

# ‘Make or Buy’ as Competitive Strategy: Evidence from the Spanish Local TV Industry

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## Abstract

This paper empirically investigates whether changes in product market competition affect firm boundaries. Exploiting regulation-induced shocks to entry barriers and differences in regulation enforcement across cities to obtain exogenous variation in competition, we establish a negative causal effect of competition (through reduced entry barriers and a larger number of rival firms) on vertical integration in the setting of the Spanish local television industry between 1995 and 2002. We also find that stations located in larger markets are on average more likely to produce their content in-house than stations in smaller markets, and that private stations outsource more.

**JEL Codes:** D22, L22, L24, L82

**Keywords:** competition, vertical integration, Spanish television

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# 1 Introduction

Firm boundaries are constantly redefined, as witnessed by the multibillion-worldwide volume of corporate mergers and acquisitions and the sharp increase in outsourcing activity observed in recent years (see, e.g., Abraham and Taylor, 1996; Campa and Goldberg, 1997; Kakabadse and Kakabadse, 2002; and Whittington et al., 1999). Much less is known, however, about the causes of this phenomenon. An explanation to the increasing adoption of new organizational structures and redefinition of firm boundaries that is gathering increasing consensus (see Bloom and van Reenen, 2007; Bloom et al., 2009; and Bresnahan and Levin, 2012) relates these changes to changes in the firms' operating environments – prominently, changes in competition in product markets brought about by, e.g., local deregulation and international trade liberalization.

In this paper we empirically investigate whether changes in product market competition affect firm boundaries – Coase's (1937) perennial make-or-buy problem. Exploiting regulation-induced shocks to entry barriers and differences in regulation enforcement across cities to obtain a source of exogenous variation in product-market competition, we establish a negative causal effect of competition on vertical integration in the setting of the Spanish local television industry between 1995 and 2002.

The question is important because both organizational structure and product-market competition have been recently identified as important drivers of widely-documented, large and persistent differences in firm-level productivity (see Syverson, 2011). Several papers have looked at the relationship between competition and productivity (see, for instance, MacDonald, 1994; Nickell, 1996; Nickell et al., 1997; Schmitz, 2005; and Syverson, 2004), while others have related organization and productivity (e.g., Bloom and Van Reenen, 2007; Maksimovic and Phillips, 2002; and Schoar, 2002). In particular, Forbes and Lederman (2010) and Hortaçsu and Syverson (2007) document how vertical integration positively affects firm-level productivity in airlines and the cement industry.

Hortaçsu and Syverson (2009) extend this result to most private non-agricultural establishments in the US, but Lu and Tao (2011) find a negative effect of integration on productivity in Chinese manufacturing firms. Regardless of sign, all these studies provide evidence that vertical integration and productivity are related.

Product-market competition can affect productivity directly or by inducing productivity-enhancing changes in organizational structures (Syverson, 2011). Studies documenting a relationship between competition and firm organization include Bloom et al. (2010), Bloom and Van Reenen (2007, 2010), and Nickell et al. (2001), but we are not aware of many previous empirical studies explicitly linking product-market competition and firm boundaries.<sup>1</sup> Exceptions are early studies by Levy (1985) and Tucker and Wilder (1977) reporting a positive correlation between vertical integration and industry concentration in US manufacturing. More recently, Aghion et al. (2006) show evidence of a U-shaped relationship between competition and vertical integration in UK manufacturing, whereas Bayo-Moriones et al. (2012) find a positive correlation between service outsourcing and competition in survey data from Spanish manufacturing.

While several correlations are solidly documented, much research in this question is still needed to establish causality. This paper contributes to this agenda by proposing a credible identification strategy to show that increased competition causes a reduction in the degree of vertical integration. To the best of our knowledge, the only other paper that provides evidence of a causal effect of competition on firm organization is Guadalupe and Wulf (2010), who show that global competition among corporations shapes the internal organization of firms. Using trade liberalization as a quasi-natural experiment and tariff differentials across industries to implement a difference-in-differences strategy, they find that increased competition leads firms to flatten, i.e., reduce depth (the number of management levels) and increase breadth (the CEO's span of control).

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<sup>1</sup>Incidentally, we note that the extensive survey of Lafontaine and Slade (2007) on vertical integration does not even include a section directly addressing this relationship between competition and integration.

To guide our empirical analysis, we first provide a simple model that uses a circular model *à la* Salop where firms (TV stations) enter a market and then decide whether to make or buy their content and the quality of that content. Given that the Salop model takes station location as given, the degree of competition is then determined by the endogenous number of stations, which in turn depends on market size and the fixed cost of entry. Our model shows that firms facing a larger number of competitors (due to lower entry costs) outsource more.

To test this prediction, we use a data set composed by three annual censuses of Spanish local television stations published in the years 1996, 1999 and 2002. The data report, for each station, the percentage of content produced internally, the city location, as well as other station-level information. More importantly for our purposes, industry regulation and its enforcement experienced several changes that were orthogonal to individual station characteristics during the period of time of our study – thus providing a convenient source of plausible exogenous variation in entry barriers. First, local TV stations were essentially unregulated until December of 1995, when the first industry regulation was passed. Second, national election results in 1996 and 2000 changed the degree of enforcement of the 1995 law, which depended to a great extent on the particular party ruling in any given city. We use a difference-in-differences strategy to exploit the first source of variation, as stations passed from being in an unregulated to a regulated industry, to examine the relation between vertical integration and competition. On the other hand, we run traditional 2SLS regression models to exploit the latter source of variation, using the political color of a city (for whether the existing law was enforced) to instrument competition.

We begin our empirical section by presenting OLS regressions that show no statistically significant relation between the percentage of content produced internally by a station and the level of competition. Once we exploit our two sources of exogenous variation, our empirical results are consistent with our model prediction. We also find that private (as opposed to government-owned)

stations are more likely to outsource content production, and that competition also leads firms to increase the number of broadcast hours per week.

The remainder of the paper is organized as follows. Section 2 describes the institutional details of the Spanish local TV industry between 1995 and 2002. In Section 3, we introduce a model of monopolistic competition with endogenous quality differentiation that we use to draw hypotheses and testable implications. Section 4 presents the data. In section 5 we describe our empirical methodology, show and discuss our findings. Section 6 concludes.

## **2 Institutional details**

This section builds on information obtained in personal interviews with industry managers and previous work (Gil and Riera-Crichton, 2012; and Gil and Nishida, 2012).

### **2.1 European versus American model of local television**

To understand how competition in the Spanish local television industry works, we first want to highlight the main differences between television markets in Europe and in the United States. The US market has been mainly characterized by little government intervention and verticality, whereas the European markets have shown strong government intervention and lack of verticality. In the US, stations in big markets were the first to broadcast content and after a while dominated the industry. As (smaller) stations were created in smaller markets, these grew dependent on the dominant stations because the latter were the main providers of content. Eventually, these relationships of content exchange were so frequent that dominant and local stations formed networks. Nowadays, local stations are affiliated to the networks, and even though the network directly provides some of their content, they still produce a reasonable share of their programming that adjusts to local preferences.

The US case differs much from the European experience. In Europe, each country regulated and monitored its own TV industry. Entry was highly regulated and the presence of local TV stations was limited. In fact, most countries entered the 1980s with only government-owned and run TV stations and, at best, a few regional stations broadcasting content for a small part of the national territory. Given the dominant role played by national and regional stations, there was almost no room left for local stations, to the point that regulation did not even recognize them as legal entities. In other words, local stations were neither legal nor illegal because no regulation prohibited or acknowledged their existence.

## **2.2 Local television in Spain**

Badillo (2005) defines three phases in the regulation of local television in Spain in the period considered in this paper: (i) no regulation (1980-94), (ii) regulation by law (1994-95), and (iii) invisible deregulation (1996-2002). Until the mid-1980s Spain had just two TV stations, TVE and TVE2. The former was the main station and the latter served as window to minority content and local news broadcast from small satellite stations that had little independence in their programming decisions. The new democratic regime in Spain consolidated during the mid-1980s and, as a consequence, the central government granted the right to its regional counterparts to develop regional stations. Still at that point, the law did not recognize local TV stations as legal entities – which did not prevent a number of local stations from emerging in the late 1980s as a result of the joint efforts of local civil associations. Since regulation at the time neither recognized nor prohibited these local TV stations, police and the judicial often did not know how to apply the law or what penalties to impose as a number of interventions and cases made it to court (Badillo, 2003).

Many local stations were created after those years and, as their economic and cultural sig-

nificance grew, the need for a legal framework became clear to politicians and regulators.<sup>2</sup> The left-winged Partido Socialista Obrero Español (PSOE) won the 1993 general election but, having lost its majority in Congress, had to yield to the demands of its allies (especially Izquierda Unida and Convergència i Unió – CiU), who were pushing for a regulatory framework for local television. 1994 saw the first regulatory proposals, which announced the end of the no-regulation period. After bargaining with other parties in Congress, the PSOE government finally approved the law of local TV stations in December of 1995 (Law 41/1995, BOE 309, 27-12-1995), to be implemented in 1996. With this law, regulators aimed at shaping the composition, commercial activities, ownership, and competitive structure of the Spanish local TV industry. Among other things, this law limited the market of local stations to their city.<sup>3</sup> Some of the most controversial points of the 1995 law were that it limited the number of stations to two per city (regardless of population), banned TV networks, and restricted local TV stations ownership and control to local governments (the latter was a concession to CiU). Given the nature of the 1995 law and the discussions surrounding its passing, it seems fair to assume that the new regulation was unrelated to vertical integration decisions – indeed, neither the law nor any of the proposals that circulated contained any disposition concerning the production of content.

In March of 1996, the PSOE unexpectedly lost the national election to the right-winged Partido Popular (PP), which had a different perspective on how the local TV market should be regulated, if at all. Shortly after winning the election, the PP (which had no majority in Congress) unsuccessfully tried to pass a new law which lifted the restrictions on number of stations and private ownership and management introduced by the 1995 law. Fiercest opposition came from the PP’s new ally,

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<sup>2</sup> According to ratings data published by the Asociación de Investigación de Medios de Comunicación (AIMC), local stations were responsible for a 0.6%, 1.1%, and 1.7% market share for the years 2000, 2002, and 2004, respectively. Although these may seem low, regional stations at the time captured 4.2%, 3.7%, and 4.2% in those three years.

<sup>3</sup> As a consequence, communication scholars have characterized local stations as providers of “proximity television” to differentiate them from the role played by national and regional stations. Local station content differed from that of nationals and regionals in that it catered more to local preferences and interests.

CiU, which still favored a more regulated environment. Rather than insisting on a new law, the PP government took the alternative route of not implementing the PSOE law – what Badillo (2005) has termed a “silent deregulation”. Badillo (2003) documents the lack of enforcement of the 1995 law with anecdotal evidence. He describes instances in which enforcement was selective depending on whether local TV stations were located in a city ruled by a PSOE or PP mayor (the enforcement of the law was definitely laxer in the last case). Other regions, such as Catalonia (where CiU is present), chose to start developing the law themselves with little support from the central government. Figure 1 compiles information from Badillo (2005) showing entry of new stations between 1997 and 2002, which should not have occurred according to the 1995 law. Although a moderate amount of sanctioning activity (files opened by the administration as well as closed cases) occurred between 1997 and 1999, such activities winded down a lot after the PP won the election in the year 2000 by an unexpected margin.

[FIGURE 1 ABOUT HERE]

The 2000 election changed the landscape of the regulation of local TV stations quite a bit. After the election, the PP gained full control of Congress and decided to push forward the deregulation that the previous legislature had stopped. The PP took to congress a revision of the law approved in 1995, which allowed the number of stations to be proportional to the number of inhabitants per city, no longer required local stations to be government-owned or managed, allowed stations to be for-profit organizations, and lifted the ban on network formation. The new law was only passed in December of 2002 (Law 53/2002, BOE 313, 12-31-2002), but its main dispositions were silently implemented (and affected stations’ behavior) since the 2000 election. We observe further evidence of this silent deregulation in the emergence of vertical networks already in 2001 and 2002 (with Localia and Vocento), even though the 1995 law clearly prevented stations from being part of any network (horizontal or vertical). Moreover, as Table 1 shows, violations to the limit on number of



stations was far more common in cities ruled by the PP – especially after 2000. We note once again that this liberalization process undertaken by the PP was not related to vertical integration.

[TABLE 1 ABOUT HERE]

In this paper, we will exploit these changes in regulation from 1995 to 2002 to analyze how changes in market structure across cities and years affected the degree of vertical integration in the Spanish local TV industry. But before turning to that matter, we present in the following section a model of monopolistic competition with endogenous quality that we will use to derive testable hypotheses that we will later take to the data.

### **3 Make-or-buy choices in market equilibrium**

Previous research has highlighted the mechanisms through which changes in competition affect the trade-offs involved in vertical integration decisions in market equilibrium. On the one hand, McLaren (2000) argues that competition, by increasing the number of suppliers and buyers in the market for inputs, reduces the scope for opportunistic behavior, and hence fosters outsourcing (in line with arguments from transaction cost economics). Similarly, Grossman and Helpman (2002) add buyer competition in the product market and find that an increase in competition (product substitutability) favors outsourcing when diseconomies of scope are more important than distortions from imperfect contracting. When distortions are relatively more important than the diseconomies of scope, higher elasticity due to increased competition favors integration, but increases the likelihood of an independent supplier finding a partner. The effect of competition on vertical integration is the net of these two opposing forces: when the first dominates, more competition favors integration; else, the relationship might be non-monotonic, with non-integration optimal for intermediate competition.

On the other hand, a separate stream of papers build on property rights theories to approach

the question. Aghion et al. (2006) find that a U-shaped relationship between integration and competition arises when the supplier's effort is important and imitation cannot be prevented: an increase in product-market competition at first reduces the incentive to integrate by enhancing the suppliers' outside options and incentives, but eventually fosters integration as the cost of incentive provision becomes too high. Finally, De Bettignies (2006) embeds a property rights model of the integration decision into a Hotelling duopoly, in which outsourcing provides stronger incentives for quality to the downstream party, but forces the upstream party to give up rents because the downstream party is wealth constrained. An increase in competition (product substitutability) makes quality improvements more important and reduces ex-post rents, favoring non-integration.<sup>4</sup>

In this paper we develop a model of vertical integration decisions in market equilibrium that takes into account the idiosyncratic characteristics of the Spanish local television industry. In this industry, a TV station maximizes profits from more than one revenue source. On the one hand, television stations produce content that they sell to television consumers or viewers. On the other hand, stations sell television space to advertisers. Since viewers value television content free of advertising and advertisers value the number of television viewers, stations balance and manage revenues from each source to maximize total profits. Some stations do not charge consumers to view their content to maximize the number of viewers, while selling advertisement space to advertisers at high prices. Other stations choose to charge a subscription fee to consumers and limit the amount of advertising.

In order to attract both viewers and advertisers, stations carefully choose the content of their programming. Programs may be outsourced or produced in-house. In the former case, these could be old programs produced in the past and now recycled, or content outsourced to an independent producer and specifically produced for the station's audience. In the latter case, the content may

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<sup>4</sup>Other papers modelling vertical integration decisions highlighting different trade-offs are Conconi et al (2012), and Gal-Or (1999).

be produced internally by the programming division.

Our model assumes non-price competition and free entry. The former assumption is validated by the fact that most stations in this market broadcast content and therefore obtain all their revenues from a competitive advertising market.<sup>5</sup> The latter captures the fact that changes in market structure have been driven by changes in regulation and entry barriers as we explained in section 2.2.

### 3.1 The economic setup

To model the interaction and competition among local TV stations in Spain, we assume that local TV stations sell audience to advertisers at a competitive given price  $p$  per viewer. On the other hand, local TV stations compete for audience with other stations through the provision of content (and its quality) that they give away.

For content production, the TV station (the principal) must contract with a content producer (the agent). Either the principal or the agent controls the facilities used to develop and produce content (or, equivalently, the right to use that content). In the first case, the agent is an employee of the principal, and therefore we will speak of in-house production or vertical integration. Under in-house production, the TV station “makes” its own content. Alternatively, the agent can be an independent content producer, with whom the TV station contracts at arm’s length and from which the TV station “buys” content. In this case, we will speak of non-integration, outsourcing, or contracting out production.

The details of the relationship between the TV station and the content producer are borrowed from Hart et al. (1997). The principal and the agent can write a contract specifying some basic content to be provided at price  $P_0$ . This basic content is characterized by a certain quality  $q_0$

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<sup>5</sup>These represent over 80% of stations in our sample.

and cost  $c_0$ . The content provider can invest resources to improve the quality or reduce the cost of the content, without breaching the formal contract, but neither of these innovations is ex-ante contractible. Only the owner of the right to use the content can approve any innovation to the basic content specified in the contract. The modified content is characterized by quality  $q_i = q_0 - b(e_i) + \beta(i_i)$  and costs  $c_i = c_0 - c(e_i) + e_i + i_i$  to produce (costs are borne by the agent in any case), where  $e_i, i_i$  denote the agent's effort in reducing costs and improving quality,  $c(e_i) \geq 0$  is the resulting cost reduction,  $b(e_i) \geq 0$  is the damage to quality from cost-reducing activities, and  $\beta(i_i) \geq 0$  is the increase in quality (net of costs) brought about by the quality innovation.<sup>6</sup> Total effort costs for the agent are  $e_i + i_i$ . We assume  $e, i, c, b$ , and  $\beta$  are observable by the principal and agent, but not verifiable by a third party. Similarly, local TV stations are not able to observe the realization of these variables from other stations but they can observe realized final qualities. Both principal and agent are risk neutral and face no wealth constraints. After content is produced, TV stations broadcast their content (i.e., charge a zero price to viewers) and compete for viewers, while the market for advertising is perfectly competitive.

### 3.2 Timing

Summing up, the timing of the game is as follows:

1. All firms make their entry decisions simultaneously.
2. All firms simultaneously sign contracts with their content providers, and make their integration choices.
3. Content producers make their effort choices.
4. Each TV-producer pair bargains over modifications to the basic content.

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<sup>6</sup>Following Hart et al. (1997), we make standard assumptions on  $b, c$ , and  $\beta$ :  $b(0) = 0, b' \geq 0, b'' \geq 0; c(0) = 0, c'(0) = \infty, c' > 0, c'' < 0, c'(\infty) = 0; \beta(0) = 0, \beta'(0) = \infty, \beta' > 0, \beta'' < 0, \beta'(\infty) = 0; c' - b' \geq 0$ .

5. Firms compete in the product market to attract viewers and advertisers.
6. Consumers choose which TV station they view and payoffs accrue.

### 3.3 The industry and the market

We consider a monopolistically competitive industry with differentiated brands, composed of a large number of identical potential firms (i.e., local TV stations). The product space is a circle with a perimeter equal to one (Salop, 1979). In this market,  $n$  firms (indexed by  $i = 1, \dots, n$ ) enter and choose symmetric locations – the distance between firms is then  $\frac{1}{n}$ . The cost of entry is  $f$ , and there is free entry and exit.

Consumers are located uniformly around the circle with mass  $m$ . They have unit demands and incur a transport cost  $td^2$  when viewing content from a TV station located at distance  $d$  from their location.<sup>7</sup> To focus on changes in  $n$  and  $f$ , we set the unit transport cost  $t = 1$ . Each consumer derives gross surplus  $v + q_i$  when consuming the content broadcasted by firm  $i$ .

**Proposition 1** *Suppose firm  $i$  has quality  $q_i$ . If it expects its rivals to choose quality  $E(q)$ , its expected (gross) profits  $\pi_i$  are given by*

$$\pi_i = pm \left[ \frac{1}{n} + n(q_i - E(q)) \right]. \quad (1)$$

**Proof.** See Appendix. ■

### 3.4 Outsourcing versus in-house content production

At date 4 the parties bargain over the modifications to the basic content. We assume they divide the gains from renegotiation according to the Nash bargaining solution: each party gets her

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<sup>7</sup>As usual, the unit transport cost  $t$  could be interpreted as the utility loss consumers suffer from not consuming their preferred variety.

disagreement payoff plus half of the surplus created. These payoffs determine the agent's effort incentives at 3. As we show in the Appendix, the resulting total surpluses under each governance structure are given

$$S^{VI} = pm \left[ \frac{1}{n} + n(q_0 - E(q)) \right] - c_0,$$

under vertical integration and

$$S^{NI} = pm \left[ \frac{1}{n} + n(q_0 - b(e^{NI}) + \beta(i^{NI}) - E(q)) \right] - c_0 + c(e^{NI}) - e^{NI} - i^{NI},$$

under non-integration.

Let  $\Delta \equiv S^{NI} - S^{VI} = pmn(-b(e^{NI}) + \beta(i^{NI})) + c(e^{NI}) - e^{NI} - i^{NI}$ .<sup>8</sup> Then

**Proposition 2** *The total effect of entry cost  $f$  on vertical integration decision is given by*

$$\frac{d\Delta}{df}_{VI} = \frac{\partial\Delta}{\partial n} \frac{\partial n^{VI}}{\partial f} < 0,$$

*under integration and*

$$\frac{d\Delta}{df}_{NI} = \frac{\partial\Delta}{\partial n} \frac{\partial n^{NI}}{\partial f} < 0$$

*under non-integration.*

**Proof.** See the Appendix. ■

In this particular setting, we are interested in the effect of  $f$  on vertical integration, since entry costs were clearly affected by the regulatory changes we are focusing on. In that case, a reduction in entry costs unambiguously increases the number of firms in the market, which in turn increases the benefits of outsourcing.

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<sup>8</sup>Notice that we focus on the total surplus of the relationship to determine the optimal organizational form. The price  $P_0$  can always be used to allocate this surplus among the parties at date 2 without affecting incentives.

Proposition 2 is the main prediction of the model and the empirical test that we take to the data later in the paper. Summarizing, this prediction states that *a reduction in entry barriers f increases the number of firms in the market and makes outsourcing more likely.*

In the next section we present our data, which we will use to test our prediction.

## 4 Data

The main data set used in this paper comes from three different sources. The first source is the Spanish censuses of local TV stations collected by the Asociación de Investigación de Medios de Comunicación (AIMC hereafter) and published in 1996, 1999, and 2002. These censuses collected information on the names and number of local TV stations per city and province for the years 1995, 1998, and 2001.<sup>9</sup> According to the data, 881 stations were operating in 1995, 740 stations in 1998, and 898 in 2001. Figure 2 provides a timeline for census data collection, changes in regulation, and elections.

[FIGURE 2 ABOUT HERE]

To create each of these censuses, the AIMC sent questionnaires to each of the existing stations in each year and published the responses. 183 stations responded in 1996 while 457 and 645 responded in 1999 and 2002 respectively. In the questionnaire, station managers answered questions regarding the station operations, coverage area, weekly and daily schedules, association memberships, advertising and broadcasting. The questionnaire also asked managers about the percentage of content in their programming that was internally produced. This variable is informative of the extent of vertical integration and make-or-buy decisions in content production for each station that responded to the questionnaire and it becomes the dependent variable in this study.

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<sup>9</sup>AIMC did not include sporadic and random emission of television content but rather established entities that emit on a regular basis. AIMC also sent questionnaires to all stations in the census, asking questions regarding the stations' schedules, content, coverage areas, and other business-related issues. We do not use this information in this paper. Bayo-Moriones et al. (2012) describe the nature of that data further.

The second source of data is the business activity and population census published by “La Caixa.” This census contains yearly information at the city, province, and region level on population, unemployment rate, number of cars, and other similar variables.<sup>10</sup> The census covers 3,209 cities, all of which at some point had 1,000 inhabitants or more. When we merge both data sets, we lose a few stations that are located in cities of less than 1,000 inhabitants. Of the 3,209 cities, 562, 544, and 592 cities had at least one station in 1995, 1998, and 2001, respectively.

Table 2 provides summary statistics across years and cities. Information in this table shows that on average stations produce in-house 69% of their content and are located in cities receiving broadcast content from 4.4 stations. The average station locates in a city with 148,000 inhabitants. Also, the average station is located in a city where the PP and the PSOE scored similar percentages of votes in the most recent municipal elections. Finally, 79% of the stations responding to the questionnaire are privately owned and 60% of them belong to a network.

[TABLE 2 ABOUT HERE]

Table 3 repeats the exercise in Table 2, breaking the sample by year. This table shows the average number of stations broadcasting into a city increased from census to census, beginning with 3.2 in 1996, up to 3.8 in 1999, and reaching 5.2 in 2002.<sup>11</sup> At the same time, the percentage of in-house content grew from 69% to 72% between 1996 and 1999, and then fell back to just 67% in 2002. Last, the percentage of votes of the PP increased from 1996 to 2002 while the electoral performance of the PSOE decreased from 1996 to 1999 and improved slightly in 2002.

[TABLE 3 ABOUT HERE]

Because the goal of this paper is to study the impact of changes in regulation between 1995 and 2002 on in-house content production due to changes in competition, an understanding of how

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<sup>10</sup>The data did not contain information on population for 1996, which we proxied with population levels of 1998.

<sup>11</sup>These qualitative changes remain unaltered when we consider the number of stations located in the same city, and the number of stations in the area covered by a station. The pairwise correlations between these variables are between 0.87 and 0.99.



market structure changed in that period on a city-by-city basis is useful. For this purpose, Tables 4 and 5 cross-tabulate the number of local stations per city and changes in this number for different years. Table 4 tabulates the number of local stations per city in 1995 and 2001, During the whole period, 2,464 cities started and finished with no stations. Out of 3,209 total cities, 159 cities lost all stations and 183 cities went from no stations to a positive number of stations. Of the rest, 240 cities started and finished with the same positive number of stations, whereas 72 cities saw their number of stations increase and 88 saw it decrease.

[TABLE 4 ABOUT HERE]

Table 5 cross-tabulates changes in the number of stations between census years 1995-1998 and 1998-2001. This table shows the number of local stations remained constant between 1995 and 2001 for 2,629 cities. Only 21 cities saw their number of stations increase in both periods of time, whereas only 6 cities saw their number of stations decrease in both periods. Changes in the number of stations appear to have been relatively more frequent between 1995 and 1998 (14% of cities) than between 1998 and 2001 (8%).

[TABLE 5 ABOUT HERE]

The last source of data that we include in this paper is the electoral outcomes from the May 1991, May 1995 and June 1999 Spanish municipal elections. We obtain these data from the data set “Consulta de Resultados Electorales” of the Subsecretaria de la Direccion General de Politica Interior at Ministerio del Interior in the Spanish Government’s website.<sup>12</sup> These data are important because, as argued in Section 2.2, law enforcement varied with the political color of local government officials. As further evidence, consider Figures 3-6, where we have plotted the percentage of in-house production (Figure 3), number of stations (Figure 4), in-house production by year of entry (Figure 5), and entry (Figure 6) for stations grouped according to the political party ruling the

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<sup>12</sup><http://www.infoelectoral.mir.es/min/>.

city in which each is located. All figures point to a clear difference in the behavior of the variables between PP and non-PP markets, and suggest changes in behavior across time. Stations located in cities ruled by the PP face more entry of competing stations and outsource more content production than stations located elsewhere.

[FIGURES 3-6 ABOUT HERE]

In the next section, we exploit the variation illustrated in Figures 3-6 to analyze the effect of changes in product-market competition on vertical integration. We begin by describing in detail our empirical specifications, and then turn to the results of our estimations, which largely corroborate the story suggested by the above figures.

## 5 Empirical methodology and results

This section describes our empirical approach to causal inference, discusses the potential problems that the analysis may encounter, and presents our results.

### 5.1 OLS regressions with fixed effects

The empirical analysis in this paper aims to recover the causal impact of product-market competition on vertical integration in the Spanish local TV industry. For this purpose, we begin by producing traditional Ordinary Least Squares (OLS) estimates of the following relationship:

$$VI_{ijt} = \alpha_0 + \alpha_1 Comp_{ijt} + \alpha_2 X_{ijt} + \gamma_j + \delta_t + u_{ijt}, \quad (2)$$

where  $VI_{ijt}$  is the percentage of content produced in-house by station  $i$  located in city  $j$  in year  $t$ ;  $Comp_{ijt}$  is the number of stations that broadcast their content into city  $j$  in year  $t$ ;  $X_{ijt}$  are a number of controls and characteristics at the station and city level; and  $\gamma_j$  and  $\delta_t$  are different

market and year fixed effects.

Since this research is mostly interested in recovering  $\alpha_1$ , we focus on two main possible problems that could cause that  $\text{corr}(u_{ijt}, \text{Comp}_{ijt}) \neq 0$  and therefore that the parameter of interest is estimated with a bias. The first possible problem is omitted-variable bias. There may be factors that are year or station specific that are unobservable to the econometrician, and correlated with  $\text{Comp}_{ijt}$ . This means that potentially the error term  $u_{ijt}$  could have a structure such that

$$u_{ijt} = r_{ij} + z_t + e_{ijt},$$

where  $r_{ij}$  are unobservable factors specific to station  $i$  and city  $j$ ,  $z_t$  are unobservable factors specific to year  $t$ , and  $e_{ijt}$  is a normally independently and identically distributed error term. The problem appears when  $r_{ij}$  and  $z_t$  are correlated with  $\text{Comp}_{ijt}$ . In that case, the estimates of  $\alpha_1$  will be inefficient and inconsistent. To address this issue, we use market and year fixed effects to control for the presence of unobserved-but-fixed omitted variables that may bias the estimates of the parameter  $\alpha_1$ .

Table 6 shows OLS estimates of (2). Column 1 contains a simple regression of vertical integration on our competition measure, whereas column 2 adds controls for market size (city population), whether the station belongs to a network and for private ownership. Our measure of competition is number of stations broadcasting into a city, and therefore it does not vary across stations within a city but it varies across cities and years. Columns 3 to 7 then include year and market (province or city) fixed effects. We observe that the coefficient on competition has no robust sign and that it is statistically significant in just one of the specifications. If anything, we show that private stations are less likely to produce their content internally, except when we include city fixed effects in the specifications in columns 5 and 7.

[TABLE 6 ABOUT HERE]

The OLS results, even if uninspiring, are not surprising due to endogeneity. Stations may enter markets for unobservable reasons (to the econometrician) that change idiosyncratically by city and year. Similarly, stations could match themselves with markets that will adjust behavior to environmental changes in ways that benefit them the most. If larger markets are also those with stronger preferences for differentiated content, stations with lower costs of internal content production may self-select into these and produce non-statistically significant estimates. Another potential source of statistical insignificance is measurement error of our competition variable as more stations may not necessarily mean fiercer competition among them. In other words, an increasing number of stations could be a sign of market segmentation and therefore it need not be capturing an increase in the degree of competition among stations. For these reasons, in the next section we exploit two sources of plausible exogenous variation to estimate in this setting the causal impact of competition on vertical integration (percentage of internally produced content) at the station level.

## 5.2 Addressing endogeneity: DiD and 2SLS

The second possible problem with the estimation of a relationship like (2) is the endogeneity of in-house content production and firm entry. More profitable markets that accommodate a larger number of stations may also have a higher taste for specialized content. On the other hand, it could be that larger markets have a lower demand for specialized content since they need to appeal to a large variety of tastes and stations in larger markets are less likely to produce their content regardless of competition.

To address this problem, we use the institutional details described in Section 2 in two ways. First, we exploit the December 1995 law to implement a difference-in-differences (DiD) approach, and compare the change in vertical integration in stations located in cities ruled by the PP to the

change in vertical integration in stations located elsewhere around the time the PSOE law was passed. Next, we claim that the political color of the party ruling a given city is a valid instrument for competition, and use two-stage least squares (2SLS) as our estimation procedure.

### 5.2.1 DiD analysis

Table 7 displays the average percentage of in-house content production in stations located in PP and non-PP cities (PSOE and others), before (1995) and after (1998) the introduction of the PSOE law. We also compute changes in in-house production over time in each type of city, market differences in each period, and the difference-in-differences (using cities run by either the PSOE or other parties). The degree of vertical integration is higher in PSOE markets (and also in other non-PP markets in 1998), and it increases from 1995 to 1998 in all non-PP cities, but it decreases in stations located in cities governed by the PP. The table shows negative difference-in-differences, consistent with our expectation that the reduction in competition (i.e., the enforcement of the law) was more important in non-PP cities.

[TABLE 7 ABOUT HERE]

Now we use regression to check whether our DiD still appears after the inclusion of controls and fixed effects. To implement our DiD regression, we separate PP markets from other markets by means of a dummy variable,  $Over30\%PPVotes_{ijt}$ , that takes value 1 if the PP received at least 30% of votes in city  $j$  in the 1995 municipal election. We use observations from before (1995, from the 1996 census) and after (1998, from the 1999 census) the law was passed. We also build a dummy  $PostLaw_t$  that takes value 1 for 1998 observations and 0 for 1995 observations. In this subsample, the local TV station industry went from no regulation to regulation by law, and therefore we should expect a general decrease in competition (because the law limited the number of stations per city to just two). Enforcement of this law, however, was laxer on cities run by PP officials, and therefore

we expect the restriction to competition (i.e., the increase in entry barriers) to be more important in non-PP cities. The law also banned TV networks and limited private ownership and control; hence we include, as controls, dummies that take value 1 if the station belongs to a network, and if it is privately-owned.

To sum up, we estimate the following relationship:

$$\begin{aligned}
 VI_{ijt} = & \beta_0 + \beta_1 PostLaw_{ijt}^* Over30\%PPVotes_{ijt} + \beta_2 PostLaw_{ijt} \\
 & + \beta_3 Over30\%PPVotes_{ijt} + \alpha_2 X_{ijt} + \gamma_j + \delta_t + u_{ijt}.
 \end{aligned} \tag{3}$$

The causal effect of interest is  $\beta_1$ , the coefficient on the interaction of the PP and post-law dummies. Table 8 shows the results of our estimation of (3). We find a negative coefficient on the interaction  $PostLaw_{ijt}^* Over30\%PPVotes_{ijt}$ , which we ascribe to a negative effect of competition on vertical integration (Proposition 2) – in this case, a restriction of competition leads firms to integrate more. The result is robust to the inclusion of controls and various fixed effects. Remember that, according to our description of the institutional evolution of this industry, the 1995 law should have implied a larger *reduction* in competition in markets not ruled by the PP – this led to increased vertical integration in stations located in these markets relative to stations located in PP markets. Other results in this table show again that privately owned stations are less likely to produce content in-house (except when we include city fixed effects). Stations belonging to a network seem to outsource more content production, though the estimates are not statistically significant. We do not find evidence of a relationship between market size (proxied by population) and the degree of vertical integration.

[TABLE 8 ABOUT HERE]

### 5.2.2 2SLS results

As discussed in Section 2.2, enforcement of the PSOE 1995 law depended strongly on the political color of the local authorities supposed to implement it. The PP, the PSOE, and other Spanish parties (particularly, the CiU in Catalonia) had very different views on how the industry should be regulated. As of 1996, the PP in power began a process of silent liberalization, which implied, among other things, lower barriers to entry of new local TV stations. As we have argued, it seems safe to assume that regulatory developments in the industry (both the 1995 law and the ensuing deregulation) were unrelated to vertical integration decisions, thus making the local electoral results good candidates for instruments of competition. This is our identifying assumption. Table 9, in columns (A), (B), (C), and (D), shows results of different regressions of our competition variable (number of stations broadcasting into a city) on our instruments, i.e., electoral dummies that take value 1 if the PP, the PSOE or the CiU were the political forces with the maximum amount of votes in the previous local election. All coefficients in this first stage have the expected sign and are statistically significant, except for the PP dummy (which is consistent with the fact that nothing much changed in cities ruled by PP before and after the passing of the law as opposed to cities ruled by other parties).

[TABLE 9 ABOUT HERE]

We exploit our instruments to analyze first the period of time after the PP won its first election. We use data from the 1999 and 2002 censuses, and instrument competition with results from the 1995 and 1999 elections (recall Figure 2). Columns 1 and 2 in Table 9 show the second stage. Column 1 contains a simple regression in which the number of stations is the only explanatory variable, whereas in Column 2 we include the full set of controls. Consistent with Proposition 2, increased competition (through a larger number of rivals, induced by lower entry barriers) causes firms to reduce the degree of vertical integration: for every new entrant, stations reduce in-house

production of content by 4.93 percentage points (a 7.1% reduction from the industry average). From a different angle, a one-standard-deviation increase in the average number of firms broadcasting into a city is related to a reduction (increase) of 16.4 percentage points in in-house production (outsourcing) – almost 24% of average vertical integration in our sample. We also find that stations in larger markets appear to outsource less, although the coefficient is small. As before, private stations outsource more than their government-owned counterparts.

Given the proximity of the passing of the 1995 law (December) and the 1996 election (March) won by the PP, it might not be clear whether the PSOE law represented such a strong landmark in practice in this industry. As a robustness check of our results, we run 2SLS regressions with the full sample; i.e., we include data from the 1996 census, using the 1991 election to instrument the competition variable. Columns 3 and 4 of Table 9 show that results are reassuringly similar.

### 5.3 Discussion and Alternative Explanations

In the model presented in Section 3, an increase in competition increases the marginal return on improvements in quality. Given our assumptions, outsourcing increases quality provision and hence our Proposition 2. Unfortunately, our data does not contain information on effort or quality provision associated with outsourcing and therefore we are left with showing the causal impact of changes in competition on outsourcing decisions.<sup>13</sup>

Our main finding is also consistent with Stigler (1951) in that specialization is limited by the extent of the market, which increases with the entry of new firms. However, previous literature has used population as a proxy for market size. We use this variable as a control in our analysis and find a positive relation between city population and vertical integration. This correlation seems to go against this potential alternative explanation.

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<sup>13</sup>We have limited data for audience and ratings for 98 stations in 2002. The cross-sectional variation in this sample does not provide clean correlations between these outcomes and percentages of in-house content production.



Aghion et al. (2006) and McLaren (2000) study how changes in the number of buyers and sellers of inputs affects the sellers outside options and incentives, and they predict also a negative relationship between competition and vertical integration.<sup>14</sup> Unfortunately, we cannot reject or confirm their predictions because we do not observe the behavior of content producers in our data.

Additionally, our results in the paper show that private stations outsource more than government-owned stations. A potential explanation could be that private stations behave differently from others and that this difference in behavior is driving our results. Similarly, the invisible deregulation that took place from 1996 to 2002 allowed entry of stations that were potentially different from incumbents in terms of ownership and network membership. We have examined the behavior (not reported here) of private vs. government-owned stations, as well as entrants vs. incumbents. We find no qualitative differences in behavior among these groups, that is, all seem to respond to changes in competition in the same way by reducing the percentage of in-house content production.

Finally, we check whether changes in competition affect other outcomes at the station level as firms may adjust different margins at the same time. Given our data, we use the same methodology of Tables 8 and 9 to assess the impact of competition on the number of weekly on-air hours per station. We report the results in Table 10 and find that an increase in competition is associated with a robust increase in the number of on-air hours per week.

[TABLE 10 ABOUT HERE]

Results in Table 10 are consistent with the existence of complementarities: more outsourcing increases the marginal return of the total number of on-air hours in a station. This complementarity may arise from two potential sources that we have confirmed through interviews with industry managers and anecdotal evidence. On the one hand, syndication lowers the average cost to all stations purchasing syndicated content. On the other hand, stations may acquire content in bundles

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<sup>14</sup>The model in Aghion et al. (2006) predicts a negative relationship between competition and integration when the supplier's effort is relatively important.

which by definition lowers the marginal costs of content. In both cases, we would expect outsourcing and the number of weekly on-air hours moving in the same direction in response to an increase in product-market competition.

## 6 Conclusions

Ever since Coase (1937) posed the Big Question – why transactions are sometimes carried out in markets, and other times within firms? – the issue of what determines firm boundaries (what has been traditionally referred to as “the theory of the firm”) has concentrated the attention of many scholars and businessmen alike – see Holmstrom and Tirole (1989), and Gibbons (2005) for a survey and discussion of the main theories, and Lafontaine and Slade (2007) for empirical evidence. In this paper we focus on a determinant of make-or-buy decisions that has, until recently, been largely overlooked both in theoretical and empirical work: product-market competition.

To study the relationship between product-market competition and vertical integration, we develop a simple model of make-or-buy choices in market equilibrium that predicts a negative effect of competition on integration, and then exploit plausibly exogenous variation in competition across markets and years to identify this negative causal effect in station-level data from the Spanish local TV industry between 1995 and 2002. This period is particularly attractive to test our predictions because regulation was introduced at the end of 1995 that arguably raised entry costs. Additionally, national election results in 1996 and 2000 generated variation in regulation enforcement according to the political color of the ruling party at the municipal level, which is arguably orthogonal to a station’s decisions on content production.

To the best of our knowledge, this is the first paper to document a causal effect of competition on vertical integration: we find that more competition (through reduced entry barriers and a larger number of rival firms) leads firms to reduce vertical integration, as predicted by our model.

Additional results show that stations located in larger markets are on average more likely to produce their content in-house than stations in smaller markets, and that private stations outsource more than their public counterparts. Finally, we provide evidence of a complementarity between outsourcing and broadcast time at the station level.

We have linked changes in regulation to changes in market competition, and studied how the latter impacted organizational structure. Although not addressed in this paper, competition-induced organizational change has been recently associated with firm-level productivity. Therefore, understanding product-market competition as a driver of integration decisions becomes important when thinking about the productivity consequences of government interventions in markets (Mullainathan and Scharfstein, 2001; Syverson, 2011). How our results extend to other industries, however, must await future research.

## Appendix

### Proof of Proposition 1

Each consumer derives gross surplus  $v + q_i$  when consuming the content broadcasted by firm  $i$ . We assume  $v$  is sufficiently large that all consumers turn on their TV sets – i.e., the market is always covered. Formally:

ASSUMPTION 1:  $v > \frac{1}{4}$ .<sup>15</sup>

At date 5, all firms have set their qualities. Suppose firm  $i$  has quality  $q_i$ . A consumer located at a distance  $z \in (0, \frac{1}{n})$  from firm  $i$  is indifferent between “purchasing” from firms  $i$  and  $i + 1$  if

$$v + q_i - z^2 = v + q_{i+1} - \left(\frac{1}{n} - z\right)^2.$$

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<sup>15</sup>Notice that this assumption implies that all consumers would watch TV even if quality were equal to zero and there were only one firm serving the market, and is stronger than necessary. It would suffice that  $v + q_0 > \frac{1}{4n^2}$  holds for our results to go through.

Solving for  $z$ ,

$$z = \frac{1}{2n} + \frac{q_i - q_{i+1}}{2}n.$$

Analogously, for a consumer located at  $z' \in (0, \frac{1}{n})$  from firm  $i$  between firms  $i$  and  $i - 1$ , we can compute

$$z' = \frac{1}{2n} + \frac{q_i - q_{i-1}}{2}.$$

The total demand faced by firm  $i$  is just  $m$  times  $z + z'$ , or

$$y_i = D_i(q_i, q_{-i}) = m\left(\frac{1}{n} + \frac{n}{2} [(q_i - q_{i+1}) + (q_i - q_{i-1})]\right).$$

If firm  $i$  expects its rivals to choose quality  $E(q)$ , its expected (gross) profits  $\pi_i$  are given by

$$\pi_i = pm \left[ \frac{1}{n} + n(q_i - E(q)) \right],$$

which completes the proof. QED.

## Proof of Proposition 2

At date 4 the parties bargain over the modifications to the basic content. We begin by identifying the parties' disagreement payoffs under each governance structure. Under vertical integration, since the principal owns the content, she can implement both innovations. Disagreement payoffs are

$$\begin{aligned} \text{Principal:} & \quad pm \left[ \frac{1}{n} + n(q_0 - b(e) + \beta(i) - E(q)) \right] - P_0 + c(e) \\ \text{Agent:} & \quad P_0 - c_0 - e - i \end{aligned}$$

Under contracting out, the content producer does not need the approval of the TV station to

implement changes to the basic content. In the absence of renegotiation, no quality innovation will take place (since the agent will not be paid for it), but it is in the content producer's interest to implement a cost reduction. Hence, disagreement payoffs in this case are

$$\begin{aligned} \text{Principal:} \quad & pm \left[ \frac{1}{n} + n(q_0 - b(e) - E(q)) \right] - P_0; \\ \text{Agent:} \quad & P_0 - c_0 + c(e) - e - i. \end{aligned}$$

Under in-house provision, there are clearly no gains from renegotiation, which hence does not take place. Anticipating this, the agent chooses to exert no effort; i.e.,  $e^{VI} = i^{VI} = 0$ . The total surplus under integration is

$$S^{VI} = pm \left[ \frac{1}{n} + n(q_0 - E(q)) \right] - c_0.$$

Under outsourcing, the gains from renegotiation concern the quality innovation, and are given by  $pmn\beta(i)$ , which is split 50:50 through Nash bargaining. The parties' payoffs are

$$\begin{aligned} U_P^{NI} &= pm \left[ \frac{1}{n} + n(q_0 - b(e) - E(q)) \right] - P_0 + \frac{pmn}{2}\beta(i) \\ &= pm \left[ \frac{1}{n} + n \left( q_0 - b(e) + \frac{\beta(i)}{2} - E(q) \right) \right] - P_0 \\ U_A^{NI} &= P_0 - c_0 + c(e) - e - i + \frac{pmn}{2}\beta(i) \end{aligned}$$

The agent's problem is to maximize  $U_A^{NI}$  through his effort choices. The first-order conditions from that problem are

$$\begin{aligned} c'(e^{NI}) &= 1 \\ \frac{pmn}{2}\beta'(i^{NI}) &= 1 \end{aligned}$$

Note then that  $e^{NI} > e^{VI}$  and  $i^{NI} > i^{VI}$ . This basically states that outsourcing content production is cheaper, but not necessarily of higher quality (because of quality-damaging cost reductions), than in-house production. When comparing efforts to the first-best solution, it is easy to show that  $e^{NI} > e^{FB}$  and  $i^{NI} < i^{FB}$ . Under non-integration, the content producer engages in too much cost reduction (because he neglects the negative impact on quality) and still invests too little in quality improvements (because the benefits must be shared with the TV station through bargaining).

When examining the make-or-buy decision in our model, we must place upper bounds on realized quality to obtain a symmetric interior equilibrium that ensures that each firm has only two effective (closest) competitors. Formally:

$$\text{ASSUMPTION 2: } \max \{q_i\} - q_0 \leq \frac{1}{\bar{n}^2}.$$

Note that  $\bar{n} = \frac{pm}{f}$  is the maximum equilibrium number of firms, and is obtained from the zero profit condition  $\frac{pm}{n} - f = 0$ , where the first term on the left-hand side is each firm's maximum expected profit in a symmetric equilibrium. The assumption ensures that it is not profitable for firm  $i$  to sell to customers located further from it than its immediate neighbors, and that the quality of the modified good cannot be much better than contractible quality.

The total surplus from the relationship under non-integration is

$$S^{NI} = pm \left[ \frac{1}{n} + n (q_0 - b(e^{NI}) + \beta(i^{NI}) - E(q)) \right] - c_0 + c(e^{NI}) - e^{NI} - i^{NI}.$$

Let  $\Delta \equiv S^{NI} - S^{VI}$ . Then,

$$\Delta = pmn (-b(e^{NI}) + \beta(i^{NI})) + c(e^{NI}) - e^{NI} - i^{NI},$$

where the value of  $\Delta$  is independent of rivals' choices because all firms are symmetric in this

model and therefore the equilibrium in organizational choices will also be symmetric, with all firms choosing either outsourcing or in-house production. Given this expression, a local TV station contracts out the provision of content if and only if  $\Delta > 0$ .

Doing standard comparative statics with parameters  $n$ , we have

$$\frac{\partial \Delta}{\partial n} = pm(-b(e^{NI}) + \beta(i^{NI})) + (pmn\beta'(i^{NI}) - 1) \frac{\partial i^{NI}}{\partial n},$$

which could, in principle, be of either sign.

A sufficient condition to have unambiguous predictions for both effects is  $-b(e^{NI}) + \beta(i^{NI}) \geq 0$ , i.e., that the net effect of both effort types on quality is nonnegative. Under this condition, it is easy to show that  $\frac{\partial \Delta}{\partial n} > 0$ . In words, with a given (exogenous) market structure, stronger competition (through a larger number of rivals) leads to increased outsourcing of content production. Since the number of firms is likely to depend on market size  $m$  and entry costs  $f$ , we analyze entry decisions.

If we allow for free entry, firms enter the market until profits are driven down to the fixed cost of entry,  $f$ . The equilibrium number of firms in the market is thus given by a zero-profit condition:

$$\max \{S^{NI}, S^{VI}\} - f = 0,$$

which reflects the fact that each firm can optimally choose its organizational form after entering the market (hence the “max”; see Marin and Verdier, 2008).<sup>16</sup>

In a symmetric equilibrium in which local TV stations opt for in-house production of content (a  $VI$ -equilibrium), the equilibrium number of firms,  $n^{VI}$ , is the solution to

$$S^{VI} - f = 0,$$

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<sup>16</sup>For simplicity, we treat  $n$  as a continuous variable.

or

$$pm \left[ \frac{1}{n^{VI}} + n^{VI} (q_0 - E(q)) \right] - c_0 - f = 0.$$

Since  $E(q) = q_0$  under vertical integration, we have

$$n^{VI} = \frac{pm}{c_0 + f}.$$

Clearly,

$$\frac{\partial n^{VI}}{\partial f} < 0.$$

This means that in a market with a symmetric integration equilibrium an increase in the fixed cost of entry would decrease the number of firms in equilibrium.

Similarly, in a symmetric equilibrium with firms choosing to contract out the production of content (a  $NI$ -equilibrium), the zero-profit condition is  $S^{VI} - f = 0$ , all firms have the same quality, and the equilibrium number of firms,  $n^{NI}$ , is given by

$$\frac{pm}{n} - c_0 + c(e^{NI}) - e^{NI} - i^{NI} - f = 0. \quad (4)$$

Applying the implicit function theorem to (4), it is straightforward to show that

$$\frac{\partial n^{NI}}{\partial f} < 0.$$

With an endogenous market structure, stronger competition (through reduced entry barriers) leads



to increased outsourcing of content production:

$$\begin{aligned}\frac{d\Delta}{df}\Big|_{VI} &= \frac{\partial\Delta}{\partial n} \frac{\partial n^{VI}}{\partial f} < 0; \\ \frac{d\Delta}{df}\Big|_{NI} &= \frac{\partial\Delta}{\partial n} \frac{\partial n^{NI}}{\partial f} < 0.\end{aligned}$$

QED.

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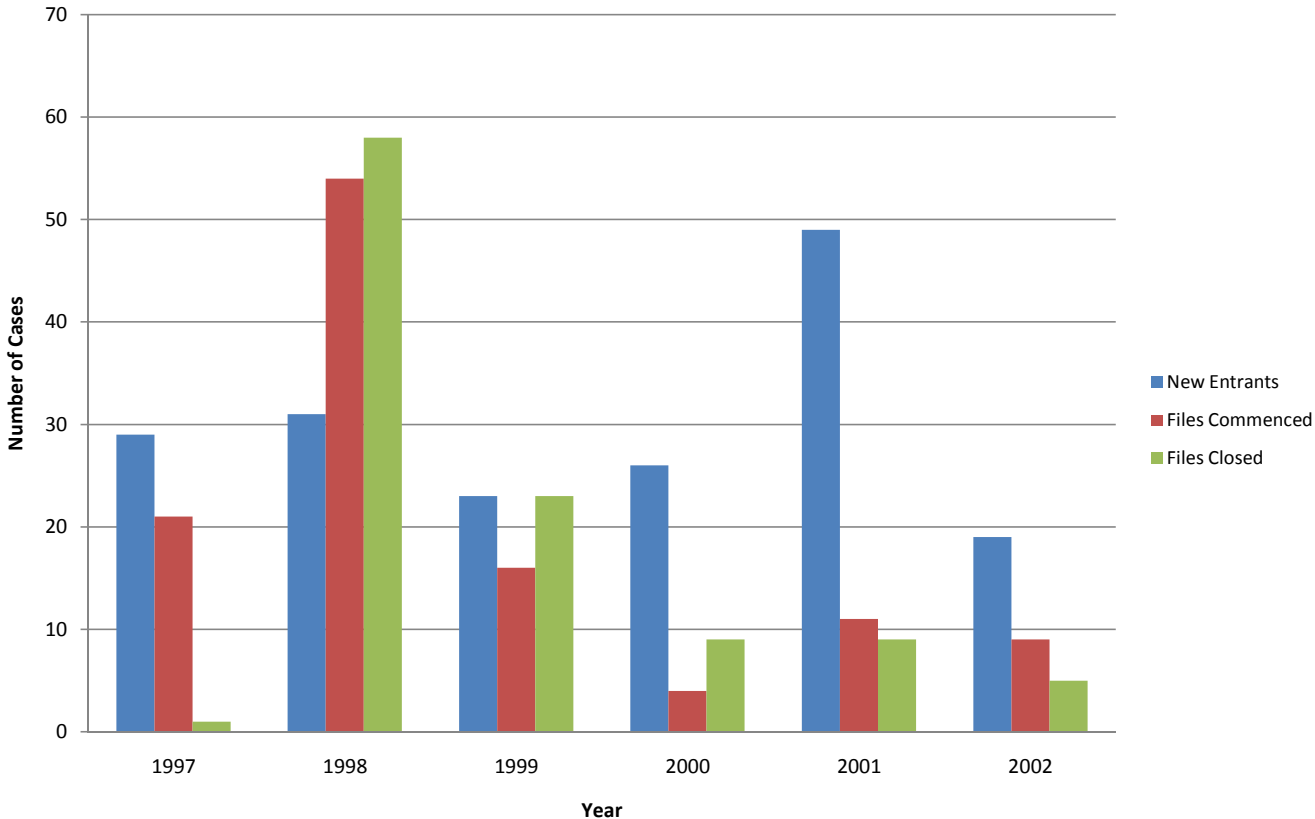
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**Figure 1. Station Entry vs. Regulatory Activity 1997 to 2002**





**Table 1. Violations by Year and PP Markets**

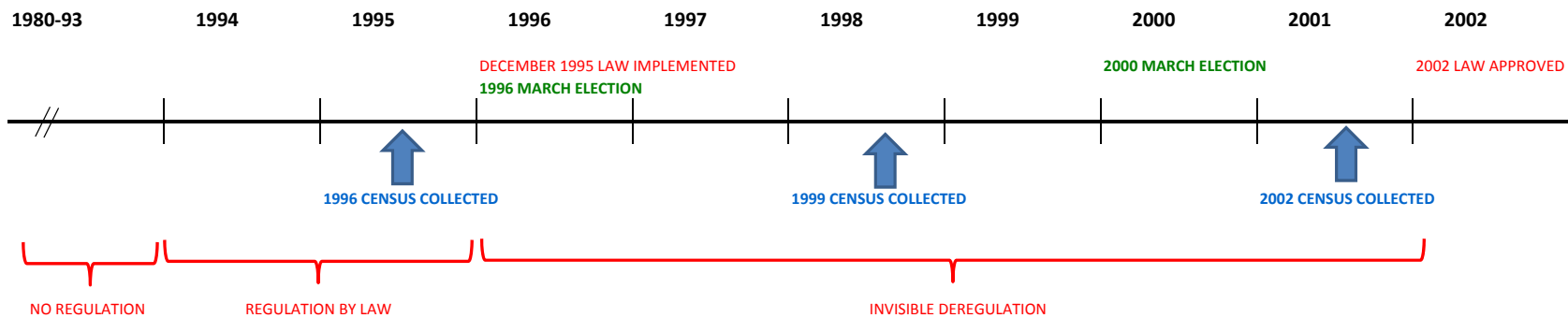
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<b>% Violations per Year</b>	<b>Cities Ruled by PP</b>	<b>Cities Ruled by Others Not PP</b>
<b>1995</b>	12.3%	10.0%
<b>1998</b>	11.6%	3.9%
<b>2001</b>	21.5%	5.1%

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Note: A violation here is more than two TV stations per city. These are percentages conditional on a city having at least one station.

Figure 2. Timing of Elections, Regulation Changes and Data Collection



**Table 2. Summary Statistics**

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<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std Dev</b>	<b>Min</b>	<b>Max</b>
<b>% Content In-house</b>	1187	0.69	0.30	0	1
<b>No Stations Comp</b>	1187	4.42	3.32	1	17
<b>Population (000s)</b>	1187	148.36	428.96	0.22	3016.79
<b>Belongs to Network?</b>	1187	0.60	0.49	0	1
<b>Private?</b>	1187	0.79	0.41	0	1
<b>PP Vote Share</b>	1187	0.32	0.18	0	0.96
<b>PSOE Vote Share</b>	1187	0.33	0.14	0	0.97

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This table shows summary statistics of all variables used in this paper and across years.

**Table 3. Summary Statistics per Year**

	<b>1996</b>	<b>1999</b>	<b>2002</b>
<b>% Content In-house</b>	0.69 (0.27)	0.72 (0.29)	0.67 (0.31)
<b>No Stations Comp</b>	3.23 (3.30)	3.77 (2.81)	5.20 (3.47)
<b>Population (000s)</b>	180.33 (476.33)	133.70 (431.01)	150.12 (414.02)
<b>Belongs to Network?</b>	0.73 (0.45)	0.53 (0.50)	0.61 (0.49)
<b>Private?</b>	0.80 (0.40)	0.78 (0.42)	0.79 (0.41)
<b>PP Vote Share</b>	0.24 (0.15)	0.32 (0.17)	0.34 (0.18)
<b>PSOE Vote Share</b>	0.38 (0.14)	0.31 (0.13)	0.34 (0.15)
<b>No Obs</b>	162	425	600

Note: This table provides year means (top) and standard deviations (bottom, in brackets).

**Table 4. Cross-Tabulation of No Stations per City for Years 1995 and 2001**

No Stations per City Year 1995	No Stations per City Year 2001													Total
	0	1	2	3	4	5	6	7	8	10	11	13	16	
0	2,464	167	14	1	1	0	0	0	0	0	0	0	0	2,647
1	147	213	33	8	3	3	0	0	0	0	0	0	0	407
2	8	56	17	9	5	3	0	0	0	0	0	0	0	98
3	4	6	14	7	0	2	0	0	0	0	0	0	0	33
4	0	1	3	2	1	0	0	0	1	0	1	0	0	9
5	0	0	2	1	0	0	0	0	0	0	0	0	0	3
6	0	0	0	1	0	0	2	1	0	0	0	0	0	4
7	0	0	0	0	0	0	1	0	0	1	0	0	0	2
8	0	0	0	0	0	1	0	0	0	0	0	0	0	1
9	0	0	0	0	0	1	0	0	0	0	0	1	0	2
13	0	0	0	0	0	0	1	0	0	0	0	0	0	1
15	0	0	0	0	0	0	0	0	0	0	0	0	1	1
17	0	0	0	0	1	0	0	0	0	0	0	0	0	1
<b>Total</b>	2,623	443	83	29	11	10	4	1	1	1	1	1	1	3,209

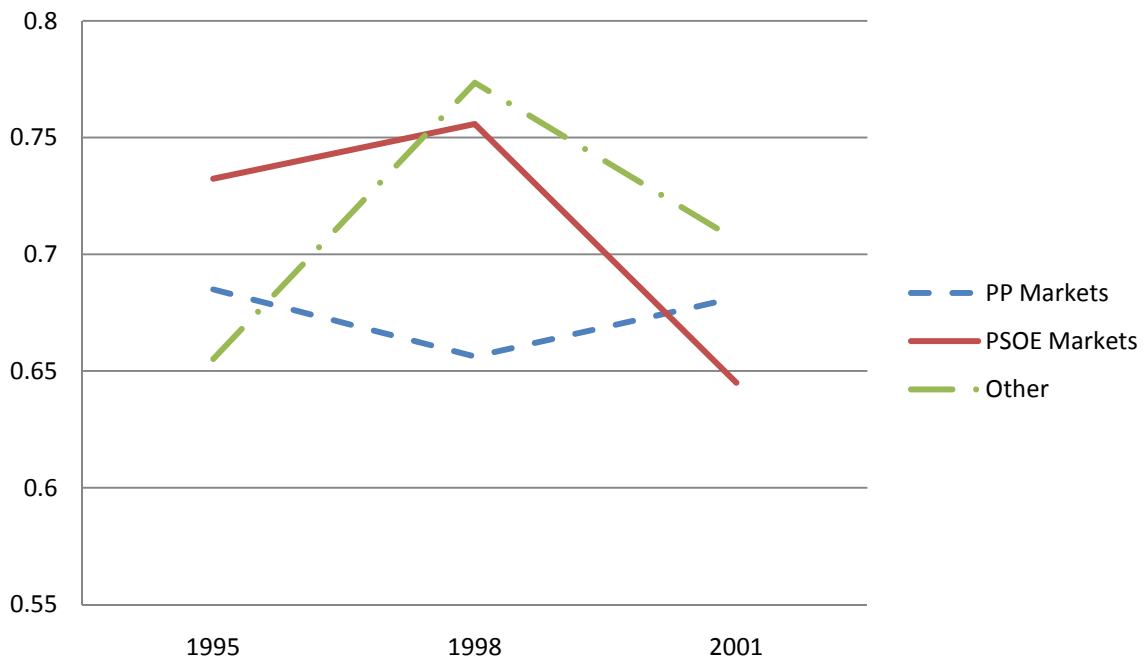
Note: This table shows results of cross-tabulating the number of stations per city in 1995 with the number of stations per city in 2001.

**Table 5. Cross-Tabulation of Changes in No Stations per City between 1995-1998 and 1998-2001**

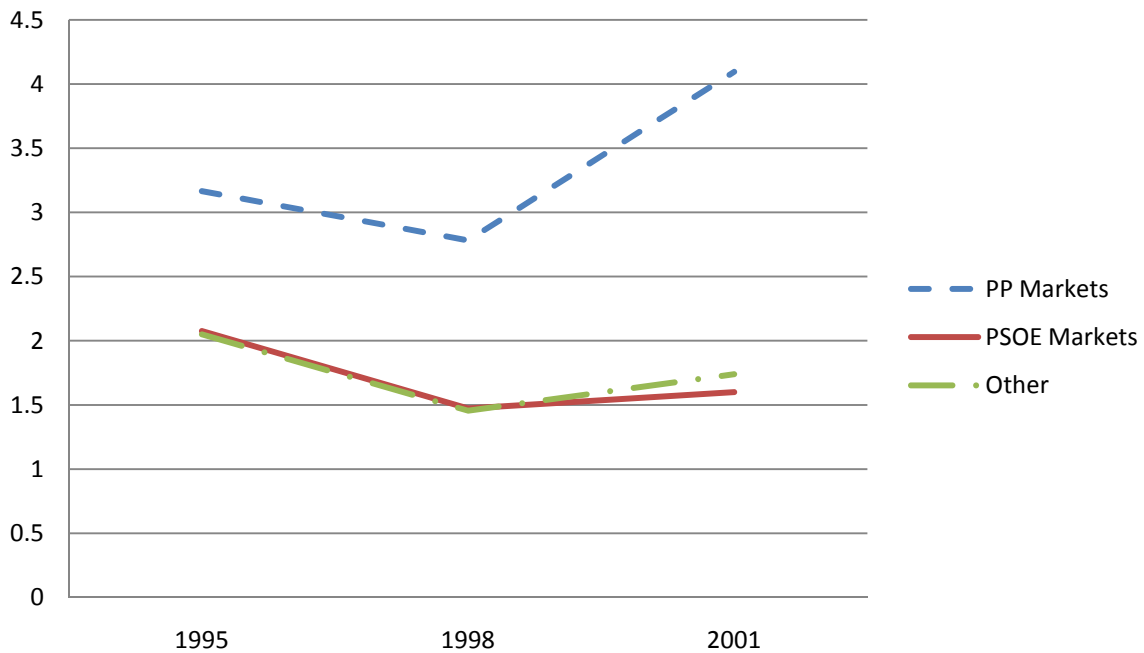
		Change in No Stations 1998-2001									
Change in No Stations 1995-1998		-3	-2	-1	0	1	2	3	4	8	Total
-13		0	0	0	1	0	0	0	0	0	1
-7		0	0	0	1	0	0	0	0	0	1
-6		0	0	0	0	0	1	0	0	0	1
-5		0	0	0	0	0	0	0	0	1	1
-4		0	0	0	0	3	0	0	0	0	3
-3		0	0	0	3	2	1	0	0	0	6
-2		0	0	2	12	7	5	2	1	0	29
-1		0	1	3	175	35	8	1	0	1	224
0		0	1	36	2,629	82	7	2	1	0	2,758
1		0	0	33	115	13	1	2	0	0	164
2		1	2	4	7	2	1	0	0	0	17
3		0	0	0	2	2	0	0	0	0	4
<b>Total</b>		1	4	78	2,945	146	24	7	2	2	3,209

Note: This table shows results of cross-tabulating the changes in number of stations per city between censuses 1995-1998 and censuses 1998-2001.

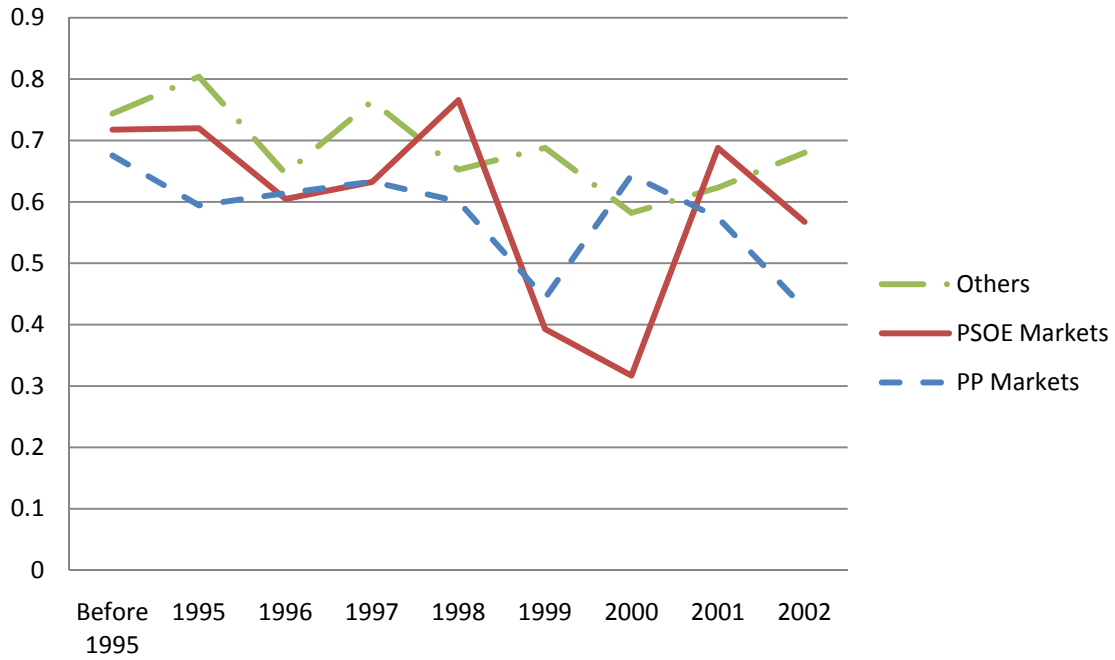
### Figure 3: Vertical Integration



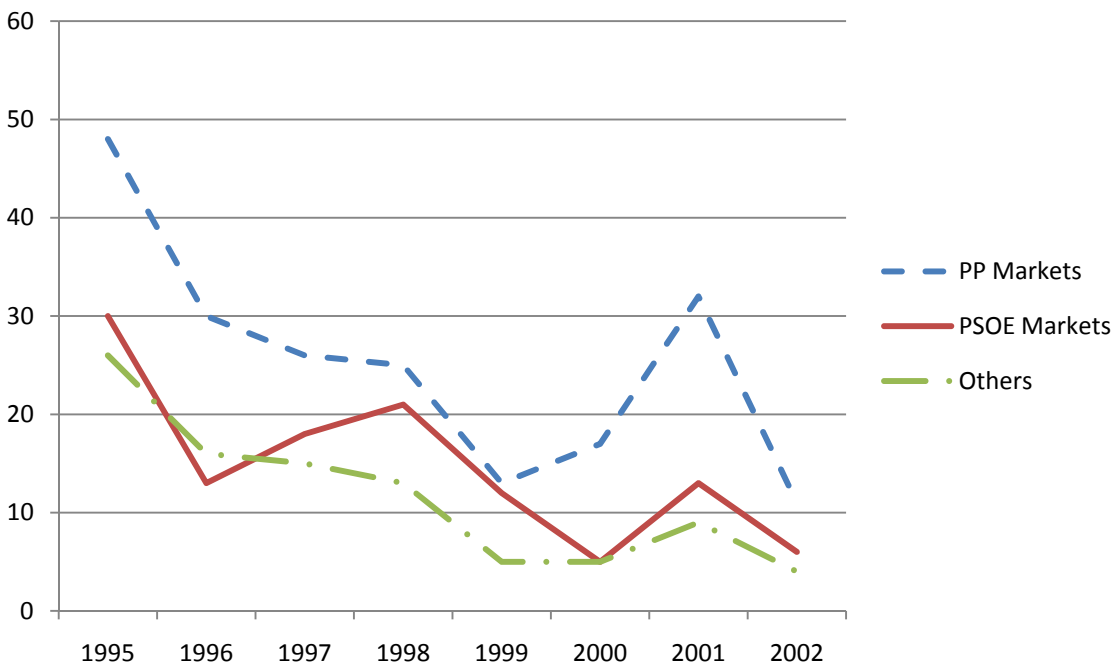
### Figure 4: Number of Stations



**Figure 5: Vertical Integration by Year of Entry**



**Figure 6. Entry by Year**





**Table 6. OLS Regressions of % Content In-House on the Number of Stations Broadcasting into a City**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Dep Var:</b>	<b>% Content In-house</b>						
<b>No Stations Comp</b>	-0.0019 (0.0030)	-0.0004 (0.0038)	0.0017 (0.0042)	0.0051 (0.0044)	0.0042 (0.0053)	0.0090* (0.0049)	0.0083 (0.0061)
<b>Population (000s)</b>		0.00002 (0.00002)	0.00001 (0.00003)	-0.00001 (0.00003)	0.0003 (0.0007)	-0.00002 (0.00003)	0.0005 (0.0007)
<b>Belongs to Network?</b>		-0.0154 (0.0179)	-0.0111 (0.0181)	0.0007 (0.0191)	0.0142 (0.0303)	0.0050 (0.0192)	0.0167 (0.0304)
<b>Private?</b>		-0.1611*** (0.0187)	-0.1633*** (0.0187)	-0.1171*** (0.0186)	-0.0574 (0.0390)	-0.1204*** (0.0186)	-0.0598 (0.0389)
<b>Constant</b>	0.7009*** (0.0154)	0.8277*** (0.0211)	0.8188*** (0.0221)	0.7630*** (0.0238)	0.6674*** (0.1085)	0.7596*** (0.0288)	0.6374*** (0.1076)
<b>Year FE</b>	No	No	Yes	No	No	Yes	Yes
<b>Province FE</b>	No	No	No	Yes	No	Yes	No
<b>City FE</b>	No	No	No	No	Yes	No	Yes
<b>Observations</b>	1,187	1,187	1,187	1,187	1,187	1,187	1,187
<b>R-squared</b>	0.04%	5.21%	5.73%	17.27%	60.51%	17.78%	60.59%

Robust standard errors in parentheses clustered at the city/year level.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 7: Average Percentage of In-House Production  
Before and After the 1995 Law**

Variable	PP	Other	Difference PP-Other
% In-House before (1995 data, all observations)	0.6776	0.7027	-0.0251
% In-House after (1998 data, all observations)	0.6580	0.7668	-0.1088
Change in mean % In- House	-0.0196	0.0641	<b>-0.0837</b>

Note: We compute averages of % in-house production in 1995 and 1998 using 1995 municipal elections to define each city ruling party.

**Table 8. Diff-in-Diff for 1996 to 1999 with Various Fixed Effects**

	(1)	(2)	(3)	(4)
<b>Var:</b>	<b>% Content In-house</b>			
<b>Post Law?*</b> Over 30% PP?	-0.0988* (0.0516)	-0.0950* (0.0498)	-0.1142** (0.0471)	-0.1272** (0.0644)
<b>Over 30% PP Votes?</b>	-0.0155 (0.0431)	0.0057 (0.0417)	0.0647 (0.0464)	
<b>Post Law?</b>	0.0846** (0.0375)	0.0716* (0.0367)	0.0807** (0.0348)	0.0816* (0.0482)
<b>Population (000s)</b>		0.000003 (0.00003)	-0.00001 (0.00003)	-0.0020 (0.0047)
<b>Belongs to Network?</b>		-0.0396 (0.0245)	-0.0210 (0.0261)	-0.0685 (0.0606)
<b>Private?</b>		-0.1312*** (0.0264)	-0.0930*** (0.0251)	-0.0447 (0.0541)
<b>Constant</b>	0.6999*** (0.0320)	0.8216*** (0.0375)	0.7510*** (0.0393)	1.06971441 (0.6788)
<b>Province FE</b>	No	No	Yes	No
<b>City FE</b>	No	No	No	Yes
<b>Observations</b>	587	587	587	587
<b>R-squared</b>	3.15%	7.44%	25.82%	72.63%

Note: Diff-in-Diff regressions with observations from 1996 and 1999, before and after regulation change. Robust standard errors in parentheses clustered by town and year. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 9. 2SLS Results for % Content In-House with 1999-2002 and the Whole Data Set Period**

	(A)	(1)	(B)	(2)	(C)	(3)	(D)	(4)
Sample	1999-2002				1996-1999-2002			
	1st Stage	2SLS	1st Stage	2SLS	1st Stage	2SLS	1st Stage	2SLS
Dep Var:	No Stations	% In-House	No Stations	% In-House	No Stations	% In-House	No Stations	% In-House
<b>No Stations Comp</b>		-0.0426*** (0.0162)		-0.0493* (0.0265)		-0.0412*** (0.0157)		-0.0547* (0.0289)
<b>Population (000s)</b>			0.0043*** (0.0002)	0.0002* (0.0001)			0.0044*** (0.0002)	0.0003** (0.0001)
<b>Belongs to Network?</b>			-0.3966** (0.1839)	-0.0310 (0.0249)			-0.4539*** (0.1714)	-0.0414 (0.0256)
<b>Private?</b>			0.6887*** (0.1989)	-0.1145*** (0.0331)			0.5606*** (0.1840)	-0.1198*** (0.0306)
<b>PP Max Votes?</b>	0.8135*** (0.2987)		-0.1336 (0.2625)		0.9488*** (0.2794)		-0.0183 (0.2432)	
<b>PSOE Max Votes?</b>	-0.6565** (0.2687)		-0.6866*** (0.2601)		-0.4883** (0.2484)		-0.5501** (0.2373)	
<b>CiU Max Votes?</b>	-1.7464*** (0.2879)		-1.3589*** (0.2839)		-1.5328*** (0.2601)		-1.1490*** (0.2577)	
<b>Constant</b>	4.5568*** (0.2349)	0.8888*** (0.0698)	4.0399*** (0.2695)	0.9957*** (0.0949)	4.2864*** (0.2135)	0.8748*** (0.0652)	3.8641*** (0.2532)	1.0145*** (0.1011)
<b>Observations</b>	1,025	1,025	1,025	1,025	1,187	1,187	1,187	1,187
<b>R-squared</b>	5.57%		35.19%		5.21%		36.73%	
<b>F Excl Instr</b>	17.23		9.36		17.91		8.88	

Note: Clustered standard errors in parentheses at the city and year level. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Columns (A), (B), (C) and (D) are first-stage regressions of (1), (2), (3) and (4) respectively. Instrumental variables are dummies for whether PP, PSOE or CiU were the political forces with the maximum amount of votes in the 1991 election (for census year 1996), the 1995 election (for census year 1999), and the 1999 election (for census year 2002).

**Table 10. DiD and 2SLS Results for Weekly Hours on Air per Station**

	(1)	(A)	(2)	(B)	(3)
Sample	1996-1999	1999-2002		1996-1999-2002	
	DiD	1st Stage	2SLS	1st Stage	2SLS
Dep Var:	Weekly Hours	No Stations	Weekly Hours	No Stations	Weekly Hours
<b>Post Law?*Over 30% PP?</b>	31.3795** (12.3314)				
<b>Post Law?</b>	-6.4337 (10.1226)				
<b>No Stations Comp</b>			21.7768*** (7.3902)		26.3888*** (8.7042)
<b>Population (000s)</b>	-0.3673 (1.3456)	0.0042*** (0.0003)	-0.0697** (0.0324)	0.0043*** (0.0003)	-0.0978** (0.0397)
<b>Belongs to Network?</b>	-4.3637 (11.8787)	-0.5336** (0.2289)	18.9586*** (6.9652)	-0.6032*** (0.2099)	20.1971** (8.0360)
<b>Private?</b>	-2.2984 (20.6591)	0.7555*** (0.2378)	24.1263** (9.8200)	0.6189*** (0.2151)	23.6696** (9.6887)
<b>PP Max Votes?</b>		-0.0441 (0.3547)		0.0495 (0.3115)	
<b>PSOE Max Votes?</b>		-0.5823* (0.3323)		-0.4682 (0.2888)	
<b>CiU Max Votes?</b>		-1.4929*** (0.3462)		-1.2513*** (0.3039)	
<b>Constant</b>	138.9457 (216.8400)	4.0568*** (0.3360)	-18.2128 (26.3736)	3.9084*** (0.3077)	-34.4329 (30.5519)
<b>Fixed Effects</b>	City	No	No	No	No
<b>Observations</b>	518	916	916	1,067	1,067
<b>R-squared</b>	77.07%	35.67%		37.41%	
<b>F Excl Instr</b>		10.04		9.29	

Note: Clustered standard errors in parentheses at the city and year level. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Column (1) is DiD regression with Weekly Hours as dependent variable.

Columns (A) and (B) are first-stage regressions of (2) and (3) respectively. Instrumental variables are dummies for whether PP, PSOE or CiU were the political forces with the maximum amount of votes in the 1991 election (for census year 1996), the 1995 election (for census year 1999) and the 1999 election (for census year 2002).