"Characterization of the relevant market in the media industry: some new evidence!"

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# Characterization of the relevant market in the media industry: some new evidence!

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**Abstract**

In this paper we estimate the degree of substitutability for advertisers across different media outlets. The estimates are motivated by the need that competition agencies have to properly characterize the relevant market when dealing with mergers in the media industry. As technology changes the industry, advertisers may not view a given media outlet as independent from those operating in other media platforms. Indeed, our results show that advertisers see outlets across platforms, either as substitutes or complements. From a policy perspective, our findings imply that competition agencies, particularly when defining relevant markets, should not assume that advertisers operate independently within a single media platform.

**Keywords:** Media substitution, Cross Price elasticity, Advertising.

**JEL**: D4; L4; L8.

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1. Introduction

Technological changes that have occurred in the radio industry during the two last decades have generated new competition policy concerns. On the one hand, the radio industry has not escaped to the so-called media convergence process (Sweeting, 2016). Such a convergence implies that radio stations may compete with different media outlets in the advertising markets. On the other hand, in most countries, the technological evolution in the radio industry has been accompanied by a wave of deregulation and consolidation (OCDE report, 2013).[4]

Mergers in the media sector, especially in the radio industry, make it crucial for antitrust agencies and regulators to have adequate toolkits to characterize the relevant market. In particular, the on-going convergence in the media industry implies that the degree of substitutability between different media outlets must be taken into account when addressing market definition issues (Argentesi and Ivaldi, 2005). Following the same argument, the 2013 OCDE report dealing with media industry highlights that "*Historically, different types of media (TV, radio, internet or press) were viewed as separate products markets, but convergence has forced a number of NCA (National Competition Agency) to adopt a broader market definition.*"[5]

In this article we provide an empirical estimation of the substitutability degree for advertisers between different media outlets in Colombia in order to test the view expressed in the OCDE report that different media outlets may belong to the same relevant market. Motivated by the RCN merger case, our starting point is the advertising market in the Colombian radio industry.[6] The available dataset contains information of the chosen media platform per month by all advertisers in Colombia for the period 2010 - 2015. The elasticities are estimated using unit prices and the amount of ads purchased by each advertiser in five different types of media platforms (radio, newspapers, magazines, outdoors, and national TV). We estimate the elasticities of interest based on the Almost Ideal Demand System (AIDs) first proposed by (Deaton and Muellbauer, 1980). The AIDS model is an attractive specification for demand because it possesses, simultaneously, all the properties which are features of the Rotterdam or translog models. Accounting for price and expenditure endogeneity we relate the budget shares of advertising expenditures to different media platforms.

Our results reveal that the different media outlets available in the Colombian media industry are substitutes or complementary in the advertising market. Previous

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[4] See Anderson and McLaren (2012) for the US media markets, in particular local media and the radio industry.

[5] Anderson and Gabszewicz (2005) explain that the media industry is a leading example of two-sided markets. On the one hand, media platforms need to attract consumers (viewers/readers/listeners) in order to increase the willingness to pay of advertisers.[5] On the other hand, viewers may value positively or negatively the presence of advertising, and according to this valuation, will affect media platforms' demand.

[6] The Colombian competition office took action against RCN, one of the biggest Colombian radio companies, because of a non-authorized merger. The competition office claimed that RCN's market share in the advertising market is above the permitted threshold, and that it consequently RCN had to submit a merger proposal to the competition office. However, the competition office defined the relevant market considering only the radio industry, assuming zero cross elasticities across media platforms for advertiser..

studies have found similar results. In particular, Esteban *et al.* (2016), Franck *et al.* (2008) and Seldon *et al.* (2000) also find relationships of substitution between radio and some of the media covered in this study. Seldon *et al.* (2000) estimates Morishima elasticities and finds substitutability between radio and print. Esteban *et al.* (2016) finds that the radio is also a substitute of print, magazines, internet and cell phones. Complementarity relationships have also been found in previous studies. In the case of USA advertising industry, Esteban *et al.* (2016) finds some cases of complementarity between media.

All previous studies on advertising substitutability focus on the US case. To the best of our knowledge, this is the first set of estimations for a country other than the United States. The implications of our results are discussed in details in the conclusion.


2. Data

We use proprietary data collected by the *Instituto Brasileiro de Opinião Pública e Estatística* (IBOPE). There are six monthly cross-sections for the period 2010-2015. The database contains information for all advertisers in Colombia, the quantity they advertise and their expenditures in five media outlets: newspapers, magazines, outdoors, radio and national TV. The dataset also includes information of the advertisers' sector.

Unit prices are derived by dividing the expenditure by the amount of ads purchased in each of the four regions in which Colombia can be divided. Thus, the data has 288 observations where the unit of observation is a year, month, and region.

Table 1 reports the descriptive statistics. Magazines charge the highest price followed by national TV, outdoors, newspapers, and radio. Outdoor quantities are the dominant media followed by radio. In figures not reported, the data shows that advertisers spend the most in national TV and radio, the two media outlets characterized by the highest audience in Colombia[7].

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[7] As reported by *"Estudio General de Medios"* (EGM), the Colombian version of the General Study of Media, between 1999 and 2015.

**Table 1: Descriptive Statistics***

| Variable | Observations | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Newspaper Price | 288 | 1,650.0 | 631.7 | 610.1 | 3,285.1 |
| Outdoors Price | 288 | 1,790.0 | 764.2 | 88.5 | 4,913.7 |
| Radio Price | 288 | 144.9 | 47.4 | 73.8 | 256.7 |
| Magazine Price | 288 | 7,280.3 | 1,138.6 | 4,618.1 | 10,146.2 |
| National TV Price | 288 | 2,982.3 | 166.6 | 2,328.0 | 3,416.9 |
| Newspaper Advertised Quantity | 288 | 15,628.6 | 11,839.6 | 2,535.4 | 57,937.0 |
| Outdoor Advertised Quantity | 288 | 466,298.8 | 1,718,568 | 177 | 8,896,496 |
| Radio Advertised Quantity | 288 | 249,454.4 | 88,015.5 | 98,158.9 | 444,078.8 |
| Magazine Advertised Quantity | 288 | 886.4 | 684.3 | 142. | 2,785.5 |
| National TV Advertised Quantity | 288 | 22,725.7 | 15,678.6 | 10,038.1 | 55,963.3 |

*Unit prices in thousands of 2008 constant Colombian pesos.
*Quantities refer to the number of ads per month.
Source: IBOPE. Own calculations.

## 3. Empirical Strategy

Unlike others in the literature who use a *translog* model (Seldon *et al.* [2000] or Franck [2008]) we estimate elasticities based on Deaton and Muellbauer´s (1980) Almost Ideal Demand System. Given the objective, the available data and the desirable micro foundations of the AIDS, this approach is the most adequate to estimate the cross-elasticities.

The model is based on the following equation:

$$w_{it} = \alpha_i \sum_{j=1}^{N} \gamma_{ij} \ln p_{jt} + \beta_i \ln\left(\frac{X_t}{P_t}\right) + u_{it} \tag{1}$$

*where*:

- $w_{it}$ is the budget share on expenditure for media $j$ during any given month $t$. The sum of $w_{itj}$ per sector is equal to 1.
- $X_t$ is total expenditure in period t.
- $p_{jt}$ is the price per for advertising in media $j$ in period t .
- $P$ is a price index defined by:

$$\ln P_t = \alpha_0 + \sum_{k=1}^{N} \alpha_k \ln p_{kt} + \frac{1}{2} \sum_{j=1}^{N} \sum_{k=1}^{N} \ln p_{jt} \ln p_{kt} \tag{2}$$

To estimate the model equation (2) is substituted into equation (1):

$$w_{it} = (\alpha_i - \beta_i \alpha_0) + \sum_{j=1}^{N} \gamma_{ij} \ln p_{jt} + \beta_i \left( \ln X_t - \sum_{k=1}^{N} \alpha_k \log p_k - \frac{1}{2} \sum_{i=1}^{N} \sum_{k=1}^{N} \gamma_{ij} \ln p_i \ln p_k \right) \quad \textbf{(3)}$$

where $\alpha_0$, as suggested in Banks et al. (1997), is set to be slightly less than the lowest value of ln$X$ observed in the data

Equation (3) presents the system of equations to be estimated. Identification issues arise because prices (Hausman *et al.*, 1994) and total expenditure (Thompson, 2004) may be endogenous. Following these articles, we instrument prices using other region average prices and total expenditure by using proxies for income and price behaviour, *i.e.* production index per region, producer price index and a trend.[8] National TV ads are available only at the country level. We exploit the richness of the data and calculate TV companies expenditures on ads and use this as a cost-based instrument.

4.  Results

Table 2 exhibits the cross-elasticities of demand derived from the parameters obtained from equation (3). The diagonal shows the own elasticities for each media. Entries outside the diagonal are the cross-elasticities. The value of each cell (*x row, y column*) is interpreted as the percentage change in demand on media *x* caused by a 1% increase in the price of *y*.

**Table 2: AIDS Model**

|  | Newspaper | Outdoors | Radio | Magazine | National TV |
|---|---|---|---|---|---|
| **Newspaper** | -0.990*** | 0.008 | 0.258** | 0.129 | -0.484*** |
|  | (0.069) | (0.018) | (0.094) | (0.110) | (0.090) |
| **Outdoors** | 0.090 | -1.042*** | 0.453** | 0.177 | -0.438** |
|  | (0.117) | (0.027) | (0.141) | (0.180) | (0.144) |
| **Radio** | 0.159 | 0.040 | -1.059*** | -0.065 | 0.045 |
|  | (0.097) | (0.024) | (0.141) | (0.148) | (0.109) |
| **Magazine** | 0.595 | 0.159 | -1.152* | -1.898*** | 0.151 |
|  | (0.320) | (0.082) | (0.570) | (0.488) | (0.292) |
| **National TV** | -0.141** | -0.034* | -0.010 | 0.038 | -0.857*** |
|  | (0.054) | (0.014) | (0.090) | (0.095) | (0.070) |

* p<0.05, ** p<0.01, *** p<0.001
Source: IBOPE. Own calculations.

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[8] Others who have used these type of instruments, either for prices, expenditure or both, include Banks et al. (1997) or Dhar *et al.* (2003) or Zhen (2014).

The results show substitution and complementary patterns across certain media outlets. An increase in price for advertising in radio, for instance, leads to higher demand for newspapers and outdoors. Similarly, complementarity relationships between media outlets are observed, suggesting that advertising across the various media platforms is, overall, interwoven.

## 5. Conclusion

Despite the fact that we have not included digital media in our estimation, our results reveal that different media outlets are substitute in the advertising markets.[9] In these non-transaction two-sided markets, Filistruchi *et al.* (2014)'s recommendations imply that competition authorities have to define one market for advertisers and one market for consumers such as the German competition authority did in Holtzbrink and Spinger/ProSieben/Sar1 cases. In both cases, the scope of the relevant market was broader on the advertisers' side than on the consumers' one.

In the RCN case, the competition authority assumed that cross-elasticities were zero across the various media outlets. Our results suggest that the Colombian competition authority should have taken into account most media outlets in the characterization of the relevant market to evaluate properly a merger case in the radio market. In line with OCDE's recommendations, our results imply that the relevant market in the media industry have to be characterized broadly.

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[9] Esteban *et al.* (2016) find that digital media and radios are substitute in advertising markets. The importance of new media is also highlighted by Ambrus *et al.* (2016).

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