Does Regulation Drive Competition? Evidence from the Spanish Local TV Industry*

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Abstract

Although we have many tools to understand the effect of regulation on competition, we know little about the importance of enforcement in explaining the impact of regulation. For this purpose, this paper uses data from Spanish local television industry in Spain from 1995 through 2001, which provide an unique opportunity for examining how competition changes with the introduction of regulation and a posterior liberalization. During this period, the television industry transitioned from a state of alegality (no regulation in place) to being highly regulated and finally to being deregulated. Using a firm entry model from Bresnahan and Reiss (1990, 1991), we estimate local TV station entry thresholds by number of entrants across years. We decompose the ratio into the fixed costs and variable profits, and find both an increase in the fixed-costs ratios and decrease in the variable-profit ratios drive the departure in the entry threshold from the one in other years. We find the model parameters are informative about the nature of the regulation and how strongly the government enforces the regulation.

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1 Introduction

The role of market regulation has generated much attention in Economics.[1] Because regulation will ultimately affect welfare, correctly interpreting and measuring the impact that regulation has on market outcomes is important. Focusing on the enforcement of regulation is equally important because government may not enforce the regulation to the degree it is formally announced. Even the legislation of market regulation that is clearly stated and understandable to industry participants does not guarantee that the government will literally interpret and enforce regulation. Rather, several factors can prevent the government from implementing the regulation.[2]

Although we have many tools to understand the effect of regulation on competition, we know little about the importance of enforcement in explaining the impact of regulation in an industry, in part because the implementations often are not observable. As a result, most of the evidence on the influences of politics on the implementation of regulation is anecdotal. The goal of this paper is then to document and infer from data and an entry model the subtle interactions between regulation, its implementation, and market entry.

The data from the Spanish local television industry from 1995 through 2001 provide a unique opportunity to examine how competition changes with the introduction of regulation and a posterior liberalization. Two features of the data are worth mentioning in this regard. First, the industry went through several different regulation statuses within a relatively short period of time. For instance, up to 1995, Spanish local TV stations were alegal. Alegal status meant the law did not recognize or protect them. Therefore, their activities were neither legal nor illegal. This alegality came to an end when the Spanish parliament approved the first law of Spanish local TV in late 1995 and implemented it in 1996. Later, this law was reformed and the industry formally liberalized in 2002. Second, we observe changes in ruling political parties during those data years, which anecdotes claim affected how the government enforced the regulation. When the right-winged Partido Popular (PP hereafter) obtained power in 2000, its perspective of the 1995 law was opposite of that of the left-winged PSOE party: PP believed the Spanish local television industry should be liberalized, and it began a process of "silent" deregulation.[3]

[1] See Armstrong and Vickers (1993) and Vickers (1995) as examples of theoretical literature that provides case-specific predictions about the relation between regulation and competition.

[2] Some examples are political connections to ruling parties, corruption within a government, exogenous shocks on the budget, and so on.

[3] Scholars have called this deregulation process "silent" because formal deregulation did not occur until December 2002.

This paper estimates an empirical entry model to investigate the changes in how stations compete within the industry across years in response to changes in the regulation status. We use the framework from Bresnahan and Reiss (1990, 1991), because it allows us to estimate the entry model with mostly publicly available data. We estimate the model for all three years in our sample to compare how these thresholds change from a situation in which no regulation was in place to a conservative regulation and its posterior liberalization.

Our findings suggest that in 1998, when the Spanish local TV industry was heavily regulated, we observe an increase in the entry threshold for any number of firms relative to the thresholds in 1995 and 2001. We investigate the sources of this changes in entry threshold in 1998 by decomposing the ratio into the fixed costs and variable profits. We find that in 1998 and 2001, the ratio of fixed costs of the second entrant relative to the fixed costs of the first entrant is higher than the ratio in 1995, and that this ratio stays constant across years beyond the second entrant. This empirical pattern is consistent with the nature of the regulation status across years: even after the deregulation period since 2000, the policy states no more than two stations should be present in principle. Meanwhile, we observe downward and upward changes in the variable-profits ratios in 1998 and 2001, respectively. These shifts in variable-profit ratios are consistent with the introduction of the regulation in the 1995 law and deregulations since 2000 on the stations' activities, such as advertising, network formations, and ownership patterns. Overall, we find the model parameters are informative about the nature of the regulation and how the change in the regulation and implementation status has impacted the market entry.

This paper mainly contributes to the empirical literature that examines the relation between regulation and competition in various industries. Some examples of work by others are Joskow (1973) and Samprone (1979) in the property and liability insurance industry, Klein (1990) in the railroad industry, or Joskow (1980) and Fanara and Greenberg (1985) in the health industry. Some examples of work studying the effect of regulation on firm entry include Griffith and Harmgart (2008), Schaumans and Verboven (2008), Cohen et al. (2010), Suzuki (2010), and Nishida (2012).[4]

To the best of our knowledge, the closest papers in topic and goal are Danzon and Chao (2000) and Schaumans and Verboven (2008). Danzon and Chao (2000) find that regulation undermines competition across generic competitors in the pharmaceutical industry by examining price competition in this industry in seven different countries with different types of regulation. Our paper differs from theirs in that we estimate entry thresholds in the Spanish local TV industry in three

[4]For a complete reference on this topic, see Ferrari and Verboben (2010).

different scenarios that differ in regulation status, and also in that we investigate how changes in regulation affect market entry, by focusing on the fixed costs and variable profits. Schaumans and Verboven (2008) analyze the restricted entry in pharmacies and physicians under the assumption that the entry restrictions are strictly binding. By contrast, our paper models the regulation on the number of stations as affecting the fixed costs of a firm, because as we observe later, the entry restrictions are not always binding; the authorities have not fully enforced the regulation, and we seek to recover from the data the degree to which they implement the regulation.

The paper is organized as follows. In section 2, we describe the institutional details of the Spanish local TV industry and the introduction and change of regulation. Section 3 presents the data. In section 4, we describe the empirical specifications, and show and discuss our results. Section 5 relates the empirical results to the changes in the regulation status across years, and 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 (2011)). Television stations maximize profits in two ways due to their two-sided and network structure. They produce content that they sell to television consumers through subscription fees, or sell television space to advertisers. Because television consumers value television content free of advertising, and advertisers value the number of television viewers, stations choose accordingly the amount of advertising and the value of the subscription fee to maximize total profits. See in Table 1 that (in our data) most stations choose to advertise and broadcast their content and only a few choose to collect revenue only through subscription fees (not advertise) from viewers (pay-per-view stations). This pattern is robust across years as shown in Table 2.

Stations carefully choose the content of their programming to attract both viewers and advertisers. In this industry, programming content is important because it differentiates the station product from others. Other factors that play an important role in this industry are whether the station is privately owned (vs. owned by local government), whether the station is integrated into a network, and whether the station broadcasts its programming. Next, we provide further detail as we draw distinctions between the European and American model as well as the idiosyncrasies of the Spanish local TV industry.

2.1 European versus American Model of Local Television

To understand how competition in the Spanish local television industry worked, we first need to point out the main differences between television markets in Europe and in the United States. The US market has been mainly characterized by its little government intervention and its verticality, whereas the European markets are traditionally characterized by strong government intervention and their lack of verticality.

Big stations in big markets first began and dominated the US TV industry. As smaller stations started to arise in smaller markets, they were 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 stations and local stations formed what we know today as TV networks. Nowadays, local stations are ascribed to the networks, and even though the network directly provides some of their content, they still produce a steady share of their programming that reflects the local demand.

These characteristics differ much from the European case. The European TV industry was mainly monitored by the government of each respective country. Entry in this industry was highly regulated and the emergence of local stations was limited. Most countries entered the 1980s with only government-owned stations and, at most, a few regional stations that broadcast for a limited range of their national territory. Given the dominant role that national and regional stations played, no room remained for local stations, because regulation did not acknowledge them as legal entities. In other words, local stations were alegal because no regulation banned or acknowledged their existence. Because this paper studies the Spanish case and the consequences of changes in regulation on competition, we now describe the case of Spain.

Spain had two TV stations until the mid 1980s, TVE and TVE2. The former was the main station and the latter served as window to minority content and local news emitted from small satellite stations that had little independence in their programming decisions. During the mid 1980s and the consolidation of the new democratic regime, the central government granted the right to its regional counterparts to develop regional stations. Still, the law did not recognize the local TV stations as entities. Despite this fact, a number of local stations were created in the late 1980s as a result of the joint effort of local civil associations. Because the law neither recognized nor prohibited these local stations, police authorities often did not know what to do about them as a number of interventions occurred and cases made it to court (Badillo, 2003).

Many other local stations were created in the following years and, as their activities grew in importance both economically and culturally, the need for a legal framework became clear to many politicians and regulators.[5] As a result of this need, the Spanish government approved the law of local TV stations in December of 1995 (Law 41/1995, BOE 309, 27-12-1995) to be implemented in 1996 as the year came to an end. The new regulation pretended to regulate the composition, commercial activities, ownership, and competitive structure of the local TV station industry in Spain. This law limited the local stations' market to its city, and 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. Some of the most controversial points of the 1995 law were that no more than two local stations were allowed per city (regardless of city population), network formation was prohibited (and therefore any possibility of collusion), and all local TV stations were to have local government personnel on their advisory and executive boards.

2.2 Liberalization of the Spanish Local TV Industry

The Spanish election in March of 1996 has affected how the government implemented the 1995 law. The left-winged PSOE party lost the election, and the new party in power, the right-winged Partido Popular (PP hereafter), had a different perspective on how the Spanish local television industry should be regulated, if at all. In short, PP believed this industry needed to be deregulated and liberalized; therefore, PP planned a formal liberalization process that proved to be rockier than first anticipated. However, due to the lack of support in congress, this new government's initiative did not go forward. As a consequence, the government chose not to fully implement the 1995 regulation passed by the PSOE. Badillo (2003) documents how the government chose not to fully enforce the 1995 law, although he gives anecdotal evidence of how some type of selective enforcement of the law took place depending on whether the local TV station was located in a city governed by PSOE (whereas the enforcement of the law was definitely laxer in cities ruled by PP officials). Other exceptions were those regions, such as Catalonia, that chose to start developing the law themselves with little support from the central government.

An example of a violation prior to the passing of the 2002 law was that because the government

[5] We do not have audience ratings prior to the year 2000, but the local station sector was responsible for a 0.6%, 1.1%, and 1.7% market share for the years 2000, 2002, and 2004, respectively. These percentages may seem low compared to the top national channel with 28.3%, 29.1%, and 24%, but the shares are indeed sizable relative to the 4.2%, 3.7%, and 4.2% captured by regional stations, given the differences in resources available to local stations relative to their regional counterparts.

did not develop the 1995 law, we should not have observed entry between 1995 and 2002. Figure 1 compiles information provided in Badillo (2005) and shows entry occurring between 1997 and 2002. 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 PP won the election in the year 2000 when the silent deregulation took place.

The Spanish election in 2000 changed the landscape of the regulation of local TV stations quite a bit. In the election, PP gained full control of congress and decided to push the deregulation that the previous legislature had stopped. PP took to congress a revision of the law approved in 1995 and passed a new law in December of 2002 (Law 53/2002, BOE 313, 12-31-2002) through which the 1995 law was modified. That instance started the official liberalization and deregulation of the Spanish local television industry.

The 2002 law allowed the number of stations to be proportional to the number of inhabitants per city such that small towns still were allowed to have two stations and larger towns could increase the number of stations for every $250,000$ inhabitants. The new law also did not regulate station ownership. In particular, stations were no longer required to be government owned or to have local government officials on their advisory and executive boards. Note that privately owned stations were permitted under the 1995 law as well, so the main change with the new regulation was with the capacity to be managed independently from local government. Thus, the tendency of a station changed over time without preventing private and government-owned stations to coexist within cities, as shown later in Table 9.

Similarly, the law allowed stations to be for-profit organizations through the free use of advertising, and allowed stations to be part of networks with other local television stations and national and regional stations. These new features does not mean some horizontal networks or for-profit stations did not exist under the old regulation, but it meant the local government no longer had to approve decisions.

Since the start of the silent deregulation in 2000, the contents of the 2002 law were well implemented, and therefore stations began acting according to the 2002 law before it was formally signed in 2002. We observe some evidence of this "silent" deregulation. For instance, we observe the emergence of vertical networks already in 2001 and 2002 with Localia and Vocento, even if the 1995 law clearly prevented stations from being part of any network (horizontal or vertical). Therefore, by 2002, the local television sector was on its way to almost total liberalization, especially if we compare it with the framework of alegality in 1995 or the previous existing regulatory framework

between 1996 and 2002.

In the following sections, we describe the data and examine how changes in regulation affected the nature of competition as the industry went from unregulated in 1995 to regulated in early 1996 and deregulated starting in 2000 until official liberalization in 2002.

3 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) 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.[6] According to the data, 881 stations were operating in 1995, 740 stations in 1998, and 898 in 2001. Figure 2 provides a timeline for when the censuses data were collected, changes in regulation occurred, and elections took place.

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. From this information, we can compute population growth rates at the city and province level, as well as the number of cars per capita or the number of bank offices for every $1,000$ people.[7] This census contains information on $3,209$ 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 $1,000$ inhabitants. The final data set contains information for $3,209$ cities in all three years. Out of these, $2,647$, $2,665$, and $2,617$ cities did not have any stations in 1995, 1998, and 2001, respectively.

Table 3 provides summary statistics across years and cities. Information in this table shows the average city had 0.26 stations with a median value of 0 and a maximum 17. Overall, 13% of the cities have one station, 2.7% have two stations, 0.9% have three stations, 0.3% have four stations, and 0.4% have five or more stations. The average city has $12,000$ inhabitants and grew almost 4%. The unemployment rate averages 3.8%, there are 0.37 cars per person, and 0.41 bank offices per

[6] 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. Gil et al. (2011) describe the nature of that data further.

[7] The data did not contain information on population for 1996, which we proxied with population levels of 1998. We calculated population growth by looking at growth between 1996 and 1999, 1999 and 2002, and 2002 and 2005.

every 1,000 people in each city. Finally, 56% of the cities in the data belong to coastal provinces. This last variable is important because land prices and population density are higher on the coast than they are inland.

Table 4 repeats the exercise in Table 3, breaking the sample by year. This table shows the average number of stations decreased from 1995 to 1998, but grew again by 2001 to slightly higher levels than 1995. This overall growth in the number of stations is mainly driven by two extremes, the number of cities with a monopoly station and those cities with five or more stations. The number of cities with two, three, or four stations stayed rather stable during this period of time. The average population size grew from 11,927 to 12,558 and so did the population growth from 1.1% to 6%. All other indicators indicate an improvement in the overall economy as unemployment rates decreased from 5.1% to 3.1% and the number of cars per person increased from 0.33 to 0.41. Finally, the number of bank offices per every thousand people decreased from 0.44 to 0.35. This tendency reflects the fact that bank entry did not follow the increase in population observed in the data.

Because the goal of this paper is to study the impact of changes in regulation between 1995 and 2001 on entry thresholds in order to study changes in the nature of competition, an understanding of how market structure changed between 1995 and 2001 in a city per-city basis is useful. For this purpose, Tables 5, 6, and 7 cross-tabulate the number of local stations per city for all possible pairs of years. Table 5 tabulates the number of local stations per city in 1995 and 1998, whereas Tables 6 and 7 do so for census 1998 and 2001, and 1995 and 2001, respectively. Table 5 shows how 162 cities with local stations in 1995 had none in 1998. On the other hand, 141 cities with no stations in 1995 observed entry in 1998. Overall, 2,506 cities did not have local stations in 1995 and 1998, whereas 400 cities had a positive number of stations in both years.

Tables 6 and 7 repeat the exercise in Table 5, but Table 6 focuses on the transition between 1998 and 2001, whereas Table 7 focuses on years 1995 and 2001. Between 1998 and 2001, 2,571 cities did not have any stations. When compared to Table 5, only 52 cities had stations in 1998 and lost them all in 2001. On the other hand, 97 cities with no stations in 1998 saw entry by 2001. The remaining 499 cities had stations in both 1998 and 2001. Table 7 captures the overall picture, tabulating the number of stations per city for 1995 and 2001. During the whole period, 2,464 cities started and finished with no stations. 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 decreased.

Table 8 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. This table shows most changes occurred between 1995 and 1998 since the number of cities with no changes between 1998 and 2001 increases to 2,945 cities.

The last source of data that we include in this paper is the electoral outcomes from the May 1995 and June 1999 Spanish municipal elections. We obtain these data from the data set "Consulta de Resultados Electorales" from the Subsecretaria de la Direccion General de Politica Interior from Ministerio del Interior in the Spanish Government's website. These data are important because according to Badillo (2003, 2005), law enforcement varied with the political identity of local government officials. Although we do not show the following finding here, we have checked for whether entry that violated regulation was more likely to occur in PSOE or PP markets, and we find that cities in which PP had won the latest municipal election had softer enforcement. Additionally, we explore the incidence of networks, because the incidence seems to be a subject generating much debate. We find the formation of local networks (associations with other stations) intensified, and even in early 2002, vertical networks appeared.

Finally, we also show in Table 9 that PP markets are more likely to have privately owned stations (around 90% between 1996 and 2002), and PSOE cities saw an increase in private ownership between 1996 and 1999 and after. This distinction is important because privately owned stations may respond to entrepreneurial activity or individual preferences (hobbies and local entertainment), whereas local government-run stations may respond to government and social needs.

In the next section, we describe the empirical specifications and then the estimation results.

4 Empirical Specifications and Results

This section describes the empirical methodology, after which we show results from the main specifications.

4.1 Empirical Specifications

This paper infers how mark-ups vary with entry by estimating entry thresholds by observing the number of establishments. In what follows, we employ the empirical entry model from Bresnahan and Reiss (1990, 1991) (BR hereafter), and adapt the framework to the features of the Spanish local TV station industry.

We model the Spanish local TV station industry as a homogeneous-goods industry.[8] The demand for local TV stations takes the form

$$Q = d(Z, P)S(Y),$$

where $d(Z, P)$ is the demand of each individual in a given market and $S(Y)$ is the number of consumers in a market. P stands for prices, and Z and Y are demographic characteristics.

On the cost side, we assume firms incur fixed costs $F(W)$ and marginal costs $MC(q, W)$, where W represents technology variables that exogenously shift the cost of firms, whereas q stands for the scale of production. The assumption of firms being homogeneous may seem reasonable for the Spanish local TV industry.

Once we have established all the components of the demand and cost, we can write down the Nth entrant's firm-level profit function such that

$$\Pi_N = [P_N - MC(q, W)]d(Z, P_N)S_N - F_N,$$

where N is the number of firms in the market and N can take values 1, 2, ... After equating profits to zero and solving for S_N, the equation shows

$$S_N = \frac{F_N}{[P_N - MC(q, W)]d(Z, P_N)}.$$

Essentially, this ratio establishes that the market size (number of consumers) necessary to meet the break-even point when N firms are present in the market is directly proportional to the size of the fixed cost and inversely proportional to the magnitude of the variable profit per consumer. We are

[8] The fixed cost of entry may vary across stations of different ownership types within markets. In this regard, Mazzeo (2002) offers a free-entry model with multiple types of entrants. Unfortunately, the low response rate of the questionnaire we describe in the previous section does not allow us to model these type differences in the estimation, as we do not have information on all existing stations for the majority of markets. If anything, the observation that no striking change occurs in the percentage of privately run stations across years within the subsample of stations responding to the questionnaire is comforting.

interested in estimating the firm-entry threshold ratios $s_N = \frac{S_N}{N}$ and see how the ratios vary with N. The ratio $\frac{s_M}{s_N}$, where $M > N$ measures either the fall in variable profits per customer between a market with N firms and a market with M firms or an increase in the fixed costs with the number of stations.

Given the data from the AIMC census on local TV stations, we are far from having price and output data for all stations in all markets. For this reason, we estimate entry thresholds by running an ordered probit on the number of stations in each market. The model posits if we observe N stations in a given market, it must be the case that in equilibrium $\Pi_N \geq 0$ and $\Pi_{N+1} < 0$. With several functional form assumptions, we can estimate a profit function such that

$$\Pi_N = V_N(Z, W, \alpha, \beta)S(Y, \lambda) - F_N(W, \gamma) + u,$$

where α, β, λ, and γ are the parameters that we aim to estimate in the profit function, and Y, Z, and W are variables that mean to proxy for market size as well as demand and cost shifters. Finally, u is a zero-mean constant-average iid normally distributed error term assumed to capture other profits that are orthogonal to the observables.

By assuming u is drawn from the same distribution across markets, we can use an ordered probit to estimate entry thresholds such that the probability of observing markets with no firms equals

$$\Pr(\Pi_1 < 0) = 1 - \Phi(\overline{\Pi}_1),$$

where $\Phi(.)$ is the cumulative normal distribution function and $\Pi_1 = \overline{\Pi}_1 + u$. Assuming average profits decrease with firm entry in equilibrium ($\overline{\Pi}_1 \geq \overline{\Pi}_2 \geq \overline{\Pi}_3 \geq ...$), the probability of observing N in equilibrium is

$$\Pr(\Pi_N \geq 0 \text{ and } \Pi_{N+1} < 0) = \Phi(\overline{\Pi}_N) - \Phi(\overline{\Pi}_{N+1}).$$

Finally, we estimate the profits of markets with six or more stations in a market by setting $\Pr(\Pi_6 \geq 0) = \Phi(\overline{\Pi}_6)$.

Next we state how we model $S(Y, \lambda)$, $V_N(Z, W, \alpha, \beta)$, and $F_N(W, \gamma)$ such that

$$S(Y, \lambda) = town\_pop + \lambda_1 prov\_pop + \lambda_2 town\_pop\_\ growth + \lambda_3 prov\_pop\_growth.$$

The coefficient of *town_pop* is set equal to one because V_N contains a constant term. *Prov_pop* stands for population of the province, and *town_pop_growth* and *prov_pop_growth* is the pop-

ulation growth experienced by the town and province, respectively, in any given year.

We model the Nth entrant's variable profits per consumer in the market, V_N, as

$$V_N = \alpha_1 + X\beta - \sum_{n=2}^{N} \alpha_n,$$

where $\alpha_1 + X\beta$ stands for monopolist profits and α_n is the degree to which variable profits decrease with the nth entrant. The X variables come from business and population census by "La Caixa," and they are unemployment rate, the number of cars per person, and the number of banks offices per thousand people. We can fairly say that even though the choice of these variables that go into X is driven by data availability, these variables capture differences across towns and provinces for any given year in our data. Finally, we model fixed costs as

$$F_N = \gamma_1 + W_L\gamma_L + \sum_{n=2}^{N} \gamma_n,$$

where α_n is the degree to which fixed costs increase with the nth entrant. The demographic variables that exogenously affect costs, W, consist from the following five variables. The first variable is a dummy *coast* that takes the value of 1 if the city is in a coastal province. We use this proxy variable in the cost equation because in general, the land prices and population density are higher on the coast than they are inland. The second variable $\ln km^2$ is the log geographical area of each market. These variables are proxies for differences in land prices and wages across coastal and non-coastal markets. The third variable is a dummy *violate* that takes 1 if the number of stations in 1995 exceeds two, which will be a clear violation in 1998 from the standpoint of the 1995 law. The fourth variable, *violate_pp* max, measures the interaction between the dummy *violate* and the index variable *pp* max that takes 1 if the number of votes for the PP party in the election for a mayor at the city level is higher than votes for any other parties and 0 otherwise.[9] We construct the final variable, *violate_psoe* max, in a similar way for the PSOE party. The rest of the political parties will be the reference group in the specification. We include those three variables related to the regulation violation only in the 1998 and 2001 specifications, because the regulation on the number of stations is in effect after 1996.

Once we estimate the ordered probit specification above, we calculate population entry thresh-

[9] The relevant municipal elections for a mayor at the city level took place in 1995 and 1999 in our sample period.

olds by plotting the formula

$$\hat{S}_N = \frac{\hat{F}_N}{\hat{V}_N} = \frac{\widehat{\gamma}_1 + \overline{W}\widehat{\gamma_L} + \sum_{n=2}^{N} \widehat{\gamma}_n}{\widehat{\alpha}_1 + \overline{X}\widehat{\beta} - \sum_{n=2}^{N} \widehat{\alpha}_n},$$

where the bar over each variable stands for the sample mean of the variable. The estimated per-station entry thresholds are $\hat{s}_N = \hat{S}_N/N$.

The next section shows results of this estimation for each year in our data.

4.2 Parameter Estimates

This section discusses the parameter estimates of the empirical specifications. Table 10 shows the structural parameters that correspond to the profit model above in the methodology section. This table contains six columns. The three columns on the left correspond to the full model outlined in the previous section, as we run an ordered probit separately for the three years in our sample: 1995, 1998, and 2001. We exclude the α_6 in 1995 and 2001 from the baseline specification, because the specification including the variable yields estimated a negative sign for α_6, violating our model assumption that late entrants will have fewer profits than the entrants that enter earlier. The three columns on the right explore the robustness of the estimates to the exclusion of imprecisely estimated parameters in all years in the baseline specification: the province-level population growth rate, λ_1, the competitive effects for the fourth and sixth entrant, α_4, α_6, and a dummy in the fixed costs, $\gamma_{violate\_pp\max}$.

The estimated positive signs of the competitive effect, $\alpha's$ in Table 10, imply an entry of an additional firm will reduce the per-firm variable profits. The parameters are precisely estimated up to the third entrant. An interesting pattern is that the magnitude of this competitive effect tends to decline with the number of stations in a given market. This pattern implies the marginal effect of an additional entry becomes smaller with N. Similarly, all the additional entry effects on the fixed costs, $\gamma's$, are positive, implying later entrants face higher fixed costs of entry. Again, we observe a striking pattern evident from the table: the marginal increase in the fixed costs tend to decline with the number of entrants.

One of our major goals in this paper is to observe how changes in regulation and politics affect entry. The violation index $\gamma_{violate}$ enters negatively in 1998 and 2001, implying fixed costs tend

to be smaller in markets that violate the 1995 law than in those markets that do not violate the regulation. This negative sign may be puzzling, but the parameter may just be picking up some unobserved market heterogeneity. Unfortunately, we do not have additional variables to identify these two effects separately. Instead, we run a separate estimation in 1995 including those three violation indices in the specification, $\gamma_{violate}, \gamma_{violate\_pp\max}$, and $\gamma_{violate\_psoe\max}$, and we find the parameter for the violation index, $\gamma_{violate}$, enters negatively in 1995, confirming our conjecture. Of interest are the parameters for measuring the interactions between the violation of the 1996 regulation and the PP or PSOE party's dominance over other parties. The index for PP violation, $\gamma_{violate\_pp\max}$, has a mixed sign and is not precisely estimated. On the contrary, the PSOE violation index enters positively consistently across years and is precisely estimated in 2001. The sign implies the PSOE party tends to increase the fixed costs of violation after the election in 2000, which is consistent with our anecdotal evidence provided in the earlier section.

Once we obtain these structural parameters, we can proceed to estimate values for average variable profits and fixed costs for every year in our sample (1995, 1998, and 2001) and for cities with one, two, three, four, five, and six or more stations. We provide those results in Table 11. In each year, per-capita variable profits for a given firm (V_N) go down with competition and are lowest in those cities with five or six or more stations. Meanwhile, the fixed cost (F_N) increases with the number of stations, reflecting the positive signs of $\gamma's$. The third column describes the calculated entry threshold $S_N = \frac{F_N}{V_N}$ for each number of stations in a market. Because the numerator F_N increases with the number of stations N and the denominator V_N decreases with N, the entry threshold S_N in the third column decreases with the number of stations. The final column computes the per-firm entry threshold s_N by S_N/N.

Figure 3 exhibits the relative entry threshold ratios of s_4 to s_N for a given number of stations (N). This ratio provides information on how quickly per-firm entry thresholds (s_N) shrink from cities with four stations to cities with fewer stations. We focus on the changes in the ratios from one to four stations, because both the competition parameters $\alpha's$ and cost parameters $\gamma's$ are statistically precisely estimated mostly until the fourth entrant. In all years, we find TV stations have the entry threshold ratio s_4/s_N declines to one with the number of stations. We observe a striking pattern in 1998 that the entry threshold ratio tends to decline steeply at the second entrant, whereas the decline in 1995 and 2001 is flatter at the second entrant.

Another way to look at this entry threshold pattern in the change in the competitive conduct is to look at the ratios s_{N+1}/s_N in Table 12, which tracks the evolution of the per-firm entry threshold

ratios in the number of stations for each of the sample years. A distinctive pattern emerges in 1998 at s_2/s_1 , s_5/s_4, and s_6/s_5. For instance, the ratio s_2/s_1 takes the value of 1.20 in 1995, 1.67 in 1998, and 1.12 in 2001. Given that 1998 is the only period in the data during which the strict regulation is enforced, observing a deviation in 1998 may not be surprising. However, the ratios s_{N+1}/s_N do not fully reveal the sources of the divergences in 1998. In the next section, we discuss in greater detail the effects of the regulation status on entry by decomposing the ratios.

5 Evaluating the Impact of Regulation on Competition

This section relates the empirical results to the changes in regulation status across three periods. The first period is 1995, determined in a frame in alegality. The second period is after the regulation took place in 1995-1996 to control competition. The third period is the silent deregulation aiming to liberalize the industry after the 2000 election. We compare results across years to determine the relation between regulation and competition. Again, our focus is on the change from $N = 1$ to 4, because the competitive effect $\alpha's$ and fixed costs $\gamma's$ are all precisely estimated up to the fourth entrant.

Recent studies on entry and regulation incorporate the institutional details of regulations, and use an equilibrium entry model to obtain the effect of policy on market entry. This paper does the opposite. We back out from the results whether and how the regulation was enforced and effective in impacting how the local TV stations compete. This approach is useful for public policies of which enforcement and effect on the competition of firms are not obvious. This case is especially true in the Spanish local TV industry, where we observe obvious local violations of the regulation, as we document in an earlier section.

Figure 4 illustrates the entry threshold S_N. In 1995 and 2001, the population needed to support a given number of firms grows linearly with the number of firms. In 1998, a higher population is necessary to support a given number of stations compared to years 1995 and 2001. The population is almost the same for a monopoly (S_1), but the gap becomes evident at two stations and is the widest at four stations. Again, the fact that 1998 is different from other years is consistent with the fact that the regulation in place most affected this year. The natural question then is: Why do we observe such gaps across years?

To further investigate the sources, we decompose the entry threshold $S_N = F_N/V_N$ into variable profits V_N and fixed costs F_N, and examine how each component changes across sample years.

Because the launch of the regulation policy in the 1995 law could affect both demand and cost sides, simply focusing on the change in S_N, s_N, or their ratios across the number of stations and across years may not fully reveal the sources of these gaps. We normalize the ratio by the fixed costs or the variable costs of the first entrant, V_N/V_1 and F_N/F_1.

Figure 5 plots the ratio F_N/F_1 by the number of stations (N) for each year. In 1998 and 2001, we observe an obvious positive gap in the ratio of the fixed costs F_N/F_1 relative to the same ratio in 1995 for any given number of stations. This pattern implies that in 1998 and 2001, the fixed costs of the second entrant relative to the fixed costs of the first entrant increase at the second entrant, and the ratio F_N/F_{N-1} stays constant across years beyond the second entrant. This empirical pattern is consistent with the nature of the regulation status across years: even after the deregulation period, the policy states no more than two stations should be present unless the city has a population of more than $250,000$ people, which is different from the alegal status of the industry in 1995. In other words, the regulation in 1995 had a positive impact on the costs in 1998, and this effect is permanent even when the industry is "deregulated" after 2000.

To formally examine this conjecture about the change in the fixed costs due to regulation, we conduct log likelihood ratio tests in which the null hypothesis is that the ratios $F_{N+1,t}/F_{1,t}$ are the same across adjacent sample years. To perform this test, we impose a constraint on one of the parameter coefficients so the resulting ratios $F_{N+1,t-1}/F_{1,t-1} = F_{N+1,t}/F_{1,t}$, and obtain a log likelihood for this restricted model. Table 13 presents the results of the tests. Confirming our points in Figure 5, the null hypothesis that the ratios F_{N+1}/F_1 are the same across 1995 and 1998 is rejected at the 5% confidence level for $N = 1, 2$, and 3.

Figure 6 presents the per-customer variable-profits ratio V_N/V_1 by the number of stations (N) for each year. The per-customer variable-profits ratio V_N/V_1 for the second entrant in 2001 is larger than the ratios in 1995 and 1998, and the same pattern remains until the fourth entrant. The first regulation in 1995 has imposed several restrictions on the industry, including advertising, ownership, and the extent of the market, which could have led to the potential decrease in profits due to the lack of flexibility in the business activities for a marginal station, such as the second and the third entrant. The downward shift in the ratios V_N/V_1 in 1998 for the second, third, and fourth entrant is consistent with the introduction of the 1995 regulation.[10] By contrast, the second (de)regulation in 2000 allows more flexible activities, including advertising, network formations, and

[10] The log likelihood ratio tests confirm the difference in the variable-profit ratios across years are statistically significant at the 5% level.

ownership patterns. This silent deregulation after 2000 may have fostered more profit opportunities in markets with any number of stations, which may have helped the variable-profits ratio to be flatter than previous years.

We recognize the model is based on a strong set of assumptions in the empirical specifications on how demographic variables affects costs and demand separately. However, based on the above decompositions, both patterns in the fixed costs ratios and variable profits ratios across years capture the changes in how local TV stations are regulated from 1995 through 2001 through non-obvious implementations. We observe two patterns emerge from the data and model. First, the 1995 regulation impacted the cost side positively and permanently. Second, the flexible implementations of the 1995 regulation, which, after 2000, culminated in the legislation of the 2001 regulation, have impacted how these stations compete and obtain profits from the market.

6 Conclusions

In this paper, we empirically examine whether regulation increases or decreases competition between firms. We back out from the data and an entry model whether and how the regulation was enforced and effective in impacting how the local TV stations compete. This approach is useful for public policies whose enforcement and effect on the competition of firms are not obvious. This case is especially true in the Spanish local TV industry, where we observe many obvious violations of the regulations in place between 1995 and 2001. During these years, the industry went from no regulation (prior to 1996) to being highly regulated (1997 to 1999) and to being liberalized (from 2000 on). To infer the number of consumers necessary for a station to break even, we estimate for every year how population entry thresholds vary with the number of entrants. This estimation allows us to determine how relatively competitive this industry became across different years in the study.

Our findings suggest that according to 1998 data, when the Spanish local TV industry is regulated, the entry threshold increased for any number of firms relative to the thresholds in 1995 and 2001. We further investigate the sources of the changes in entry threshold in 1998 by decomposing the ratio into the fixed costs and variable profits, and find an increase in the fixed costs of the second and beyond entrants relative to the fixed costs of the first entrant drives the departure in the entry threshold from the one in other years. Meanwhile, the silent deregulation since 2000 reflected in the 2002 legislation seems to have impacted the industry through the change in variable

profits. Overall, we find the model parameters are quite informative about how the change in the regulation status has impacted the market entry and how strongly the government enforces the regulation.

Despite our sensible results, our paper is not without limitations. First, we apply each year the static model of entry proposed by Bresnahan and Reiss (1990, 1991). Although this static framework allows us to investigate how regulation and its implementation affect market entry with three cross-sectional data years, we implicitly assume away the forward-looking entry and exit behavior of firms. Second, our methodology assumes homogeneity among stations within markets. We know from responses from questionnaires that stations are indeed different within markets, but we fail to adjust for this factor as we seldom observe responses for the totality of stations in a market.[11] These issues are left for future research.

Most previous papers exploring the same topic have examined how changes in existing regulation impact the nature of competition. This paper differs from those in that we examine how competition changes when an industry transitions from a status of alegality and no regulation to one of legality and regulation, as well as how competition in this industry moves from being highly regulated to highly liberalized. An examination of the literature shows that despite the clear importance of this research question, the implementation and interaction with political influences from change in leading political parties has received little previous attention. Our results also show that when evaluating the impact of regulation, inferring the degree to which the current regulation is implemented is important. We hope this paper will encourage others to explore other industries and study further the impact of regulation and its implementation on market entry.

[11] For example, the census of 1996 has a much lower response rate than the 1999 and 2002 censuses. Similarly, not all responding stations answer to all parts in the questionnaire.

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

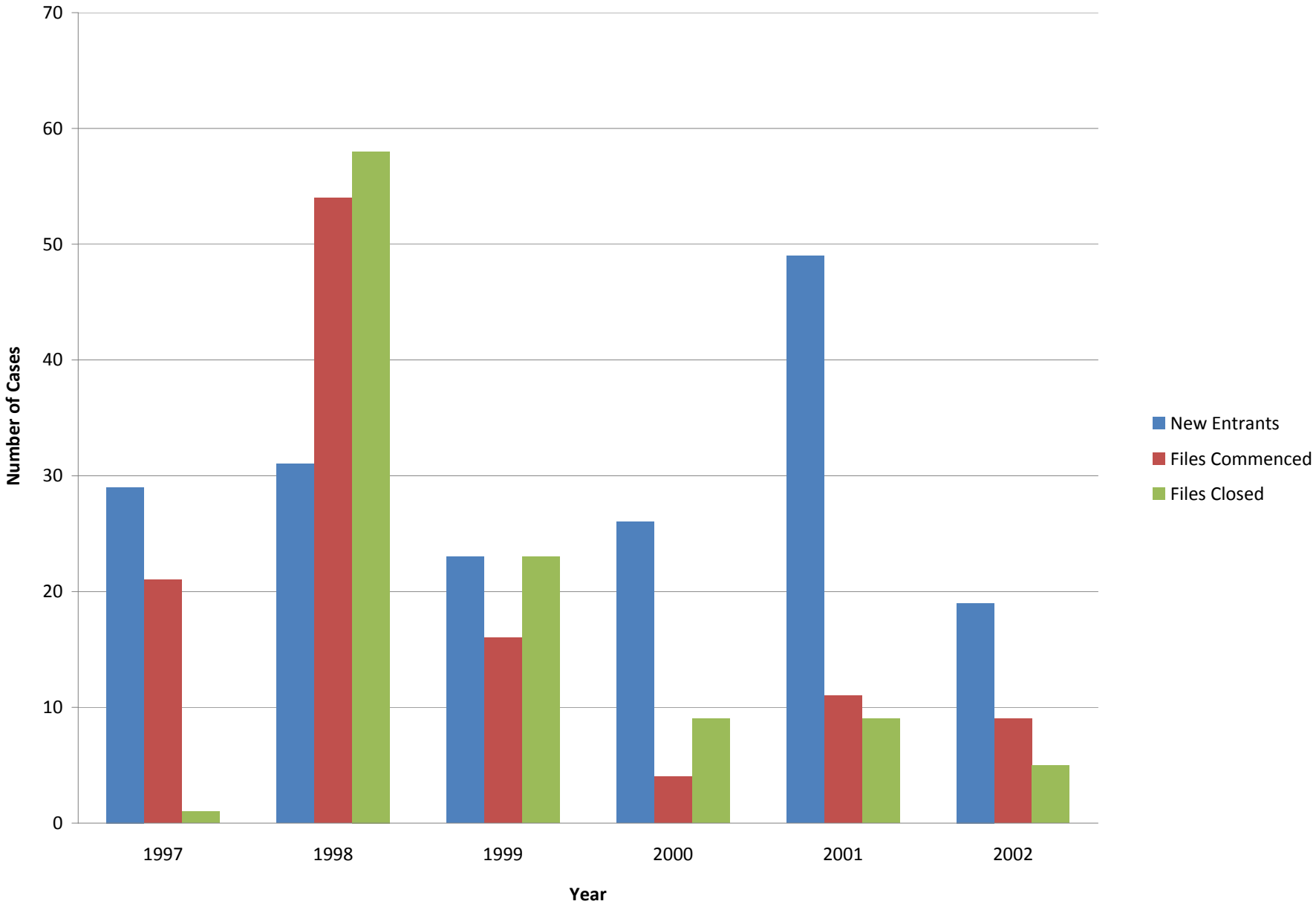

Figure 2. Timing of Election, Regulation Changes and Data Collection

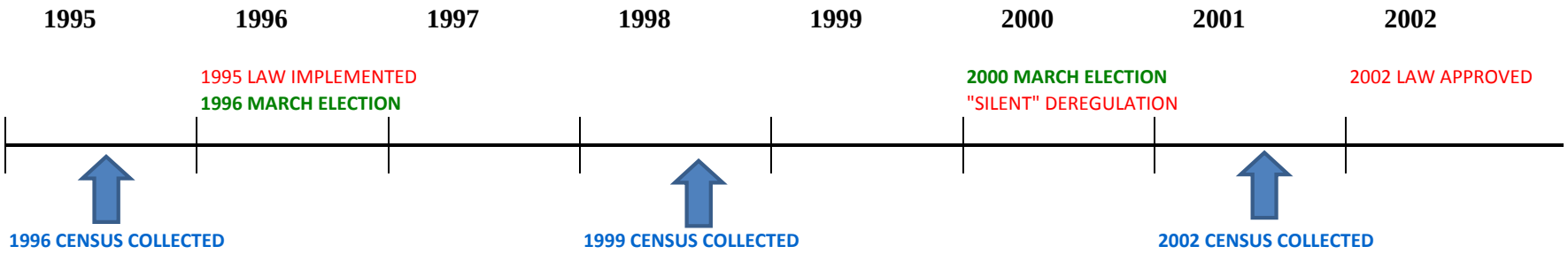

Figure 3. Relative Entry Threshold Ratio s4/sN

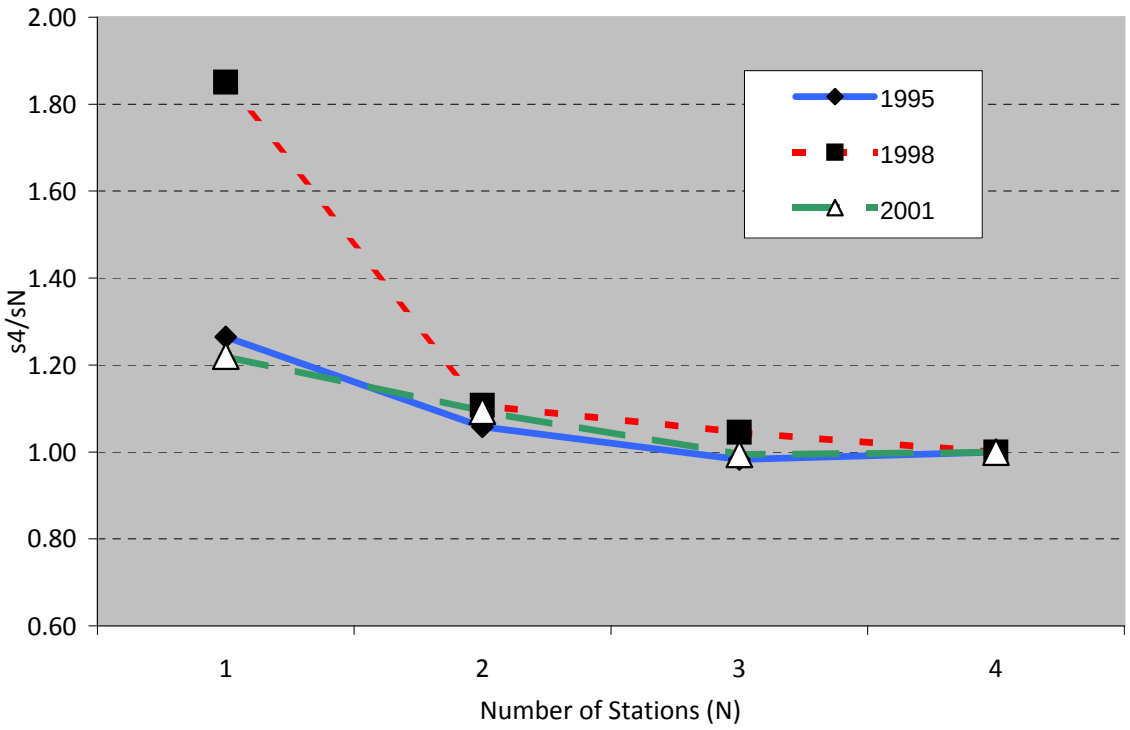

Figure 4. Entry Threshold Estimates S_N

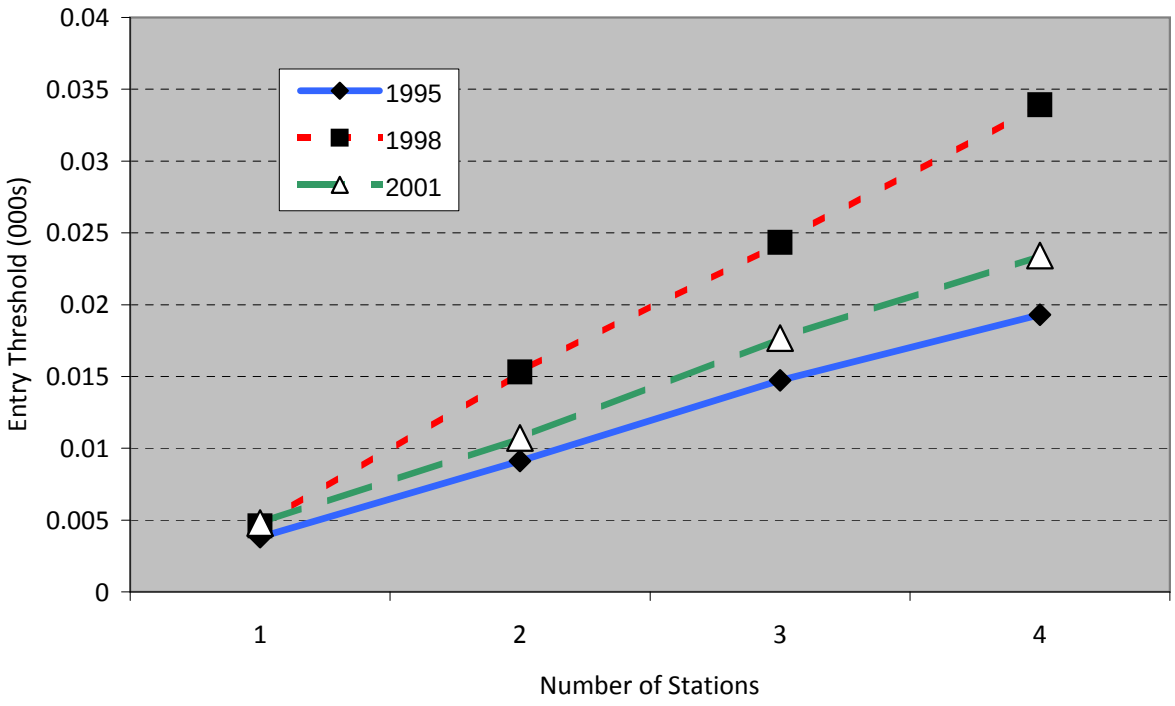

Figure 5. Fixed Costs Ratio F_N/F_1, 1995-2001

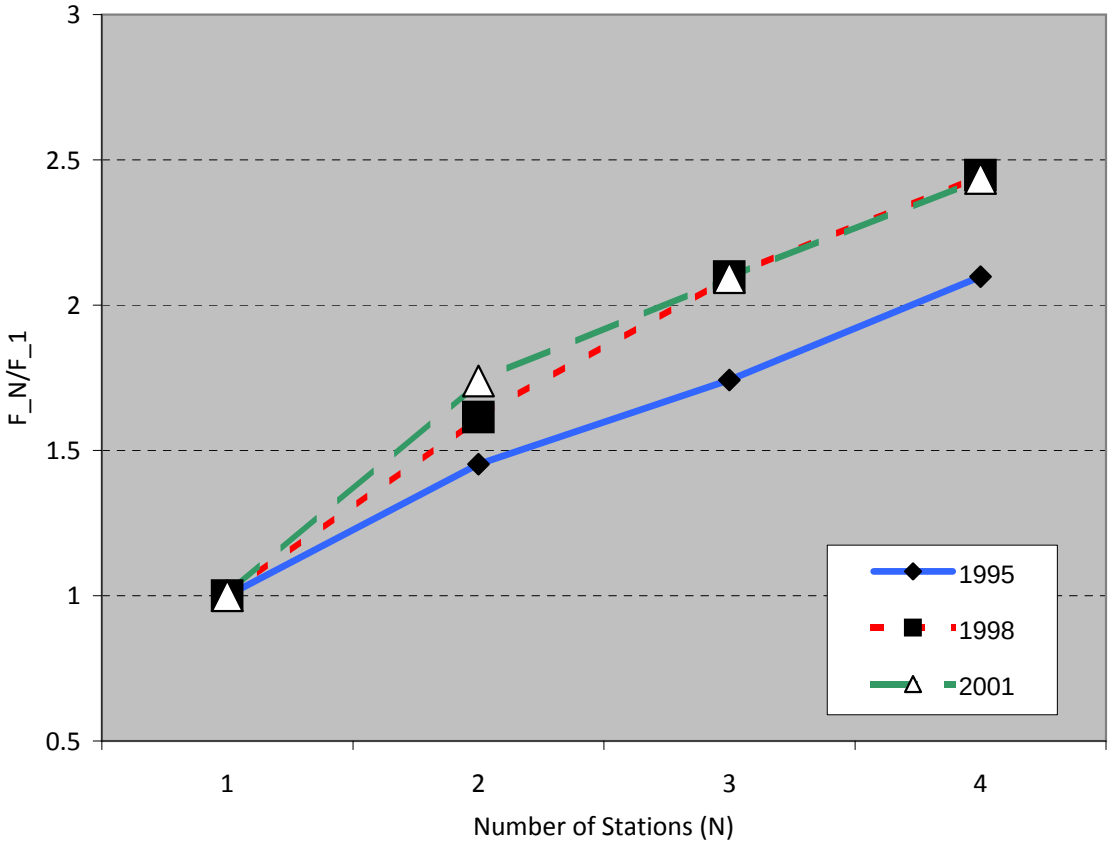

Figure 6. Per-Customer Variable Profits Ratio V_N/V_1, 1995-2001

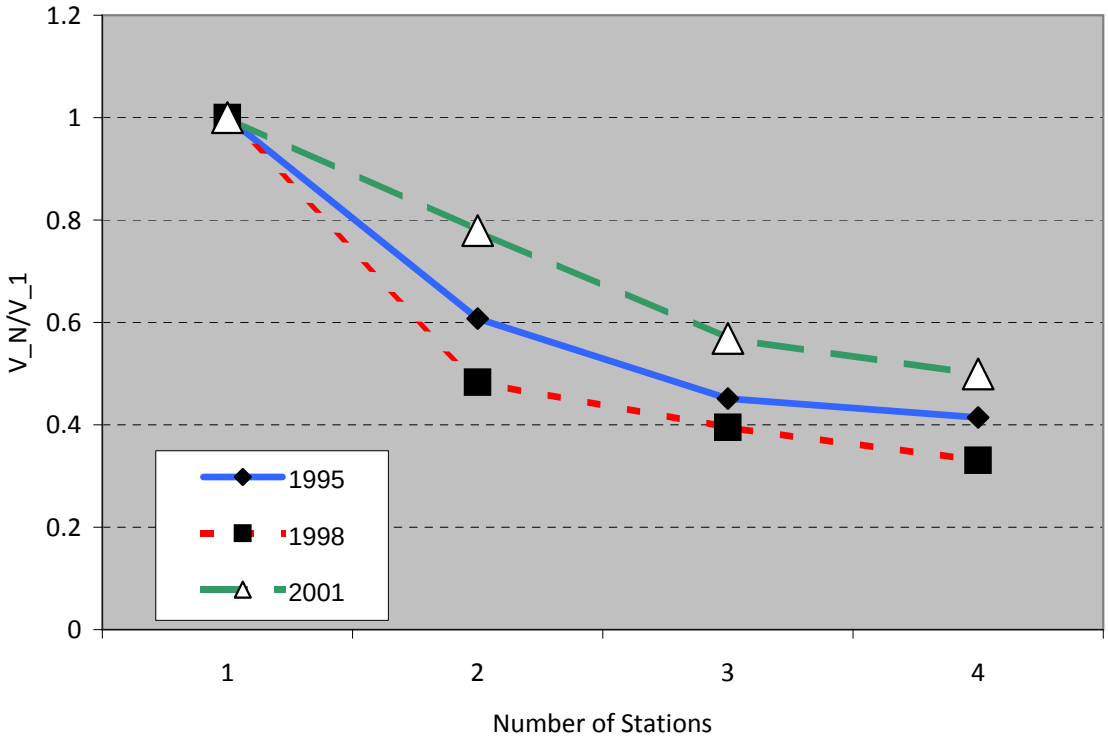

Table 1. Tabulation for Advertising and Broadcasting for all Years

Market for TV Content	No Info	No Adv	Adv	Total
No Info	**6**	**5**	**13**	**24**
Broadcast	**18**	**152**	**839**	**1009**
Pay-per-View	**6**	**83**	**153**	**252**
Total	**30**	**240**	**1015**	**1,285**

Note: This table tabulates advertising and broadcasting decisions for the 1,285 TV stations we have information across years.

Table 2. Advertising and Broadcasting per Year

Year 1995

Market for TV Content	Market for TV Advertising: No Info	No Adv	Adv	Total
No Info	4	0	1	5
Broadcast	3	16	128	147
Pay-per-View	2	3	26	31
Total	9	19	155	183

Year 1998

Market for TV Content	Market for TV Advertising: No Info	No Adv	Adv	Total
No Info	2	2	4	8
Broadcast	4	70	259	343
Pay-per-View	3	33	70	106
Total	9	105	343	457

Year 2001

Market for TV Content	Market for TV Advertising: No Info	No Adv	Adv	Total
No Info	0	3	8	11
Broadcast	11	66	442	519
Pay-per-View	1	47	67	115
Total	12	116	517	645

Note: This table tabulates advertising and broadcasting decisions for the 1,285 TV stations we have information for each separate year in our sample.

Table 3. Summary Statistics Across All Census Years

Variable	Obs	Mean	Std. Dev.	Min	Max
Stations HQ per City	9627	0.26	0.77	0	17
Monopoly?	9627	0.133	0.339	0	1
Duopoly?	9627	0.027	0.162	0	1
Triopoly?	9627	0.009	0.092	0	1
Quadropoly?	9627	0.003	0.055	0	1
Five Stations or More?	9627	0.004	0.065	0	1
Stations not HQ per City	9627	1.407	1.885	0	13
City Population (000)	9627	12.17	67.73	0.32	3016.79
City Growth	9627	0.04	0.11	-0.78	5.73
Province Population (000)	9627	1223.66	1363.04	56.93	5527.15
Province Growth	9627	0.03	0.03	-0.05	0.22
Unemployment Rate per City	9627	3.89	1.90	0	25
Cars per capita and City	9627	0.37	0.15	0.04	7.08
Bank Office per capita and City	9627	0.41	0.43	0	4.01
Province on the Coast?	9627	0.56	0.50	0	1

Note: This table provides summary statistics of all variables used in the empirical analysis. The number of observations for all variables is 9627, that is, 3207 observations for each year in the sample 1995, 1998 and 2001.

Table 4. Summary Statistics by Census Year

	Year 1995	Year 1998	Year 2001
Variable	**Mean (Std. Dev.)**	**Mean (Std. Dev.)**	**Mean (Std. Dev.)**
No. Stations per City	0.269	0.228	0.274
	(0.835)	(0.646)	(0.814)
Monopoly?	0.127	0.133	0.138
	(0.333)	(0.339)	(0.347)
Duopoly?	0.030	0.024	0.026
	(0.172)	(0.154)	(0.159)
Triopoly?	0.010	0.006	0.009
	(0.101)	(0.080)	(0.095)
Quadropoly?	0.003	0.003	0.003
	(0.053)	(0.053)	(0.058)
Five Stations or More?	0.005	0.002	0.006
	(0.068)	(0.043)	(0.079)
Stations not HQ per City	0.190	1.592	2.439
	(0.519)	(1.743)	(2.186)
City Population (000)	11.927	12.037	12.558
	(66.869)	(66.903)	(69.394)
City Growth	0.011	0.044	0.060
	(0.039)	(0.147)	(0.119)
Province Population (000)	1199.522	1210.029	1261.442
	(1328.110)	(1340.618)	(1418.267)
Province Growth	0.008	0.032	0.048
	(0.007)	(0.036)	(0.038)
Unemployment Rate per City	5.117	3.347	3.196
	(2.021)	(1.478)	(1.512)
Cars per capita and City	0.332	0.362	0.408
	(0.100)	(0.119)	(0.193)
Bank Office per capita and City	0.446	0.433	0.352
	(0.459)	(0.443)	(0.366)
Province on the Coast?	0.557	0.557	0.557
	(0.497)	(0.497)	(0.497)

Note: This table provides summary statistics of all variables by year. Each year contains information for 3209 cities.

Table 5. Cross-Tabulation of No Stations per City for Years 1995 and 1998

	No Stations per City Year 1998									
No Stations per City Year 1995	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**12**	**13**	**Total**
0	2,506	131	9	1	0	0	0	0	0	2,647
1	153	218	30	5	1	0	0	0	0	407
2	8	60	24	2	3	1	0	0	0	97
3	1	14	9	9	0	0	0	0	0	33
4	0	2	4	2	0	1	0	0	0	9
5	0	2	1	0	0	0	0	0	0	3
6	0	0	0	1	2	0	1	0	0	4
7	0	0	1	0	1	0	0	0	0	2
8	0	0	0	0	1	0	0	0	0	1
9	0	0	0	1	0	0	0	1	0	2
13	0	0	0	0	0	0	1	0	0	1
15	0	0	0	0	0	0	0	0	1	1
17	0	0	0	0	1	0	0	0	0	1
Total	2,668	427	78	21	9	2	2	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 1998.

Table 6. Cross-Tabulation of No Stations per City for Years 1998 and 2001

	No Stations per City Year 2001													
No Stations per City Year 1998	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**10**	**11**	**13**	**16**	**Total**
0	2,571	93	4	0	0	0	0	0	0	0	0	0	0	2,668
1	48	328	36	11	2	2	0	0	0	0	0	0	0	427
2	3	22	35	11	4	2	0	0	0	1	0	0	0	78
3	1	0	7	6	3	3	0	0	0	0	1	0	0	21
4	0	0	1	1	2	2	2	1	0	0	0	0	0	9
5	0	0	0	0	0	1	0	0	1	0	0	0	0	2
6	0	0	0	0	0	0	2	0	0	0	0	0	0	2
12	0	0	0	0	0	0	0	0	0	0	0	1	0	1
13	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	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 1998 with the number of stations per city in 2001.

Table 7. Cross-Tabulation of No Stations per City for Years 1995 and 2001

	No Stations per City Year 2001													
No Stations per City Year 1995	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**10**	**11**	**13**	**16**	**Total**
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
Total	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 8. Cross-Tabulation of Changes in No Stations per City between 1995-1998 and 1998-2001

	Change in No Stations Censuses 1998-2001									
Change in No Stations Censuses 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
Total	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.

Table 9. Private Station Ownership by PP or PSOE City Ruling Government

Variable	Obs	Mean	Std. Dev.	Max Votes PP? = 1	Max Votes PP? = 0	Diff	Max Votes PSOE? = 1	Max Votes PSOE? =0	Diff
Private Property?	1255	0.80	0.40	0.91	0.71	0.20	0.73	0.83	-0.10
				(0.01)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)
Max Votes PP?	1255	0.44	0.50	1	0	1	0	0.66	-0.66
				.	.	.	.	(0.02)	(0.02)
Max Votes PSOE?	1255	0.34	0.47	0	0.60	-0.60	1	0	1
				.	(0.02)	(0.02)	.	.	.
Year 1995									
Private Property?	173	0.80	0.40	0.93	0.67	0.26	0.59	0.89	-0.30
				(0.03)	(0.05)	(0.06)	(0.07)	(0.03)	(0.06)
Max Votes PP?	173	0.51	0.50	1	0	1	0	0.71	-0.71
				.	.	.	.	(0.04)	(0.07)
Max Votes PSOE?	173	0.28	0.45	0	0.58	-0.58	1	0	1
				.	(0.05)	(0.05)	.	.	.
Year 1998									
Private Property?	450	0.79	0.41	0.92	0.71	0.20	0.74	0.82	-0.08
				(0.02)	(0.03)	(0.04)	(0.03)	(0.02)	(0.04)
Max Votes PP?	450	0.39	0.49	1	0	1	0	0.62	-0.62
				.	.	.	.	(0.03)	(0.04)
Max Votes PSOE?	450	0.36	0.48	0	0.60	-0.60	1	0	1
				.	(0.03)	(0.04)	.	.	.
Year 2001									
Private Property?	632	0.80	0.40	0.90	0.72	0.18	0.76	0.83	-0.07
				(0.02)	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)
Max Votes PP?	632	0.46	0.50	1	0	1	0	0.68	-0.68
				.	.	.	.	(0.02)	(0.03)
Max Votes PSOE?	632	0.33	0.47	0	0.61	-0.61	1	0	1
				.	(0.03)	(0.03)	.	.	.

Note: This table shows the propensity of private ownership in local stations across markets of different political preferences.

Table 10. Parameter Estimates from Ordered Probit Regressions

	Baseline			Robustness check		
Variables	1995	1998	2001	1995	1998	2001
province population (λ_1)	0.000745	0.000251	-0.000619			
	(0.000607)	(0.000771)	(0.000779)			
city population growth (λ_2)	0.00236	0.000558	0.00225**	0.00280	0.000611	0.00213**
	(0.00226)	(0.000842)	(0.00105)	(0.00221)	(0.000828)	(0.00105)
province population growth (λ_3)	0.0454***	0.00925***	0.00944***	0.0428***	0.00919***	0.00951***
	(0.0116)	(0.00302)	(0.00309)	(0.0112)	(0.00299)	(0.00315)
unemployment	-16.83***	-9.655*	-4.724	-18.29***	-9.924*	-4.593
	(5.215)	(5.586)	(5.550)	(5.201)	(5.555)	(5.456)
cars	-226.5*	-56.57	-153.5*	-227.6*	-60.10	-144.6*
	(133.3)	(123.6)	(87.68)	(138.0)	(125.1)	(83.60)
banks	-53.78	63.70	128.1**	-66.07	67.97	120.6**
	(52.12)	(53.18)	(51.21)	(53.01)	(53.05)	(49.80)
α_1	603.5***	343.5***	331.8***	621.1***	345.2***	326.3***
	(71.94)	(61.00)	(53.96)	(71.24)	(61.11)	(52.07)
α_2	164.1***	164.5***	65.97***	165.8***	165.9***	66.21***
	(26.90)	(24.20)	(23.75)	(27.02)	(24.17)	(23.50)
α_3	65.44***	27.98	62.96***	69.41***	32.19*	70.34***
	(18.63)	(19.50)	(21.00)	(18.39)	(18.72)	(19.98)
α_4	15.17	20.51	20.88			
	(19.73)	(24.87)	(19.58)			
α_5	6.304	59.59**	14.48	8.761	70.11***	19.17
	(17.08)	(24.81)	(20.32)	(17.62)	(22.13)	(20.54)
α_6		21.01				
		(38.30)				
γ_1	2.643***	2.636***	2.792***	2.568***	2.617***	2.831***
	(0.146)	(0.147)	(0.149)	(0.133)	(0.137)	(0.141)
γ_2	0.722***	0.896***	1.061***	0.737***	0.898***	1.049***
	(0.0680)	(0.0723)	(0.0764)	(0.0652)	(0.0702)	(0.0765)
γ_3	0.462***	0.705***	0.510***	0.456***	0.681***	0.466***
	(0.0936)	(0.137)	(0.124)	(0.0903)	(0.132)	(0.117)
γ_4	0.569***	0.509**	0.491***	0.687***	0.678***	0.673***
	(0.182)	(0.240)	(0.190)	(0.117)	(0.150)	(0.123)
γ_5	0.384*	0.0617	0.287	0.373	0.0323	0.247
	(0.232)	(0.185)	(0.265)	(0.229)	(0.170)	(0.256)
γ_6	0.201	0.183	0.893***	0.207	0.188	0.918***
	(0.139)	(0.452)	(0.334)	(0.143)	(0.456)	(0.341)
$\gamma_{\text{violate\_ppmax}}$		-0.205	0.529			
		(0.419)	(0.411)			
$\gamma_{\text{violate\_psoemax}}$		0.274	0.920**		0.391	0.569*
		(0.436)	(0.427)		(0.335)	(0.333)
γ_{violate}		-1.194***	-1.450***		-1.326***	-1.105***
		(0.350)	(0.341)		(0.215)	(0.213)
γ_{coast}	-0.468***	-0.458***	-0.487***	-0.479***	-0.458***	-0.486***
	(0.0675)	(0.0648)	(0.0627)	(0.0671)	(0.0647)	(0.0626)
γ_{1km2}	-0.196***	-0.225***	-0.266***	-0.186***	-0.222***	-0.272***
	(0.0275)	(0.0280)	(0.0277)	(0.0263)	(0.0269)	(0.0268)
Log likelihood	3,142	3,146	3,146	3,142	3,146	3,146
Observations	-1507	-1396	-1509	-1508	-1397	-1511

Note: This table shows results from running ordered probit specifications following the profit function specified in the text. Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 11. Calculation of Fixed Costs, Variable Profits per Consumer, and Entry Thresholds

Year	# of Stations **(N)**	F_N	V_N	S_N (= F_N/V_N)	$s_N = S_N / N$
1995	1	1.60	418.13	0.0038	0.0038
	2	2.32	254.00	0.0091	0.0046
	3	2.78	188.56	0.0147	0.0049
	4	3.35	173.39	0.0193	0.0048
	5	3.73	167.09	0.0223	0.0045
	6 or more	3.93	167.09	0.0235	0.0039
1998	1	1.46	318.21	0.0046	0.0046
	2	2.35	153.68	0.0153	0.0077
	3	3.06	125.69	0.0243	0.0081
	4	3.57	105.18	0.0339	0.0085
	5	3.63	45.59	0.0796	0.0159
	6 or more	3.81	24.59	0.1550	0.0310
2001	1	1.44	299.15	0.0048	0.0048
	2	2.50	233.18	0.0107	0.0054
	3	3.01	170.22	0.0177	0.0059
	4	3.50	149.34	0.0234	0.0059
	5	3.79	134.87	0.0281	0.0056
	6 or more	4.68	134.87	0.0347	0.0058

Note: This table calculates the implied from the model fixed costs F, variable profits V, and S = F / V.

Table 12. Per-Firm Entry Threshold Ratios by Year

Year	**S_2 / S_1**	**S_3 / S_2**	**S_4 / S_3**	**S_5 / S_4**	**S_6 / S_5**
1995	1.20	1.08	0.98	0.93	0.88
1998	1.67	1.06	1.05	1.88	1.62
2001	1.12	1.10	0.99	0.96	1.03

Table 13. Likelihood Ratio Tests for Constant Fixed Cost Ratios over Time

Null hypothesis	**F_2 / F_1**	**F_3 / F_1**	**F_4 / F_1**	**F_5 / F_1**	**F_6 / F_1**
$F_{N/F1,1995} = F_{N/F1,1998}$					
Test statistics	8.12	12.13	4.15	0.58	0.18
Prob. > chi square	0.00	0.00	0.04	0.45	0.67
$F_{N/F1,1998} = F_{N/F1,2001}$					
Test statistics	3.51	0.00	0.00	0.41	4.58
Prob. > chi square	0.06	0.97	0.95	0.52	0.03