometric Implementation

4.1 Modelling approach

The readers’ demand for political bias potentially will influence the newspapers to bias their news. To establish the empirical importance of political branding we therefore estimate a demand model. We assume an underlying discrete choice utility model in characteristics space.¹⁸ The consumer i gets utility u_{ij} from consuming product j which is a function of the characteristics of the product (x_j) and the price (p_j). Furthermore, we make the standard assumption that the utility is linear in characteristics and prices.

$$u_{ij} = x_j\beta + \alpha p_j + \varepsilon_i \quad (1)$$

The vector (α, β) contains the parameters to be estimated, and ε_i is a stochastic error term. If this term is distributed i.i.d. extreme value, the probability of choosing good j has the familiar logit form, if we set the mean utility of the outside good to zero.

$$s_j = \exp(x_j\beta + \alpha p_j) / (1 + \exp(x_j\beta + \alpha p_j))$$

With n potential consumers in the market, we can write demand as the product of potential consumers and the probability that they will buy the product. The predicted quantity is thus: $D = ns(x, p; \alpha, \beta)$.¹⁹

¹⁷One could think about potential advertising competition from local TV and radio channels. We argue that this is not the case. Only the biggest cities have local radio stations, and these are not included in our sample. There are local TV-channels, but these are regional and also owned by the same national TV-channel. They typically carry nationwide generic advertising for cars etc. and only to a very small extent local advertising. Lately we have seen a change towards more local advertising, but this is after our sample period ends.

¹⁸Lancaster (1966) and Gorman (1980) were the first studies that use traceable models of differentiated products. Later McFadden (1981) showed how to implement the approach in discrete choice models.

¹⁹The discrete choice models of market demand have been extended, see e.g., Nevo (2000) and Petrin (2002). Nevo (2000) looks at market power in the ready-to-eat cereal

The choice probability is calculated as the ratio of quantity sold to the number of adults in the market, implying that all adults could subscribe to the local newspaper. The logit model can be solved to an expression which is linear in the characteristics. The outside good has index zero.

$$\ln(s) - \ln(s_0) = x_j\beta + \alpha p_j$$

This property allows us to use instrumental variable techniques to identify the demand.

There are several ways to proceed with a binary explanatory variable. The simplest is to use a standard instrumental variable approach, neglecting the problem with a qualitative left hand side variable in the first step estimation. A more correct approach is to use a control function approach and include the generalized residuals from a first step probit estimation in the second step demand estimation. Formally the generalized residual (λ) can be calculated from a probit estimation as:

$$\lambda = \rho\sigma_\varepsilon \left(pd \frac{\phi(w\alpha)}{\Phi(w\alpha)} + (1 - pd) \frac{\phi(w\alpha)}{(1 - \Phi(w\alpha))} \right).$$

In the above equation, the ratio of the normal p.d.f. (ϕ) and the normal c.d.f. (Φ) are weighted by a variance (σ_ε) and a covariance term (ρ) (Maddala, 1983).

Wooldridge (2002) propose an alternative to the control function approach where one can use the predicted probabilities from a first step probit estimation as instruments in a standard IV-estimation. We will apply both these techniques.

4.2 Instruments and variables

We have three endogenous variables that need to be instrumented, subscription price, advertising price and the political branding dummy.

The instruments used for our two prices are: newspaper weight, geographical market area size and readership. Newspaper weight is an indirect measure of the costs of one of the principal raw materials, paper. It is therefore a valid instrument for the subscription price. The geographical market

market, and Petrin (2002) looks at how one can capture the introduction of a new product. In a slightly different vein, Mazzeo (2002) looks at how discrete choice models can be used to analyze how firms locate in geographical space.

area size is an indirect measure of the cost of distribution, and is therefore also used as an instrument for subscription price.²⁰

The readership variable used as instrument for the advertising price is the estimated number of newspaper readers in the local market, which of course will differ from actual subscription. The average household, subscriptions to firms and libraries all have more readers than copies. This figure is advertised by the trade organization and is known by the advertisers. The fact that the readership has a direct effect on what the advertisers are willing to pay, and that this figure is known to the advertisers, makes readership a valid instrument for the advertising price.

The instruments used for the political branding dummy are all based on the results from the local municipal elections. We use measures that mirror both the distribution of political parties and voters' election participation.

First we calculate the political concentration index we defined above (PHHI_2) for each monopoly market. We also calculate the sum of cubes ($\text{PHHI}_3 = \sum_i m s_i^3$). This measure puts more weights on the tails of the political distribution. We would expect that the more concentrated the voting is, the easier it is for a newspaper to tailor its political brand to these consumers. This means that PHHI_2 should have a positive sign, while PHHI_3 should have a negative sign since fat tails mean that there are many consumers that disagree with the main political opinion.

The share of voters is calculated on the actual votes. Those who did not vote are not included. Since political 'apathy' or indecision could make voters more adverse to political branding, we would like to include the voting probability in the model as well.

Our dataset on the newspaper variables covers three years, 2001-2003. Elections take place every four years, and the only municipal election during our sample was in 2003. This means that for 2003, we have very good knowledge of how the political opinion was distributed among our consumers. For 2002 and 2001, we have no direct information. We could use the election in 1999 for these two years, but the election in 2003 is closer in time. The obvious solution is to use both elections, and weigh them by the distance in time. This means that for 2003 we use the results directly. For 2002 we calculate the share of each party counting 3/4 of the result in 2003 and 1/4 of the share in 1999. Similarly we calculate the shares for 2001 as the average of

²⁰Although the supply-side is not explicitly modeled in this study, we assume a certain cost structure. The most important of these assumptions is constant returns to scale and common shocks in observables such as paper weight and issues per week. Looking at the cost distribution in Norwegian newspapers, wages account for 51%, raw materials 20% and other production and administrative cost for 29% (2000). (Source <http://medienorge.uib.no>)

the shares for each party in the two elections. These weighted shares are then used to calculate the indexes and the voting probabilities. In sum we now have four instrument variables we can use for the political branding dummy; the two PHHI's, the probability of voting and its square.²¹

In addition to the endogenous variables, we include two exogenous newspaper characteristics; Issues per week and column with on text pages. The first of these provide information on the quality of the newspaper, the latter on the type of newspaper (tabloid vs non-tabloid).

Table 3 APPROXIMATELY HERE: Summary statistics.

Table 3 summarizes the variables used in our regressions. The average market has 15000 inhabitants. Our political Herfindahl index suggests a relatively concentrated "political market" but still considerably more fragmented than for instance a situation with two political parties each having 50% of the votes. Voter participation is relatively high in Norway with an average of 0.57 in our local markets.

5 Results

Our focus is political branding and how to deal with this effect empirically. We estimate four different models: A *naive model* where we disregard potential endogeneity in the political dummy, a *control function model* where we make use of a first step probit estimation, a *predicted probability model* and a *standard IV-model* disregarding the problems with having a qualitative endogenous variable.

We start out with the control function model. The first step probit model is presented in Table 4. The instruments explain the political branding well and the signs are as expected. The political concentration measure (PHHI₂) is significantly positive. This suggests that branded newspapers are more likely in markets where the consumers' political preferences are concentrated as revealed by the votes cast in the municipal election. The cubed concentration measure (PHHI₃) is a measure of the distribution on the tails. A high number means the small parties are small. Although some parties are small in some markets, they are all mainstream political parties. When these are

²¹It is also reasonable to assume that the choice of editorial line does not impact the optimal solution of all the other characteristics and thereby on costs, e.g., why should say conservative journalists be cheaper or more expensive than other journalists? It is also unlikely that the politics of a newspaper should impact on how the consumers evaluate the other characteristics of the newspaper.

small, the "minority" consumers are of diverse belief. The cubed concentration is therefore a crude measure of the distance from the wing voters to the center. If this distance is large, theory predicts that they will be less likely to buy a political newspaper, and political branding is less likely. Up to a point, we are also more likely to find political branding if the voter turnout is high.

TABLE 4 HERE First step probit estimation control function model and predicted probability model

Formally, our study cannot ascertain the causal direction between political preferences (voting) and political branding. We believe that newspapers tailor their branding to the consumers' preferences, but branded newspapers may influence the consumers in their choice of political support. And our data does not distinguish between these two interpretations. But our knowledge of newspapers suggests that they preach to the congregation and not to convert. We also believe that political preferences are not easily influenced by the editorials of a local newspaper.²²

We omit the two other first-step regressions for the endogenous price variables, but the signs, t-values and explanatory power suggest that our instruments are good.

Let us now turn to the demand model. In Table 5 we present the results from the control function approach where the generalized residual (λ) from the probit estimation in Table 4 and an interaction term between this and the political dummy are included.²³ Table 5 also include the naive demand model where the political branding dummy is assumed exogenous. Note that in all demand models, we use instruments for the price of subscription and the price of advertising. All models are also estimated using instrumental variable LIML, but they are quite similar if estimated by 2SLS (robust or conventional standard errors).

TABLE 5 HERE: Demand naive model and Control function model

²²DellaVigna and Kaplan (2007) are able to identify this potential endogeneity in their study combining the differences in timing of Fox's entry across the US markets matched with local election data. In particular they can control for historical trends in the local political development prior to Fox's entry, and they can compare across local market with and without Fox's presence in the local news market. Television is however, a far more influential medium than local newspapers. Furthermore, the 'aggressiveness' of Fox in terms of political 'propaganda' is not comparable to the way in which Norwegian local newspapers slant their political news.

²³Note that we also include the political variables from the first step probit equation as instruments in the first step estimation for the other endogenous variables.

Except for the political branding, coefficients are much the same across the two specifications. Subscription price has a significant negative effect on newspaper demand. Looking at the advertising price, its coefficients are positive. The advertising price is included to account for the average area of advertising space in the newspaper. A positive coefficient suggests that the consumers dislike advertising. The negative coefficient of the number of issues per week indicates that many issues are less worth than few issues. At first glance this sign is counterintuitive. Without any further data, it is however difficult to elaborate on this. One possible explanation is that local newspapers with more frequent issues are facing more competition from regional newspapers that typically also have higher numbers of weekly issues. Column width is positive, saying that consumers prefer wide rather than narrow columns, or in other words, more tabloid format is preferred to tabloid formats.

Turning now to the demand for political branding, both models suggest a significant increase in demand for political branded newspapers. However, the magnitude changes substantially when we treat the branding dummy as exogenous. The control function approach suggests that the naive model significantly underestimates the political effect. The coefficient changes from 0.167 to 0.407.

The control function estimation may tell more about the potential selection taking place (see Vella and Verbeek, 1999 for a discussion). In our model, the Mills ratio interaction term is not significant. This is consistent with what Vella and Verbeek calls a hierarchical structure, implying that political newspapers that have a high demand would also have a high demand as independent newspaper. As a technical point, we cannot reject the equality of the latent variable error terms that is assumed in the instrumental variables approach. This can be used as a technical argument for using a standard IV-model in our case.

Now we turn to our last two models. The first step regressions for the standard IV-model and the predicted probability models are presented in Table 6.

TABLE 6 HERE First step regressions for the political dummy variable, standard IV-model and predicted probability model.

The instrument variables have much the same signs and magnitude across the two regressions. The political variables are also much in line with what we found in the first step probit model in Table 4. Note that the predicted probability is strongly significant in the predicted probability model's first step. In Table 7 the demand model results are presented

TABLE 7 HERE Demand model results standars IV-model and predicted probability model.

The results are very similar to the control function approach model. The political branding effects are much in the same range and more significant, also now suggesting that the naive model underestimates the political branding effect. The subscription price coefficients are somewhat lower, suggesting a lower subscription price elasticity in these two latter models.

The above regressions are not on log-log form. Elasticities have to be calculated. The elasticities for subscription price and advertising price are tabulated below. All models give us an average estimate of the own price elasticity that is consistent with monopoly pricing. The confidence interval excludes 0 but includes -1. As expected for our small sample, the elasticity varies somewhat between the firms. The control function model suggests an subscription price elasticity very close to -1. The advertising price elasticities are all positive but suggest a less elastic effect on demand.

TABLE 8 HERE Elasticities all four demand models.

When we look at the political dummy, it is higly significant across models, suggesting a higher demand for political newspapers. To interpret the coefficient, we transform the estimate into changes in predicted buying probabilities. Our results suggest that after controlling for other factors, the consumers' average likelihood of buying a local newspaper increases by 8-10 percentage points when the political market characteristics allow for a political newspaper. Thus, if the political composition allows for a political newspaper, potential profits increase. One explanation for this result is that readers of political newspapers could be more loyal than readers of independent newspapers.

In the standard naive model, where our political branding variable is treated as exogenous, the results on prices and characteristics are similar. The main difference is that political line in the naive model is both substantially lower in magnitude (less than half) and marginally less precisely estimated. Transforming the estimates into predicted buying probabilities, we find the likelihood of buying to increase by only 4 percentage points in the naive model as compared to 8-10 percentage points when political line is endogenous. Thus, by not accounting for endogeneity in political branding we underestimate the importance of political product branding by a factor of more than one.

The relationship between political concentration and political line may also explain in part why the number of two-newspaper markets decrease.

Our results suggest that in a monopoly market the choice of political being political increases profit if the consumers are concentrated enough. If true for all newspapers, we can infer from our result that the gain from political differentiation will decrease as political dispersion increases. A decrease in differentiation will increase competition, perhaps to monopoly. And tellingly, we have seen a historical development towards more political dispersion. As a point in case, some years ago we saw a merger between two newspapers in one of our monopoly markets, Bodø. The conservative and the labor newspaper merged to become an independent newspaper. The market had grown steadily for a long time, and market size could therefore not explain the merger. However, in 1999 the political dispersion in Bodø was more than 5 times higher than in 1963. Our results suggests there was no longer room for political product differentiation, and that an independent newspaper *in the middle* was better. Hence, our results suggest a possible explanation for the reduction in duopoly markets that we have observed in so many countries.

6 Conclusions

It is well known from theory that a duopoly will either center on the same location or diversify to the maximum distance. To study the demand and not the strategic interactions, we have therefore excluded all but the monopolies and estimate a demand model on a set of monopoly newspaper markets. The choice of political profile is considered as a strategic choice of product mix which is treated as endogenous. We use several two-stage estimation methods to account for selection bias stemming from this potential endogeneity. We find the instrument approaches to provide very similar results, all being effective tools against the endogeneity generated through the decision problem faced by newspaper editors.

The results indicate that the firms may indeed expand their markets by choosing the right product differentiation, *i.e.*, slanting the news. Both magnitude and significance of the political indicator variable increase when potential endogeneity is accounted for. When transforming the estimate into changes in predicted buying probabilities, our results suggest that after controlling for other factors, the consumers' average likelihood of buying a local newspaper increases by as much as 8-10 percentage points when the political market characteristics allow for a political newspaper. We also show that by neglecting the endogeneity of political branding we underestimate this demand effect by a factor of more than one.

Since we are concentrating on local newspaper monopolies we are able to control for the two-sided nature of the newspaper market. This is done by also

including advertising prices in our demand model. Subscription is positively related to advertising prices suggesting that high advertising volumes reduce the likelihood of subscription.

Our results suggest that political newspapers face a higher demand than independent newspapers all other things equal. This implies that if the political composition allows for a political newspaper, potential profits increase. A tempting explanation for this result might be that readers of political newspapers are more loyal than readers of independent newspapers.

Finally, what we find here is complimentary to the results in George and Waldfogel (2003) in the sense that product mix seems to matter - in our case political line - in their case composition of race.

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A The Geographical Market Definition

The traditional approach to defining markets relies on consumer preferences in the sense that products that consumers view as substitutes are in the same market. Classical quantitative techniques to determine whether two products are in the same market are price studies where potential price interdependencies are analyzed, or the so-called SSNIP test where substitutability is verified through demand analysis. However, none of these techniques are suited to be used on our data.

We start our market definition with observing that the products - local newspapers - rely to a large extent on local news and local advertising. Some institutions such as libraries and schools may subscribe to a large set of local newspapers, but the typical consumer of local newspapers will care about news from his or her neighborhood. The overlap between the geographical coverage of the newspaper and the neighborhood of the consumer will therefore to a large extent define which local newspapers that he or she will prefer. Or said in another way, consumers will prefer newspapers that cover the geographical area where they live over newspapers that cover other areas.

One way to proceed using this information is to look at the probability that an average consumer buys a newspaper. In an ordinary logit model, this probability will be proportional to the substitution elasticity. A problem with this approach is that the market size will determine how many local newspapers there are in a market. A large market may sustain three or four, while a small market may only support one (or zero). Comparing a large and a small market, the individual probability that a consumer will buy one particular newspaper in a large market will therefore be much smaller than in the small markets, all other things equal.

To find the relevant monopoly markets we look at how the subscriptions of every newspaper are distributed geographically. Bearing in mind that many subscriptions in an area actually reflect that many consumers prefer this newspaper, we define the geographical market of a newspaper as the market where the newspaper has the most significant share of its subscriptions. This means that we divide the country into areas (municipalities) and count the number of subscriptions in each of these areas. We define a market share threshold at 10%, where a monopoly market is defined as the area where only one newspaper has more than 10% of its subscriptions. The markets as defined by using this rule end up being only single municipalities for each monopoly newspaper. This is in line with what one would expect since a municipality represents a separate political and demographic entity and therefore more of a 'one to one' match for the individual monopoly newspapers when it comes to political branding.

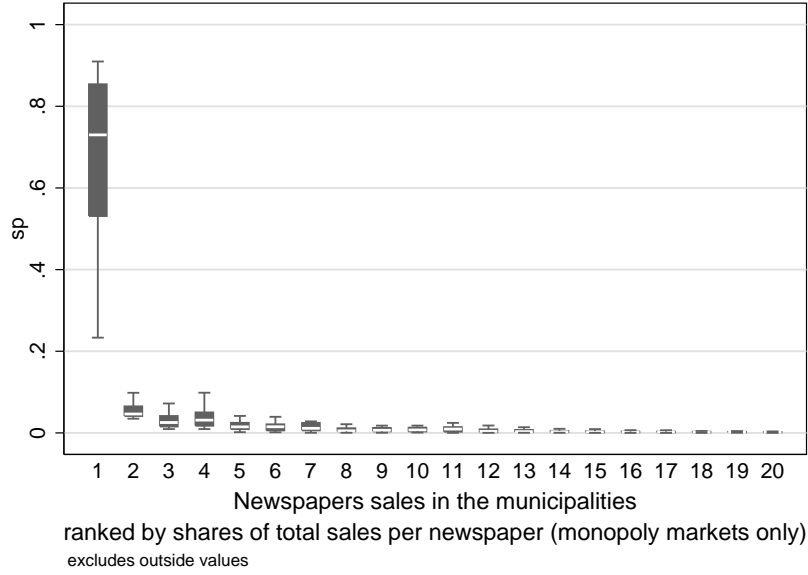


Figure 2: Share of total shares by municipalities, monopolies only

When we graph the distribution of subscriptions for all our monopoly newspapers, starting with the area with their highest share and the area with their second highest share we get Figure 2. The median monopoly newspaper sells 73.0% of their newspaper in their monopoly municipality. In the second largest market, the median sale percentage is only 4.6%. Thus, the area we define as its geographical market represents a much larger share of the sales than the other municipalities where the newspaper is sold. We have also available a monopoly market classification made by the trade organization to compare our results to. Although these two methods are not mutually exclusive, we have chosen to rely more on the quantitative approach than on the trade organization's qualitative approach. However, in the final market definition all our local monopoly markets can be found also in the trade organization's definition, but we include somewhat fewer markets.

The local newspaper is however not alone in its market since other local newspapers have subscribers there. One might therefore ask what competitive pressure monopoly newspapers actually face in their markets. An indicator of competitive pressure is the market shares of the potential competitors. We have therefore computed the market share in terms of local newspapers sold in each market. As expected the monopoly has a rather large market share with a median of 66%. The median of the second largest newspaper in

the market is only 16%, suggesting that there is a large difference between the first and second newspaper in terms of market shares.

B Data and Variable Definitions

The data is compiled from two different sources: (i) Newspaper data from the trade organizations published under the name *Aviskatalogen*, (ii) municipal data from Statistics Norway. The variable definitions are given in Table B1.

Table B1: A description of the variables used

| Variable name | Description |
|-------------------------|--|
| $\log(s) - \log(s_0)$ | The dependent variable: It is the difference between the log of the number subscribers per adults in the market and the log of the probability of choosing the outside good. |
| Subscription price | Yearly subscription prices transformed to find the price per issue for a subscriber. |
| Advertising price | There are a large variety of advertising rates. To ensure comparability, we have used the rate for one whole page in the text sections of the newspapers with black and white print. |
| Political dummy | This is a dummy variable based on a categorization made by the trade organization. It is coded 1 for the political newspapers and 0 otherwise. |
| λ | The generalized residual from the probit estimation. |
| λpd | The generalized residual interacted with the political dummy. |
| Issues per week | This variable gives the number of issues per week. |
| Column width | Width of columns on text pages, measured in centimeters. |
| Adults | The number of adults in the market. |
| Weight per year | This is the weight of the newspaper per year per subscriber. |
| Area of market | This is the area of the market in 100 square kilometers. |
| Number of readers | This is the estimated number of readers of the newspaper used by advertisers since there are more readers than there are subscribers. |
| Political HHI | The Herfindahl-Hirschman index of political parties is created by taking the sum of the square of the shares of each political party in each municipality |
| Political "HHI" (cubes) | This index is the sum of the market shares cubed. |
| Voter participation | This is the probability of voting. |
| Voter participation | This is the probability of voting squared. |

Table 3: Summary statistics

| | mean | sd |
|----------------------------------|---------|---------|
| $\log(s)-\log(s_0)$ | -0.303 | 0.186 |
| subscription price per newspaper | 5.665 | 0.683 |
| advertising price 1 page B&W | 163.60 | 84.90 |
| Political line (1 if political) | 0.211 | 0.410 |
| Issues per week | 4.329 | 1.668 |
| Width of column | 45.447 | 2.049 |
| Adults | 15222.0 | 11792.4 |
| Weigth per year | 20.43 | 15.77 |
| Area of market (100 sq. km) | 7.321 | 5.604 |
| Number of readers (in 10 000) | 2.920 | 2.962 |
| Political HHI | 0.194 | 0.032 |
| Political "HHI" (cubes) | 0.050 | 0.020 |
| Voter participation | 0.571 | 0.032 |
| Voter participation squared | 0.327 | 0.036 |

Table 4: First step regression for political branding

| | First step probit b/(t-values) |
|--|--------------------------------------|
| Instrument for pd: Party shares squared | 61.3318** (2.2552) |
| Instrument for pd: Party shares cubed | -76.6092* (-1.8809) |
| Instrument for pd: Voter participation | 601.9425** (2.1797) |
| Instrument for pd: Voter participation squared | -540.0971** (-2.2375) |
| Constant | -176.3592** (-2.2450) |
| Pseudo R2 | 0.20 |

NOTE: Robust t-values in parenthesis and * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Regression analysis

| | Naive Model | Control function Model |
|--------------------|------------------------|---------------------------|
| Subscription price | -0.3154*** (0.0875) | -0.3222*** (0.1012) |
| Advertising price | 0.0016*** (0.0006) | 0.0021*** (0.0006) |
| Political dummy | 0.1674** (0.0694) | 0.4073** (0.1832) |
| Issues per week | -0.0587** (0.0294) | -0.0771** (0.0318) |
| Column width | 0.0532*** (0.0173) | 0.0511*** (0.0173) |
| λ | | -0.2421* (0.1341) |
| $pd\lambda$ | | 0.1022 (0.1744) |
| Constant | -0.9773* (0.5669) | -0.9222 (0.6462) |

NOTE: Robust standard errors and * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: First step IV regressions

| | First step Standard IV | First step Predicted probability model |
|---|---------------------------|---|
| Instrument for ps: Weigth per total yearly issue | 0.0158** (0.0071) | 0.0096* (0.0057) |
| Instrument for ps: Area of market (sq. km) | 0.0291*** (0.0084) | 0.0231*** (0.0077) |
| Instrument for pa: Number of readers of newspaper | -0.0491 (0.0299) | -0.0286 (0.0270) |
| Instrument for pd: Party HHI 1, squares | 20.6267*** (6.2627) | |
| Instrument for pd: Party HHI 2, cubes | -31.6400*** (10.1500) | |
| Instrument for pd: Voter participation | 34.4412 (27.6194) | |
| Instrument for pd: Voter participation squared | -31.9348 (24.8737) | |
| Issues per week | 0.0086 (0.0523) | 0.0155 (0.0439) |
| Column width, text pages | -0.0279** (0.0135) | -0.0381** (0.0154) |
| Pr(pd) | | 0.7706*** (0.2639) |
| Constant | -10.6112 (7.5514) | 1.4313** (0.7132) |
| r2 | 0.3867 | 0.3558 |

NOTE: Robust t-values in parenthesis and * p<0.10, ** p<0.05, *** p<0.01

Table 7: Regression analysis

| | Standard IV (LIML) | IV predicted probability model (LIML) |
|--------------------|------------------------|--|
| | b/(rob. se) | b/(rob. se) |
| Subscription price | -0.2480*** (0.0722) | -0.2599*** (0.0722) |
| Advertising price | 0.0014** (0.0006) | 0.0014*** (0.0005) |
| Political dummy | 0.3991*** (0.1316) | 0.3383*** (0.1226) |
| Issues per week | -0.0616** (0.0290) | -0.0585** (0.0280) |
| Column width | 0.0417** (0.0184) | 0.0432*** (0.0166) |
| Constant | -0.8379 (0.6373) | -0.8413 (0.5802) |

NOTE: Robust standard errors and * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Average elasticities

| | Naive Model | Control function Model | Standard IV | Predicted probability model IV |
|---|----------------|---------------------------|----------------|-----------------------------------|
| Subscription price | -1.031 | -1.053 | -0.811 | -0.849 |
| Price per whole page advert, black & white | 0.150 | 0.197 | 0.129 | 0.129 |