Computing abuse related damages in the case of new entry: An illustration for the Directory Enquiry Services market*

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Abstract

A number of European countries, among which the UK and Spain, have opened up their Directory Enquiry Services (DQs, or 118AB) market to competition. We analyse the Spanish case, where both local and foreign firms challenged the incumbent as of April 2003. We argue that the incumbent had the ability to abuse its dominant position, and that it was a perfectly rational strategy. In short,the incumbent raised its rivals' costs directly by providing an inferior quality version of the (essential) input, namely the incumbent's subscribers' database. We illustrate how it is possible to quantify the effect of abuse in situation were the entrant has no previous history in the market. To do this, we use the UK experience to construct the relevant counterfactual, that is the "but for abuse" scenario. After controlling for relative prices and advertising intensity, we find that

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one of the foreign entrants achieved a Spanish market share subtantially below what it would have obtained in the absence of abuse.
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1. Introduction

The European Union has initiated the liberalisation and opening up to competition of telecommunications through the adoption of a series of Directives which has been shouldered by the publication of green papers and recommendations. Typically, this liberalisation process involves setting a deadline for complete market opening, with an allowance being made for Member States being able to liberalise ahead of the deadline. Liberalisation affected distinct services at different moments in time; for instance, data transmission and mobile telephony were opened up to competition early on, while fixed line voice telephony was liberalised later. In practical terms, one of the last telecom services to be effectively liberalised are Directory Enquiries (DQs) over the telephone networks. The latter service had traditionally been provided by the incumbent under a regulated monopoly regime. Calls to a single universal number would give access to an operator that would provide the phone number of a physical or legal subscriber. The same kind of services was also available, at much higher prices, for international DQs. That was made possible by a series of international agreements that involved setting a single protocol for international DQs between members of the International

Telecommunications Union.

Two large markets, the UK and Spain, were effectively opened to competition in early 2003. The UK market was considered one of the most attractive, as the total number of DQ calls was estimated to be about 600 million per year at the time of liberalisation. Both UK and non-UK firms entered to challenge the incumbent, British Telecom (BT). In Spain, a similar entry pattern is observed, with two non-Spanish firms (Telegate and Conduit) challenging the incumbent Telefónica de España and its subsidiary, Telefónica Publicidad e Información (TPI) as of April 2003. Further entry by local firms followed, while the Telefónica group later launched an additional brand.

Conduit Ltd., one of the foreign entrants started legal proceedings against Telefónica for abuse of dominance.[1] While the latter concept has been under discussion over the last few years, its application is straightforward in the case analysed in this paper. There is no doubt that the incumbent enjoyed a dominant position at the time when the market was effectively opened to competition. In addition, the conduct imputed to Telefónica does not fall into "grey area actions" that may be considered pro-competitive in a different situation. Telefónica raised its rivals costs and made entry more difficult by deteriorating the quality of an input that ought to have been made available for free, namely the database containing information pertaining to fixed line (PSTN) subscribers. As will be described further on, Telefónica's strategy was both implementable and profit maximising.

In November 2005, Madrid´s Fifth Commercial Court found Telefónica guilty of abuse, and awarded a small amount of damages to Conduit. Part of the judge-

[1] Since September 2004, Spanish Commercial Courts have to apply Article 82 of the Treaty of Rome which prohibits the abuse of dominance. This means that agents can now claim damages for violations of Article 82.

ment's motivation relies on earlier findings of the industry regulator, the Comision del Mercado de Telecomunicaciones. Following this initial decision, both Telefónica and Conduit appealed the verdict. In May 2006, the appeals court (Audiencia Provincial de Madrid) upheld the initial ruling. As will be argued further on, both decisions either reflect excessive caution or a lack of understanding of the economics of the case, or a mix of the two.

The objective of the paper is to quantify the damages stemming from Telefónica's behaviour aimed at impeding the entry of new competitors. There exist various methodologies to compute damages stemming from anti-competitive behaviour; Connor (2006) describes the various options that have been used (and accepted) in US in competition law enforcement. In terms of his taxonomy, we simultaneously apply a yardstick and econometric modelling approach. More precisely, we use Conduit's experience on the UK market to econometrically estimate its expected, abuse free, market share in Spain. In order to assess the validity of our central results, we provide a series of robustness checks. As far as we understand, obtaining alternative estimates that yield consistent results is highly valued by US anti-trust enforcers and forensic economists (Connor (2006), Fisher (2006)).

In Europe, the use of rigorous forensic economic analysis in competition cases is both new and rare (see Connor (2006)). To the best of our knowledge, only the EU Commission and a few Member States (the UK among them) have accepted (or requested) econometric analyses in competition cases. In the case of Spain, the practice has been almost inexistent, and whenever the parties have spontaneously presented an econometrically based forensic analysis, Spanish enforcement authorities do not seem to have paid much attention. Last, the parties involved usually prohibit the public diffusion of the results, even under strict confidentiality conditions (the Volvo-Scania merger being an exception, see Ivaldi and Verboven (2005)). In the case at hand, Conduit gave us permission, subject to confidentiality clauses, to write an academic paper. In that sense, this is a novelty in the European context.

The remainder of this paper proceeds as follows: section 2 briefly describes the technological characteristics of DQ services provision and drivers of demand. Section 3 provides a conceptual rationalisation of the incumbent's behaviour and makes explicit predictions regarding the market share of entrants submitted to aggressive behaviour by highlighting the importance of search costs. Section 4 quantifies damages by using the UK experience to construct the "but for" scenario. Section 5 concludes.

2. Supply and demand characteristics

The basic input required to provide DQ services is the database pertaining to fixed line subscribers. The latter are, principally, households, firms, and public administrations. In the case of Spain, and in accordance with EU rules on cost orientation, the incumbent was supposed to provide this data for free in a ready to use standardised format to all entrants that met the relevant regulatory requirements. In addition to the phone number(s), the database had to include additional information such as postal address as well as fax number(s) whenever applicable. From a commercial perspective, intelligent network numbers (90X or 80X) are particularly relevant, since they the fall into the category of "Frequently Used Numbers" (FUNs), i.e. they represent a large proportion of DQ enquiries.

For an agent that does not own a network, the second necessary input is access to the network so that enquiries to a given 118AB number end-up being directed to the pertinent call center. Once routed to a centre, the call is put in a queue before being answered by an operator that uses a search engine to extract the relevant information from a database. Once the enquiry is completed, the operator may offer "call termination"; the latter is an example of value added service provided by DQ operators (others include SMS delivery of the number). Once the basic operation has been set-up, a DQ service provider is not faced with capacity constraints, save in the very short-run. It is indeed easy to attend a growing number calls, either by hiring more operators or by subcontracting part of the activity to a third party.

Prior to liberalisation, DQ services did not include value-added services and were typically provided by the incumbent monopoly operator at a regulated price. Basic DQ services may be considered as forming part of universal service obligations that have to be maintained by incumbent operators. As a consequence, Spanish authorities decided to maintain a basic DQ service at a regulated price to be provided by the incumbent, Telefónica. In principle, the market was opened to entry for licensed operators in April 2002. For a period of one year, the old regulated number (1003) was to coexist with commercial 118AB numbers. In practice, the incumbent ensured that entry was impeded while 1003 still existed. However, during this period, the Telefónica Group launched two numbers of its own in February 2003. The first (11888) was introduced by its fully controlled subsidiary, TPI (Telefónica Publicidad e Información). The second (11818) was launched by Telefónica as a direct substitute for 1003 as the new regulated service. In the UK, a similar path was chosen: following liberalisation in December 2002, the old regulated number provided by BT (192) was maintained until the end of August 2003; thereafter both the old number and regulated services disappeared altogether. The difference between Spain and the UK is that effective entry was possible for non-incumbent firms during the parallel running of the old number and the new commercial ones.

Under "normal" circumstances, the product offered by 118AB providers is by and large functionally homogeneous. In practice, service providers have horizontally differentiated their products through advertising. In terms of quality, DQ providers may differ in terms of the accuracy of the information they provide (see for instance, OFCOM 2003 & 2004). In addition, the speed at which an enquiry is being dealt with may differ across providers, for instance because of the time spent queuing before being attended by an operator. In the industry's jargon, "Service Levels" refer to the time spent queuing while "Average Handling Time" (AHT) is the average number of seconds that are effectively charged on a call. Since the price charged is usually formed by a two part tariff (a fixed fee for connection plus a per second fee), quality adjusted prices may differ across two operators that offer the service with the same tariff structure (as AHTs may differ). However, the UK experience indicates that quality convergence among service providers (as proxied by AHTs and Service Levels) is quick (OFCOM 2004). In other words, quality differences are transitory.

Since the new DQ umbers were unknown to the public, the opening of the market was accompanied by intensive advertising campaigns to promote brand recognition. This dimension of horizontal differentiation is particularly marked in this industry. Table 1 indicates that advertising intensity (measured as the ratio of advertising effort to the total number of calls) is very large.[2]

Insert Table 1 about here

This high advertising intensity reflects the fact that, in this industry, brand recognition is the key to commercial success. Even after the initial launch pe-

[2] Given that the unit price is slightly below 1 €, these ratios are also an approximation of the advertising to sales ratio.

riod, advertising remains important to maintain number awareness (i.e., aimed at ensuring that actual or potential customers remember the 118AB number being advertised). In that respect, it is worth mentioning that in the UK, the advertising campaign pursued by the one of the new entrants (The Number) acquired something close to "cult status" and received various advertising awards.

The literature distinguishes between "persuasive" and "informative" advertising. The former is aimed at altering consumer tastes and "creates spurious differentiation and brand loyalty" (Bagwell, (2005), p.3) while the "informative" kind performs the useful task of conveying product information to consumers.[3] In practice, most markets are characterised by both types of advertising, and DQ services are no exception. When the products were initially launched, advertising informed consumers of the 118AB alternatives. However, given the degree of functional homogeneity of the products on offer, advertising became of the "persuasive" type once consumers have been familiarised with 118AB numbers. In such circumstances, "advertising can have important anti-competitive effects, as it has no "real" value to consumers, but rather induces artificial product differentiation and results in concentrated markets characterised by high prices and profits" (Bagwell (2005), p.3).

Despite the fact that there is no significant difference between the technology used in the UK and Spain, that entrants adopted similar strategies in each of these markets, and that there is no a priori reason to believe that there exist marked divergences in terms of consumer behaviour, the evolution of market structure has been quite different across the two countries. In the UK, although the number of licensed operators is very large, the market quickly evolved into an oligopoly

[3]There is a third view on advertising, namely that it is a complement to the good being purchased (e.g. the utility is derived from consuming a luxury good increases because it is socially perceived as such because of advertising). This third category is not applicable to the 118AB market.

dominated by The Number and BT. These two firms account for about 80% of the market, while the remainder is shared among smaller operators. Among the fringe, three operators nonetheless enjoy a significant market share: Yell, Maureen, and Conduit. The striking characteristic of the UK market is that the largest operator is not the incumbent: BT's market share is estimated at 35%, while The Number's stands at about 45%.[4] Given Spain's less extensive market, the number of active operators with a significant market share is smaller. The main difference with the UK is reflected in the dominance still enjoyed by the Telefónica group. The latter offers three products: a regulated one (11818), and two commercial ones (11822 and 11888). 11822 is provided by Telefónica de España, while 11888 is marketed by its fully controlled subsidiary TPI. As can be seen from Table 2, the data provided by the Comisión del Mercado de las Telecomunicaciones (CMT) indicate these three brands accounted for more than 81% of the market at the end of 2003.[5] During 2004, that dominance was maintained, with the three Telefónica brands still accounting for more than 79% of market revenue. Apart from a change in the relative position of the smaller operators over the period, it is also worth noting that while the overall market share of the Telefónica group has barely changed, there has been a migration from the regulated number (11818) towards the commercial ones (11888 and 18822). The rise of TPI's number (a Telefónica subsidiary) has been particularly spectacular: its share of market revenue jumped from 29.5% to 49.1% in one year. It is worth pointing out that this number (11888) is also the most expensive among the main commercial ones.

[4] Industry regulator OFCOM does not provide information on market shares. The UK figures appearing in the text have been obtained from the press (BBC online) and specialised information providers (e.g. 118tracker).

[5] This holds irrespective of whether market size is approximated by number of calls, total minutes, revenue, or total number of enquiries (the latter may differ from total calls as a single call may result in two or more enquiries).

Insert Table 2 about here

3. Rationality of the alleged abuse

Conduit asked us to quantify the possible damages resulting from the incumbent's actions. In what follows (and in line with Spanish legal practice), we will refer to the direct costs as the ones that can be quantified on the basis of direct and "hard" evidence such as invoices. The indirect damages stem from the quantifiable additional loss of profits stemming from the abuse.

3.1. "Direct" costs

The central claim is that Telefónica impeded the entry of new competitors through a combination of actions. First, it erected a series of obstacles to new entrants prior to the effective opening of the market on April 5 2003 (the "launch date"). For instance, prior to launch, it dragged its feet to provide terms and conditions for network access; when it did the price turned out to be such that downstream activity would have been loss making under any reasonable parameter constellation (a clear attempt of price-squeeze leading to foreclosure). On that particular issue, the industry regulator had to intervene in order to force Telefónica to make a reasonable non-discriminatory and cost-oriented offer. Second, Telefónica failed to provide the database in timely manner and in the format stipulated by the CMT. When it did provide the data, it proved to be defective in a number of respects. Many compulsory fields were left empty or were inaccurate (e.g. a fax instead of a phone number would appear in the extraction process, or when more than one number was associated with a commercial or administrative entity, it did not stipulate which was the main one). In addition, intelligent network entries (which represent the a large part of FUNs numbers) were simply missing. These claims were upheld by the Courts.[6]

For a new entrant, this generated additional costs that would not have otherwise been incurred. Since the data was faulty, the entrant hired personnel to "fix it". This task involved obtaining information from printed version of the telephone directory (white and yellow pages) and/or surfing the web. In addition, operators were, all else equal, slower since the extractions would sometimes return blank fields, leading to an increase in AHTs. In addition, the new entrant was faced with a very real short term problem, namely to provide information once the operation had gone live. Since the data was of such poor quality, the firm had to turn to the E.115 service, a costlier alternative which was meant to be used for international enquiries only. E.115 is a protocol developed by members of the International Telecommunications Union (ITU) in order to provide foreign phone numbers in a standardised format. That service is offered by existing telecom operators on the basis of per consultation fee; it is not possible to download the E.115 database. In addition, E.115 consultations are slower, thus leading to increased AHTs. Given that each E.115 consultation effectively cost about 0.40 €, and that the entrant's prices stood at approximately 0.30€ per enquiry, it meant that the margin was negative, even before advertising, wages, overheads, and other expenses were taken into account. Apart from generating pecuniary costs, the faulty database led to a deterioration in service quality. During the early stages, the entrant's AHTs were well above international standards, and above its performance in the UK market. Moreover, the accuracy of the information suffered substantially. In short, this new operator was offering lower quality at a price above the one it would have charged had AHTs been shorter.

Raising a rival's direct costs (RRDC) and forcing quality deterioration (QD)

[6] Decisions by Madrid´s Fifth Commercial Court (November 2005) and by the Audiencia Provincial de Madrid (May 2006).

form part of a single abusive strategy; *stricto sensu*, forcing QD increases a rival's costs. However, distinguishing between increases in direct costs and QD is useful in the context of the empirical exercise. We will refer to RRDC as the effect of Telefónica's actions on the entrant's costs, while forced QD represents abuse induced changes in the residual demand faced by that firm.

A combination of RRDC and forced QD is a very attractive strategy for an incumbent bent on impeding entry into a lucrative market.[7] Compared to a more "traditional" case of predatory pricing, a combination of RRDC and QD provides immediate benefits, as opposed to sacrificing short term profits for future, possibly elusive, profits once exit takes place. In addition, it does not require exit: it is sufficient to weaken the entrant in order to achieve additional profits above those that would obtain in an abuse-free situation. Nor is it necessary to have access to a "deep pocket".[8] As will be argued below, the existence of search costs in this market renders this strategy all the more attractive, since it can have permanent effects beyond the time period during which the abuse is taking place *stricto sensu*. For all of the above, such a strategy (involving both RRDC and QD) is more credible. To sum-up, within the menu of aggressive postures, RRDC combined with QD is highly attractive for the incumbent.

3.2. Static effects

Economides (1998) presents a model that neatly fits this situation. In his paper, there is a vertically integrated firm that enjoys a position of upstream monopoly for the provision of an essential input for downstream production. In the latter, the monopolist control a subsidiary that competes à la Cournot with other firms. He shows that, under very general conditions, the vertically integrated monopolist

[7] See the classic contributions of Salop and Scheffman, (1983, 1987).

[8] It should be noted that the Telefónica Group is highly unlikely to face such a constraint in any case.

has an incentive to raise its downstream rivals' costs. In his own words (p. 278): "Therefore *any* increase of rivals' costs above zero results in increased profits for the integrated monopolist and subsidiary". In addition: "Raising rivals' costs allows the monopolist to "manage" the downstream market and force independents to exit. Thus, in the medium and long run, the consequences of non-price discrimination can be much more adverse to social welfare than the short run consequences that I have described" (p. 278). Last, Economides (1998) shows that his results also applies when cost raising strategies are substituted by forcing quality downgrading: "inspection of the profit maximization conditions (..) shows that the results of this paper also hold for a discriminatory degradation of the quality of the input offered to rivals which decreases the willingness to pay for the rivals' downstream output but leaves costs unaffected. In such a setup, independent downstream firms have marginal cost $w + s$, but, since they have a lower quality product, consumers are willing to pay only $p - r$ for their product (while consumers pay p for the subsidiary's output). That is, the independents face a demand curve that is a parallel downward shift by r of the demand faced by the subsidiary (pp. 278-279)". It is worth noting that similar results would obtain if the downstream industry were to de modelled as a horizontally differentiated market in the line of Salop (1979). Our claim is that the Telefónica's strategy resulted in both directly increasing costs and downgrading quality, with each effect reinforcing one another.[9]

Objections were raised to Economides' (1998) paper; in particular, the generality of his findings were questioned. In a series of contributions (Sibley and Weisman, (1998a, b)), models were presented in which a vertically integrated mo-

[9] Conceptually, RRDC and QD may be considered as indistinguishable, as a single action produces one outcome. In practical terms, the distinction between RRC and QD is useful, as we have directly observed some of the direct costs associated with Telefónica's actions aimed at RRDC, while the "indirect effect" (QD) is econometrically estimated.

nopolist facing competition in the downstream market would *not* have incentives to RRDC. The intuition is the following: if the monopolist enjoys positive margins in the upstream market and its downstream market share is very small, a countervailing effect to the incentive to RRDC emerges. Since the monopolist derives profits from selling the essential input, it benefits from larger sales to downstream firms as long as its subsidiary commands a negligible market share. Mandy (2000) provides a general overview of models were this second effect may dominate the cost raising incentive. Mandy (2000) also identifies the real world conditions required for the cost raising incentive to disappear. None of these conditions are present in the case at hand, that is Telefónica clearly has incentives to RRDC and to force QD. First, upstream margins are zero, or close to zero: the database had to be provided for free, and interconnection charges are cost-oriented. In both cases, this results from a regulatory decision. By contrast, downstream price-cost margins are very high (50% or more). Last, Sibley and Wiesman (1998a) simulated their model using reasonable parameter values. They show that if the downstream subsidiary enjoys a market share greater than 26%, the cost-raising incentive dominates, even under the most "adverse" conditions for this effect to be present. Given that Telefónica's market share is way above this threshold, RRDC is optimal.[10]

3.3. Dynamic effects in the presence of search costs

In view of the specifics of this market, Telefónica's actions had an effect beyond the time period during which the entrant had to operate with a defective database. The existence of search costs combined with the fact that this market was opened to effective competition for the first time in April 2003 means that developments

[10] This statement holds true irrespective of how market share is computed on the basis of number of calls, minutes, or revenue.

during the launch period (the first 4 to 6 months) persisted over time. Liberalised DQ services were new to Spanish consumers: a single regulated number (1003) was replaced by various 118AB numbers; the latter (save for the regulated one) were allowed to provide value-added services; quality levels were unknown; and finally, prices levels (and differences thereof) were also new. In short, consumers had to incur search costs in order to obtain information regarding these new offers. For an average consumer, these search costs are low in absolute value, but very large compared to the potential savings to be achieved by incurring them. As is well known, this is the trade-off facing consumers: it is not the absolute value of search costs that matters, but whether it is worth incurring them. As pointed-out by the British National Audit Office (2005), expenditure on DQ services is a very low proportion of income; as a consequence, the savings to be achieved by looking for the best offer are minute when compared to total income.

The importance of adopting a dynamic approach when search costs are present is stressed by NERA's (2003) report to the UK's Office of Fair Trading (OFT) and Department of Trade and Industry (DTI). In their words: "When assessing an abuse of dominance investigation with switching costs, the importance of taking a dynamic approach cannot be overstated. (...) Competition in markets with switching costs can often be divided into a 'phase 1' and a 'phase 2'. In phase 1 firms price low to build a customer bases, whilst in phase 2, they concentrate on 'milking' their installed customer base and price high".[11] Further, the report notes that the ability of firms to extract rents is inversely proportional to the competitiveness of the market during 'phase 1'.

The evolution of the DQ market neatly fits this two-phases description: the initial launch (during which firms' "plough", or "invest in", the market) followed

[11] The discussion is framed in terms of switching costs; the same conclusions hold in the presence of search costs.

by a stabilisation period (during which firms "harvest" or "milk" the market). During the launch phase, providers build a customer base through intensive advertising, while consumers experiment the products on offer. It is plausible to think that the bulk consumers that have a satisfactory experience with a particular 118AB number will stick to it. By contrast, a bad experience during this experimentation phase is likely to induce the consumer to switch, or stop consuming the good. In addition, a negative experience during that initial phase may induce more consumers to switch (or choose another brand for the first purchase) because of hearsay. During the second phase, profit maximising firms set prices given the market share that they have achieved during the launch period. As a consequence, market shares and prices stabilise, while advertising becomes more sporadic and aimed at maintaining awareness of a particular 118AB number. In a market with these characteristics, second period market shares are a function of first period ones.[12] This correspondence is strongest when agents share the same technology, i.e. face similar costs. Last, the existence of search costs also ensures that second period equilibrium prices will be set above marginal cost.

In short, the time to profitably build a market share is during the launch phase, when customer's have not yet chosen a brand to patronise. Building a customer base at a later stage is unlikely to be profitable, since it is much more costly to induce customers to switch to a new brand as opposed to simply maintaining them.[13]

[12] See, for instance, the classical contributions of Klemperer (1987, 1992) or the extensive analysis carried for the OFT and the DTI by NERA (2003).

[13] In general terms, the marketing literature (see, for instance, Kotler (1997)) indicates that in order to attract a new customer, it is necessary to spend five times more on advertising as compared to maintaing a client that already buys the product. This order of magnitude is consistent with the experience of MGA, a late entrant on the Spanish DQ market (that launched in June 2003). Despite heavy advertising in 2003-2004 (26.6% of total spend in 2004) and about average prices, its market share stood at 4.8% at the end of 2004 (cf. Table 4).

4. Identification of the effects of the abuse

For practical purposes, we have decomposed possible abuse related losses into direct costs and the additional loss of profits once the direct costs have been netted out. It is straightforward to show that the lost profits resulting from the abuse are always larger than the direct costs that can be imputed to the incumbent's actions. Save for the polar cases of Bertrand competition with no capacity constraints or perfect competition, firms face a downward slopping residual demand curve. Suppose constant marginal costs MC, and that a firm faces the residual demand depicted in Figure 1. In the absence of abuse, the firm would earn gross profits equal to $BCDE$. If its costs are increased to MC', and profits dwindle to AB. The "direct damage" is equal to the quantity produced under abuse times the increase in costs, that is D. Even if the firm manages to recover D through the courts, it still suffers a net loss, as $A < CE$.[14]

Insert Figure 1 about here

While useful to show that total damages are greater than direct costs, Figure 1 does not depict the effect of forced QD. In addition, it ignores the importance of search costs and the fact that the abuse occurred before and during the launch phase. In this paper, we almost completely ignore abuse related costs prior to April 2003 because of lack of quantifiable data; it should however be borne in mind that their consequence was that Conduit was not as ready as it would have liked on launch day.

New entrants in these markets build a market share with intense advertising. The latter increases demand for the firm's product in each period and can be cou-

[14] This always holds, since profit maximization in the absence of abuse implies that BCDE>ABD.

pled with low, cost oriented prices during launch. Once a sufficiently large market share is built, prices are raised in order to recoup advertising outlays and generate profits. The combination of low initial prices and heavy advertising results in a steady increase in market share, followed by a drop once prices are raised (which would correspond to the beginning of the stabilisation period). Figure 2 depicts the expected evolution of the market share of a firm (Firm 1) that follows this course of action. In this example, the price charged during two initial periods equals (or is close to) marginal cost; as of period 3, prices are raised thus resulting in a drop in market share. As of period 4, which corresponds to the first phase of the stabilisation period, market share fluctuates around a level.

In both Spain and the UK, Conduit has adopted advertising *cum* low initial prices to build its customer base, and raised its prices later. In Graph 1, we represent the evolution of that firm's market share in these two markets; the scale on the vertical axis has been transformed for reasons of confidentiality.[15]

Insert Figure 2 about here

Insert Graph 1 about here

It is simple to represent the evolution of a firm that adopts a penetration strategy based on low prices and advertising and that is subjected to an abuse which results in inflated costs and forced QD. *Ceteris paribus*, higher costs mean that fewer resources are available for advertising. More importantly, forced QD means that advertising is less effective at increasing demand during each period of the launch phase. Once the "stabilisation period" begins, the market share fluctuates around a level which is lower than that which corresponds to an abuse-

[15] The construction of these market shares is described in section 6.

free situation. This evolution is depicted by the line labelled Firm 1' in Figure 2. Note that the gap between curves Firm1 and Firm 1' *only* reflects the forced QD suffered by the entrant; direct costs have to be added to the profit loss stemming from this lower market share.

This statement is illustrated in Figure 3a.[16] In order to simplify exposition, assume that this corresponds to the first period of the stabilisation phase. In line with Economides (1998), it is assumed that forced QD results in the leftward shift of the residual demand curve faced by the firm from $d(p)$ to $d'(p)$. In addition, the incumbent's RRDC strategy raises constant marginal costs upwards from MC to MC'. Assume that the firm chooses prices and quantities which correspond to the intersection between marginal revenue (MR) and marginal cost (MC). In the absence of any kind of abuse, the firm would face $d(p)$ and MC, set price at p^1, sell q^1, and obtain gross profits equal to $\Pi = (p^1 - MC)q^1$. As a consequence of the abuse, the firm faces MC' and $d'(p)$, sets price at p^* and sells q^*, obtaining $(p^* - MC')q^*$ gross profits. In this example, the "direct costs" as we have defined them are equal to $(MC' - MC)q^* = X$. Full compensation for lost profit is equal to $(p^1 - MC)q^1 - (p^* - MC')q^*$. As will be explained below, we cannot estimate this amount. However, what we can estimate is the market share that the entrant ought to have obtained in the absence of QD, *given the price it actually set* (p^* in this example). Concretely, we are able to estimate the magnitude of $\Pi^1 = (p^* - MC)(q^2 - q^*)$. Thus, the damages that were able to quantify are the sum of X (direct costs) and Π^1 (the latter due to QD). Note that the amount that we identified is smaller than the one that corresponds to full compensation.[17] Figure 3a also permits to depict the damages suffered by the entrant's during

[16] The discussion is framed in terms of pricing (and not pricing and advertising) behaviour for ease of exposition.

[17] Again, this obtains immediately: in the absence of abuse, p^1 and q^1 maximise profits; therefore p^* and q^2 yield lower gains.

later periods when data problems were supposedly solved. In the initial stages, the entrant faces MC', and damages we compute amount to $X + \Pi^1$. At a later stage, marginal costs fall back to MC, and our approach proxies Π^{1^*}, defined as $\Pi^{1^*} = (p^3 - MC)(q^4 - q^3)$.

Insert Figure 3a about here

The argument developed above holds if the only effect of forced QD is to lower the quality offered by the entrant, as reflected by the inward shift of the residual demand it faces. It could however be the case that the abuse also reduces the intensity of competition. In that case, all firms would price less aggressively as a consequence of forced QD. The converse is that, in the absence of abuse, firms' residual demand would be more elastic, reflecting the higher intensity of competition. In other words, the abuse free residual demand that the entrant would have faced is not $d(p)$ (cf. Figure 3a), but $f(p)$ depicted in Figure 3b. If this is the case, the amount damages (above direct costs) remain positive, but are lower. To illustrate this point, imagine that RRDC is absent, and that the abuse only consists of forced QD. In the abuse free benchmark characterised by a higher intensity of competition, the entrant would have earned profits equal to $(p^5 - MC)q^5$. As before, forced QD results in the firm facing $d(p)'$ instead of $f(p)$, earning gross profits equal $(p^3 - MC)q^3$. In these circumstances, full compensation would amount to $(p^5 - MC)q^5 - (p^3 - MC)q^3$. Again, we cannot compute this magnitude, but we can estimate the loss of profits given the firm's *observed* pricing behaviour. In this second example, this amounts to $\Pi^2 = (p^3 - p^5)(q^6 - q^3)$

Insert Figure 3b about here

In each of these two cases, the total of damages is higher than what we are to quantify econometrically. The difference between the two scenarios is that in the second, we posit that competition would have been tougher in the absence of abuse.

5. Construction of the "but for" scenario

In order to compute damages, it is necessary to construct a counterfactual, the "but for the abuse" scenario. The latter exercise can not make use of the data pertaining to the market and time period during which the abuse took place as the data is distorted (Hall (1994), Ashurst (2004)). Since the entrant never experienced an abuse-free situation in Spain, this precludes the use of Spanish data to build the "but for" scenario. We have therefore used the UK market to construct a competitive reference point. We chose econometric estimation over possible alternatives, such as calibrating a theoretical model. The fundamental reason is that we need to capture the idiosyncrasies of a market characterised by first time entry and a launch period dedicated to building a customer base in the case of a new entrant. Calibrating a model a carrying out comparative statics exercises would not permit a proper treatment of this crucial initial phase.

Using the UK experience to construct the but for scenario is motivated by the following reasons. First and foremost, we observe the same firm on both markets; this allows us to directly estimate the firm level fixed effect. In addition, the entry strategy adopted is the same in both countries: cost oriented prices shouldered by heavy advertising, followed by a posterior increase in prices. Graph 2 provides the re-scaled evolution of Conduit's prices in the UK and Spain; combining it with Graph 1 visually illustrates the entrant's strategy.[18] Second, the opening up of the market coincides almost perfectly in the two countries (December 2002 for the

[18] At the beginning of the period, the high effective prices charged by Conduit on the Spanish market are due to inflated AHTs derived from the abuse.

UK, April 2003 for Spain). Conduit's actual launch dates is April 2003 on both markets. Third, the UK market has not been distorted by any abuse.[19] Fourth, the initial market structure is identical across the two markets: an incumbent facing the entry of new competitors. Fifth, per capita incomes are no too far apart. Sixth, during the launch period, advertising intensity measured as total expenditure over potential market size was very similar across the two countries (cf. Table 1).[20] Last, the technology used in both markets is essentially the same.[21]

Insert Graph 2 about here

Apart from the abuse, there are some additional differences across the two markets. In Spain, the old regulated number (1003) was abolished as of April 2003. In addition, the regulator imposed a so-called "carrousel". During the period April-July 2003, calls to 1003 were answered by a recorded message that quoted the numbers of the active entrants.[22] Since the numbers were quoted on a rotating basis, a large number of calls were directed to the new entrants.[23]

[19] There has been a complaint against BT filed by the new entrants. The core of the case was whether BT had abused its dominant position by advertising its new number in the paper edition of the phonebook. A detailed enquiry, which included the use of econometric techniques, was carried out. The case was closed without penalties, as it was established that BT's conduct had no material effect on competition (Decision of the Director General of Telecommunications, case CW/604/03/03).

[20] The experience of other countries that have liberalised their DQ services indicate that there is clearly room for more than one large operator in Spain. In Norway (a much smaller market, with less than 60 million calls in 2002), two firms have successfully challenged the incumbent (see Norwegian Post and Telecommunications Authority, (2003), "Competition in the Norwegian market for directory enquiries - an analysis and evaluation").

[21] Conduit's experience in markets other than the UK (e.g. Switzerland or Austria) presents some serious drawbacks to be used to construct the "but for" scenario. Apart from the fact that the time periods do not coincide, the main limitations is that in these other countries, liberalisation has been incomplete. However, it is important to note that the entrant already had extensive experience in terms of entering foreign markets in which it had to operate in a different language than that of its country of origin.

[22] In April, 4 new numbers were active; in July 2003, 6 numbers were quoted.

[23] The imposition of a carrousel by the CMT was motivated by the desire to facilitate entry

By contrast, in the UK, the old regulated number was maintained until the end of August 2003, and no "carrousel" was put in place after the disappearance of the 192 number. In addition, the number of active entrants has been larger in the UK, even if allowance is made of the different country sizes (60 versus 40 million inhabitants). Last, the UK has pioneered telecom liberalisation in Europe, possibly suggesting that both consumers and firms are well accustomed to a fiercely competitive environment, and therefore act accordingly (e.g. being more price sensitive). All these characteristics suggest that, in the absence of abuse, entry in the UK would have been more difficult than in Spain. In the econometric exercise, we are only able to control for the maintenance of the 192 number by including a time dummy; it is not however possible to control for the other characteristics that make the UK market more competitive.

6. Econometric specification and variable definition

We estimate a market share equation for the entrant in the UK market; we then use these UK results to predict the evolution of that operator's market share in Spain. There are two basic approaches to estimate market share equations. The first approach, commonly used in the marketing literature, consists of the estimation of market response models that predict the influence of marketing variables on market share (see Kumar and Heath, (1990), or Kumar et al, (2002), among others). These models can be used to infer the cross-effects between a set of marketing variables (prices, advertising, discounts,...), but one can also learn about the effects of own efforts while conditioning on competitive reactions. Usually, these models are proposed in a linear, multiplicative, or in the so-called attraction

in view of the impediments that new operators had faced as a consequence of the incumbent's behaviour prior to the launch date.

form.[24] Among these specifications, the attraction from is the most adequate, as it simultaneously estimates the behaviour of all participants' market shares and it embodies a series of restrictions (e.g. market shares are between zero and one and sum to 1). The second approach, more common in the economics literature, is the estimation of logit demand models that are based on a model of individual brand choice (see Nevo (2000) for a survey of logit demand models). In these models, consumers observe prices and product characteristics for J differentiated products and choose the product that maximizes their utility. The specification of a demand system is completed with the introduction of an outside good, since individuals may decide not to purchase any of the brands. These models have been successfully estimated both with household level and aggregate data (see Allenby and Rossi (1991)). Although logit demand models are utility based, their specification coincides with an attraction model that embodies restrictions on the competitive process (the attraction of brand j only depends on own explanatory variables), and where attraction depends on the exponential of the marketing variables.

Our choice of model specification is driven by data availability. As we describe in next section, we do not have information regarding competitors' market shares. This precludes the estimation of a fully fledged attraction model. Therefore, we estimate an additive and multiplicative form of the market share response models, but for Conduit only. In addition, we estimate a logit demand model for that firm.

The marketing mix variables relevant in the DQ market are prices and advertising. The three specifications that we estimate are defined as follows:

[24] In attraction models, the market share of a brand is determined by its attraction, A_{jt}, with respect to the sum of all attractions, $MS_{it} = \frac{A_{it}}{\sum_{j=1}^{J} A_{jt}}$. The attraction of a brand depends on the mix of its own and competitors' marketing variables.

1. Additive specification. This specification implies that we assume that the market share for each brand is a linear function of the marketing mix variables. Thus, the equation to estimate is:

$$MS_{it} = \beta_{i0} + \beta_{i1} relP_{it} + \beta_{i2} relA_{it} + Q_t' \beta_{i3} + \varepsilon_{it} \tag{1}$$

where MS_{it} is brand i's market share at time t; $relP_{it} = \frac{P_{it}}{\frac{1}{J}\left(\sum_j P_{jt}\right)}$ is own price relative to that of its competitors, with J equal to the number of active firms; and $relA_{it} = \frac{A_{it}}{\sum_j A_{jt}}$ is the firm's advertising effort relative to total. Q_t' is a set of time dummies to control for possible changes in market shares due to holidays and different days of the week. It also includes a dummy taking value 1 for the period April-August 2003 (and zero thereafter) to control for the continued existence of the old regulated number (192).

2. Multiplicative specification. This specification assumes that market shares are a multiplicative function of the marketing mix variables:

$$MS_{it} = \exp(\beta_{i0} + Q_t' \beta_{i3} + \varepsilon_{it})(relP_{it})^{\beta_{i1}}(relA_{it})^{\beta_{i2}}$$

where the definition of the variables is as above. Therefore the equation to estimate is given by:

$$\ln(MS_{it}) = \beta_{i0} + \beta_{i1} \ln(relP_{it}) + \beta_{i2} \ln(relA_{it}) + Q_t' \beta_{i3} + \varepsilon_{it} \tag{2}$$

3. Logit demand. Logit demand models are derived from individual discrete choice models. In the simplest version, heterogeneity among consumers is introduced in the model via the inclusion of a separable additive random shock, ε_{it}. If we assume that this shock is identically and independently distributed among individuals according to a Type I extreme value distribution, the market share of a brand i coincides with the probability that an individual buys that particular good. It can therefore be written as:

$$MS^*_{it} = \frac{\exp(\alpha_i + \delta_1 P_{it} + \delta_2 A_{it} + \varepsilon_{it})}{1 + \sum \exp(\alpha_j + \delta_1 P_{jt} + \delta_2 A_{jt} + \varepsilon_{jt})}$$

where P_{it} and A_{it} stand for the price and advertising effort of firm i at time t, and j denotes active firms (including firm i). There also exists the possibility of not buying any brand. In the latter case, the associated probability is given by:

$$MS^*_{0t} = \frac{1}{1 + \sum \exp(\alpha_j + \delta_1 P_{jt} + \delta_2 A_{jt} + \varepsilon_{jt})}$$

computing MS^*_{it}/MS^*_{0t} and taking logs, we obtain the following J equations:

$$\ln MS^*_{it} = \ln MS^*_{0t} + \alpha_i + \delta_1 P_{it} + \delta_2 A_{it} + Q'_t \beta_{i3} + \varepsilon_{it} \tag{3}$$

Note that the market share in equation (3) is different than the ones that appear in equations (1) and (2), since we also include consumers that do not purchase any brand. In other words, firm i's market share is defined over the potential market (the latter also encompasses consumers that do not make any purchase).[25]

[25] Apart from specifications (1)-(3), we estimated our market share equations with an alternative set of regressors (e.g., by using a time trend and its square instead of a yearly dummy, or with alternative values for potential market size in the logit specification). This additional set of results yielded very similar estimates.

Four comments are in order regarding the identification of equations (1), (2), and (3). First, these equations form a system of J equations, one for each market participant. As mentioned above, Conduit is the only firm for which we have a sufficient number of observations on market shares. Consequently, we estimate (1), (2), and (3) for that firm only. The parameters are then identified by the (daily) time series variation of the explanatory variables. Provided there is sufficient time variation, the parameter estimates are consistent, although not necessarily efficient. Second, the three specifications include a constant that picks-up any time invariant firm specific effect. This constant can be consistently estimated given the long time series that we use (more than 500 daily observations). Therefore, we control for any unobserved time invariant firm specific fixed effect. Third, there may be a source of simultaneity in the explanatory variables if there exist daily shocks that affect both daily prices and/or advertising as well as the error term. Therefore, we estimate the three equations by applying the Generalised Method of Moment (GMM), thus allowing for the endogeneity of both variables. Last, the use of daily data suggest that the errors are probably autocorrelated. As we will see below, given the type of instruments that we use, the presence of autocorrelated errors does not affect the consistency of the coefficient estimates but it affects the consistency of the standard errors estimates. Therefore, we compute standard errors robust to autocorrelation and heteroskedasticity.[26]

With respect to the possible endogeneity of the explanatory variables the situation is different for advertising and prices. In our context, it is reasonable to think that these variables are predetermined. The reason why we believe that the regressors may be predetermined is that advertising is booked months ahead of actual spend, and the entrant's pricing strategy is "mechanical" and established

[26] The robust standard errors use a kernel (Newey-West) based heteroscedasticity and autocorrelation consistent (HAC) estimation procedure.

prior to actual launch (cf. Graph 2). However, as we describe in next section, we construct the daily observations pertaining to advertising on the basis of their the monthly counterparts. More precisely, A_t (daily advertising) being predetermined means that it is uncorrelated with ε_t in equations (1), (2) and (3). But this does not preclude that *future* realisations of A being correlated with the error in period t. In the regressions, we use $\overline{A}_t = \frac{A_{t-15}+...+A_t+...+A_{t+15}}{31}$ instead of A_t. Thus, $E(\varepsilon_t \mid \overline{A}_t)$ is different from zero, even if A_t is predetermined. Therefore, we assume in all empirical specifications that the advertising variables are endogenous. For prices the situation is different since we have access to daily observations and therefore we do not introduce any additional correlation between this regressor and the errors. Actually, Conduit sets prices equal, or close to, marginal cost during the launch phase (approximately 6 months) and then raises its prices (typically by doubling them), but remains among the cheapest commercial alternatives. This is the pattern observed on both the UK and Spanish markets (cf. Graph 2). Still, we did not impose that this variable is predetermined and we test its endogeneity in the context of GMM.

Last, our specification of the logit demand equation does not allow for heterogeneity among consumers. This is equivalent to imposing a particular form of cross-price elasticities among firms, namely that the degree of substitution among brands is the same. This is a problematic assumption for some markets (e.g. the automobile industry as in Berry, Levinsohn and Pakes, (1995), that consider all vehicle classes, or the ready-to-eat cereal market analysed in Nevo (2001), where cereals for children and adults are not close substitutes). In our context, this assumption does not appear as too restrictive: DQ services are perceived as close substitute by consumers.[27]

[27] Allenby and Rossi (1991) provide evidence for the conditions under which a simple logit model performs well with aggregate data. They identify three conditions: that all consumers

Next we present the definition and construction of the variables used in the study.

6.1. Variable definition

The entrant provided us with their daily call volumes and AHTs; eqs. (1), (2), and (3) were thus estimated on the basis of daily volumes and prices (computed on the basis of AHTs). Some of the variables, such as market size, are not publicly available; competitors' AHTs (and therefore prices) are not observed with daily frequency; last, advertising effort is available on a monthly frequency. We therefore had to construct some of these variables on the basis of reasonable assumptions, described in the next sub-section.

6.1.1. UK data

To estimate eq. (1)-(2), we need an estimate of actual market size. In October 2004, industry sources estimated that market size had fallen by 45%, representing 315 million calls at that time. We assumed that the monthly reduction was proportional and constructed total market size accordingly.[28] We were able to cross-check our estimates with the figures provided by an independent consultancy. Performance House/118 tracker provides an estimate for monthly market size during the period December 2003-November 2004. Their estimate of total market volume over that time period stands at 378 million calls, while our estimate yields 370 million for the same time period. In addition, the correlation between the two monthly series is 0.9. We are therefore confident that we have used a fairly accurate measure of UK market size and its evolution. That market volume figure

are exposed to the same marketing mix variables; that the brands are close substitutes; and that the distribution of prices is not concentrated at an extreme value. All three conditions seem quite reasonable in our context.

[28] More precisely we assumed that volumes in October 2004 were equal to 26250000 monthly calls, and that they stood at 50416666 in March 2003. We applied a proportional monthly reduction between these two dates.

includes outsourcing services, that is calls attended on behalf of another company. We consider outsourcing as forming a distinct market, as it is not directed at final consumers. The market size we used for the UK nets out outsourcing calls from total call volumes. We divided monthly volume by the number of days of each month in order to get daily market size.

To estimate eq. (3), we also need to define the potential market for the UK. We have chosen the total number of calls prior to liberalisation as representing the potential market. According to BT, market volume stood at about 600 million calls at the time when the 192 number was abolished (August 2003). This is the value for potential market size that we use for the UK when estimating eq. (3).

In its study of service quality, OFCOM (2004) indicates that there are at least 30 active providers. According to the Performance House report mentioned above, four numbers (BT, The Number, Conduit, and Yell) represent more than 93% of total volume. These, plus Maureen, are the competitors that we included in the empirical exercise. To construct their prices, we used publicly available information on their tariff structure (and changes thereof over time) and the average AHTs provided by OFCOM. As far as the new entrant is concerned, we were able to construct daily prices for services provided through BT's network (minutes charged divided by the total number of calls, taking into account the entrant's tariff structure). The regressor is then the price in the case of eq. (3), and the entrant's relative price when we estimate eq. (1) and (2)

Monthly advertising expenditure for the entrant and all of its competitors was obtained from Initiative UK, a market intelligence firm; the original data comes from the Nielsen Media Research Multimedia System. The figure represents gross advertising (i.e. prior to discounts) in all outlets: TV, newspapers, radio, movie theaters, and street advertising. The regressor is simply the ratio of the entrant's advertising to total effort when estimating eq. (1) and (2), and advertising spend when estimating eq. (3).

6.1.2. Spanish data

According to the CMT, the total number of calls stood at 192 million in 2002. This is the value that we use for the potential market in Spain. For 2003, the CMT annual report indicates that call volumes stood at 127,26 million at year end. One year later, the same source reported that volumes had fallen to 99.7 million calls in 2004. We have assumed that this drop occurred month by month in a proportional manner. As in the British case, we divided monthly volume by the number of days of each month in order to get daily market size. Since no company provides outsourcing services in Spain, no adjustment was made to total market size.

At the end of 2003, 95% of calls we concentrated in four numbers: TPI's 11888 (TPI is a fully controlled Telefónica subsidiary), Telefónica's two numbers (11818, and 11822; the latter started operating in July 2003), Telegate's 11811, and Conduit (11850). Another two numbers have gained market share in 2004: Multiasistencia y Gestión (MGA, 11824, that starts operations in June 2003) and Antena 3's number, 11843, that was launched in May 2004. These are the agents that we used in the empirical analysis. In order to construct competitors' effective prices, we divided the total number of minutes by call volumes for each operator on the basis of the data reported in the CMT annual report. For the entrant, we constructed daily prices (used in eq. (3)), as we have AHTs for each day. With this information in hand, we built the entrant's relative price (used in eq. (1) and (2)). To build this variable, we had to assume that competitors' AHTs obtained from the CMT report remained constant. The entrant's advertising effort relative to its competitors has been calculated on the basis of the data provided by Initiative España. The original data comes from INFOADEX, a specialist provider of advertising data in Spain. As in the UK, we constructed the ratio of the entrant's effort to total advertising expenditure. Table 3 provides summary statistics for each of the two markets.

Insert Table 3 about here

Table 4 reports information that we deemed useful for understanding the situation. It relates operators advertising effort to their market share in Spain. Some interesting patterns emerge: for instance, in view of their advertising, it seems that new entrants systematically achieve a lower market share compared to the Telefónica numbers.[29]

Insert Table 4 about here

7. Econometric results and quantification of damages

As mentioned above, we are unable to compute the abuse-free profits that the entrant's would have obtained by choosing prices and advertising optimally, which correspond to Π^1, Π^{1*} or Π^2 as defined on the basis of Figures 3a & 3b. In the case of Figure 3a, it is assumed that forced QD only results in an inward shift of the residual demand faced by the entrant. We approximate Π^1 from below by estimating eq. (1), (2), and (3) for the UK, and then use parameter estimates and *observed prices and advertising in Spain* to predict the entrant's markets share had forced QD been absent. In Figure 3b, the abuse free residual demand is more

[29] Clearly, this information is incomplete, as it does not take into account prices. However, given that Telefónica's prices (and in particular, TPI's) are among the highest, the inference that can be drawn from Table 3 would not vary had prices been properly taken into account.

elastic as compared to the previous case, reflecting the fact that the intensity of competition would have been higher. Under this scenario, we approximated Π^2 from below in the following manner: we assumed that the entrants behaviour in terms of pricing and advertising effort would have been identical on both the UK and Spanish markets. We thus use parameter estimates and *observed prices and advertising in the UK* to predict the entrant's markets share had forced QD been absent.[30]

Clearly, there may exist seasonal influences. For instance, Bank Holidays, Summer months (July and August), the Christmas season or even the day of the week may influence consumption patterns. Since there is no a priori reason to believe that seasonality patterns are the same in Spain and the UK, we decomposed the predicted market share for Spain in two pieces: the non seasonal part and the seasonal part. We used a three stages procedure to recover these two elements. First, we estimated the three equations for the UK with the full set of time dummies (daily and monthly). Next, we predicted the entrant's non seasonally adjusted market share in Spain using the parameters estimates obtained for the UK, save for the time dummies. We then computed the difference between this prediction and observed market share in Spain, obtaining a set of residuals. The latter were then regressed on all time dummies, obtaining a set of estimates of time dummies for Spain that are used to predict the seasonal component of the entrant's market share. Last, we constructed the predicted market share as the sum of the seasonal and non-seasonal components estimated previously.

Our central results are obtained with three different specifications. The first two correspond to the additive and multiplicative specifications of eqs. (1) and (2).

[30] Note that this second exercise provides a "lower bound" to the "lower bound" of lost profits derived from the abuse. As argued above, all estimates are obtained from "below"; in addition, competition was tougher in the UK. Thus, this second exercise underestimates by a large margin the profits that the entrant would have obtained on the Spanish market.

Both sets of results are presented in table 5. The third set of results, presented in table 6, is obtained from estimating the logit demand eq. (3).

Before discussing the results in Tables 5 and 6, a short discussion of the possible endogeneity of the explanatory variables is warranted. As mentioned above, given the data constraints and the way we deal with daily observations for advertising, we assume the endogeneity of these variables and test the possible endogeneity of the variables of prices. As instruments we use the sum of the competitors' advertising, current and lagged up to two periods (that is, dated at time t, $t-1$, and $t-2$).[31, 32] The bottom part of Tables 5 and 6 report the values of an incremental Sargan tests and their p-values for a test of the exogeneity of prices. These tables also provide Hansen J statistics and their p-values to test the adequacy of the instruments used for advertising by testing the two implied overidentification restrictions. As it can be seen, we can not reject the exogeneity of prices in any of the three models. Moreover, the Hansen J statistics for the instruments suggest that we can not reject these implied overidentifying restrictions. Therefore, and on the basis of all these tests, the final estimated specifications considers prices as exogenous while advertising is instrumented with competitors' current advertising.

Insert Tables 5 and 6 about here

Table 5 presents our central GMM results for the additive and multiplicative models while Table 6 presents the results for the logit demand model. Recall that these estimations are obtained for the UK market; we do not estimate the evolution of the entrant's market share with Spanish data. In both Tables 5 and

[31] We also experimented with alternative instruments such as Conduit's (accounting) marginal costs. However, given Conduit's start up strategy described above (low prices that are progressively increased), there is a strong spurious negative correlation between price and marginal costs. This spurious correlation translates into less precise estimates.

[32] In the multiplicative model (eq. (2)), the explanatory variable is the log of advertising and the instrument is the log of competitors' advertising.

6, the goodness of fit is high: the adjusted R^2 ranges from a minimum of 0.61 (model [I]), to 0.90 (specification [III]). The variables of interest (relative prices and advertising) have the expected sign and are significantly different from zero.

These estimates are used to predict the Conduit's market share in Spain had forced QD not occurred, *given the prices and advertising chosen by that firm.* Graphs 3, 4 and 5 present the observed market shares as well as the predicted ones for the specifications for the whole period (for reasons of confidentiality, the vertical axis has been re-scaled, i.e. the values appearing on the vertical axis are imaginary). The predicted market share in Graph 3 is constructed with the point estimates obtained from model [I], in Graph 4 we have used model [II] and finally in Graph 5 we have used model [III]. In the three cases, we observe that the predicted market share stands above what the entrant achieved in Spain. This visual evidence also indicates that our econometric model does a good job of picking-up the turning points in the evolution of the entrant's market share.

Insert Graphs 3, 4 and 5 about here

From the difference in the market shares presented in Graph 3-5, we estimate the damages as well as the number of lost calls for the three specifications. The results are shown in Panel A of Table 7. For reasons of confidentiality, the monetary amounts and lost calls have been scaled to 100 with respect to model [III]. As can be readily seen, the range of damage estimates is pretty narrow: the largest difference is between specifications [I] and [II] and amounts to 13.7%. In general it can be seen that the multiplicative model [II] tends to predict higher damages and lost calls while the logit model [III] predicts lower amounts.

Insert Table 7 about here

Panel B of table 7 shows the damages as well as the number of lost calls under a different scenario: one in which Conduit would have acted in Spain exactly as it did in the UK in terms of prices and advertising. As argued in section 4, this proxies lost profits in Spain *had competition been as tough as in the UK.* Recall that this represents the "lower bound" of the "lower bound" in terms of actual damages suffered. The lower panel of Table 7 indicates that Conduit would have enjoyed a much larger market share. The estimation of losses is lower, reflecting the fact that prices are consistently higher (around 15 € cents per call) in Spain as compared to the UK.

8. Robustness checks

We interpret the small variation in the estimation of damages across specifications as evidence that our results are robust. In this section, we provide simple additional robustness checks.

8.1. Monthly data

Since we either estimated daily fixed effects for Spain in an indirect manner and transformed monthly variables into daily ones, we re-estimated eq. (1) and (2) with monthly data for the period April 2003-October 2004 by simple OLS.[33] The results are presented in Table 8.

Insert Tables 8 about here

The goodness of fit is slightly lower when compared to the estimates appearing in Tables 5 and 6, but it remains reasonably high. In the same vein, the point

[33] We choose OLS over GMM because of the reduced sample size with monthly data (19 observations). Moreover the correlation between advertising and the error term due to the way in which we constructed the daily variable disappears with monthly data.

estimates for relative prices and advertising are less precisely but they remain of the expected sign and their magnitude is similar to that obtained in the first estimation. Despite the fact that the sample is much smaller, our estimation of injury remains practically identical. Table 9 provides estimates of damages as well as lost calls. The figures are expressed as a fraction of the estimates obtained with daily data and model [I].

Insert Table 9 about here

Graph 6 compares the entrant's actual market share in Spain and the one it could have hoped to achieve given its relative price and advertising effort. Again, the pattern is very similar to what is obtained with daily data.

Insert Graph 6 about here

8.2. Competitors

At one point, we obtained some additional data pertaining to the entrant's main competitors in Spain, and in particular, the evolution of their monthly market share over the period July 2003-October 2004. We are therefore able to assess whether our econometric estimates can predict the evolution of the market share of the entrant's competitors. In other words, we want to see whether our approach allows us to predict the "ups" and "downs" in the market share of other operators. The information we have pertains to four additional 118AB numbers. Graphs 7 and 8 present the actual market share and the ones that our econometrics would predict for two of these operators. As before, the vertical axis has been re-scaled. In addition, we do not specify which curve pertains to the predicted and actual market shares. Apart from confidentiality, this omission is due to the fact that we can not estimate a firm specific effect (the constant) for each of these operators. This means that our predictions are up to a scale parameter.

Insert Graphs 7 and 8 about here

This visual evidence suggests that the econometric model does a good job of approximating the evolution in the market shares of Conduit's competitors.

8.3. Profitability

It is also possible to check that some market-wide variables have behaved in a manner consistent with the existence of an abuse on the Spanish market. We therefore computed average price-cost margins as a proxy for the intensity of competition.[34] On the cost side, the pre-liberalisation regulated price was chosen as an estimation of marginal cost for all firms in the market. For prices, we took the simple, unweighted, average price of the operators that were used in the econometric exercise. In the case of Spain, we also computed the average margin with a higher estimate of marginal cost, since Telefónica has systematically complained that the regulated rate did not cover variable costs. More precisely, we computed the margin with a marginal cost of 0.55 € instead of 0.35€.[35] The larger number is very similar to the UK (40 p., i.e. 0.571 €). Graph 9 plots the evolution of average price-cost margins. The initial drop in margins observed in Spanish margins is due to the reaction of Telefónica to entry (TPI halved its prices from 2.06€ to 1.06€) and the fact that Conduit's effective prices were high due

[34] The use of profitability measures in antitrust cases has been heavily criticised (see Fisher (2006)). However, note that we do not use indicators of individual firm profitability, but the average for a market were efficiency differences between firms are small or (economically) irrelevant. More importantly, we only use average margins as corroborating evidence compatible with the existence of an abuse.

[35] The price of the regulated number (11818) was maintained at 0.355€ from April 2003 to July 2005. In July 2005, the price of 11818 was liberalised, and Telefónica raised it to 0.55€.

to abuse induced abnormal AHTs. Despite this initial drop, margins are much higher in Spain than in the UK, even when the higher estimate for marginal cost is used.[36] Note that this is perfectly compatible with an exclusion strategy based on forced QD and RRDC instead of predatory prices.

Insert Graph 9 about here

9. Conclusions and discussion

In this paper, we argue that Telefónica had the ability to abuse its dominant position in the Spanish DQ market, and that this was a perfectly rational strategy. The essence of the abuse consisted of forcing a deterioration in the quality of the products offered by its competitors. This forced "vertical" differentiation would have been absent had abuse not taken place. Apart from resulting in an inward shift of the residual demand faced by Conduit, it generated additional pecuniary costs. These facts were first established by the Comisión del Mercado de Telecomunicaciones, were then accepted by Madrid 5th Commercial Court, and were finally upheld in appeal. Thus, the factual evidence is not under discussion in this particular case.

Section 3 dwells on the rationality of the Telefónica's behaviour and stresses that, because of large search costs in relation to potential savings, the abuse had long lasting effects. Section 4 shows that, in the case at hand, the total effect of the abuse is always larger than the direct pecuniary cost. That section also explains that, subject to accepting our specification, all the econometric evidence yields a lower bound of true damages. Section 7 presents consistent and robust damage estimates obtained with three distinct specifications. Last, section 8 reports a

[36] This industry wide information is corroborated by Conduit's own EBIDTAs.

battery of robustness checks that are consistent with our main findings

Summing-up, the Courts did not question the existence of an abuse and the empirical evidence appears as robust and consistent. Despite this, the Courts decided to award a tiny amount of damages, and this decision was upheld in appeal. Concretely, the amount awarded represents a fraction of "direct costs" and about 10%-15% of total damages that we estimated (recall that our estimates provide a lower bound). In fact, all the forensic economic evidence was ignored: the damage award was almost entirely based on invoices stemming from Conduit's inflated costs (e.g. E.115). It is unclear whether this disregard for economic and econometric evidence is driven by excessive caution or simply a lack of understanding. With respect to the former, both decisions allude to the fact that the direct causal link between the abuse and the loss of market share had not been established beyond reasonable doubt. As a possible explanation for Conduit's poor performance on the Spanish market, the judge suggested that Conduit had hired poorly trained personnel and that it lacked experience on the Spanish market. This begs the question as to how Conduit successfully managed to enter in other non-English speaking markets such as Austria (12% market share) and Switzerland (5% market share), and why it would have risked the loss of a lucrative market share by hiring poorly trained personnel. In any event, even if some credence to this claim (Conduit hired poorly trained personnel), this would not invalidate our main findings. At most, it could serve to attribute part of Conduit's poorer performance on the Spanish market to a factor other than forced QD.

More importantly, both decisions interpreted the evidence in a manner which is inconsistent with economics. Conceptually, the recognition that Conduit incurred direct costs inexorably leads to the conclusion that total damages are larger than these direct costs (and not a fraction of them). The second economic inconsistency regards the interpretation of econometric evidence. Both decisions argued that Conduit's poor performance in Spain was due to its limited advertising efforts. In other words, the decisions looked at simple correlations (larger advertisers achieve a larger market shares), and not conditional correlations (given an advertising effort, what market share ought to have been achieved). The fact that the damage estimations are obtained *conditional on Conduit's pricing and advertising behaviour* appears to have escaped the Courts.

It is clearly to early to say, but this apparent lack of understanding of basic economics and econometrics suggests that the application of Article 82 in private litigation may not yield the expected results. Last, the small amount of damages awarded despite the clarity of the abusive behaviour raises the issue of deterrence. It is not unreasonable to think that award damages of this kind will have little, if any, deterrent effect.

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Table 1: Advertising intensity

	Advertising (A)[a]	**Number of calls (B)**	**Intensity (A/B)×100**
UK			
April-December 2003	62929585	338751597	18.58
January-October 2004	36726834	278949099	13.17
Spain			
April-December 2003	15086829	93564506	16.12
January-October 2004	45873127	84842494	54.07

(a) Quantities in €

Table 2: Market shares in Spain, measured by revenues, minutes, and number of calls

	2003 (% of total)			2004 (% of total)		
	# of calls (million)	Revenue (million €)	Minutes (million)	# of calls (million)	Revenue (million €)	Minutes (million)
I: Telefónica de España	92.45	37.16	69.55	48.04	27.91	42.42
(11822 &11818)	(72.70%)	**(51.70%)**	(57.80%)	(48.20%)	**(30.10%)**	(35.10%)
II: TPI	18.16	21.21	29.33	34.88	45.56	54.89
(Telefónica subsidiary, 11888)	(14.30%)	**(29.50%)**	(24.40%)	(35.00%)	**(49.10%)**	(45.50%)
Telefónica Group (I+II)	110.61	58.37	98.88	72.92	73.47	97.51
	(87.00%)	**(81.20%)**	**(82.20%)**	**(83.20%)**	**(79.20%)**	**(80.60%)**
Telegate (11811)	6.79	6.87	9.8	9.24	10.62	13.78
	(5.30%)	(9.50%)	(8.10%)	(9.30%)	(11.40%)	(11.40%)
Conduit (11850)	6.02	3.02	7.95	NA	NA	NA
	(4.70%)	(4.20%)	(6.60%)			
MGA (11824)	NA	NA	NA	3.38	4.42	4.4
				(3.40%)	(4.80%)	(3.60%)
Others	3.84	3.69	3.64	4.14	4.35	5.26
	(3.00%)	(5.10%)	(3.00%)	(4.20%)	(4.70%)	(4.40%)
Total	127.26	71.95	120.26	99.69	92.85	120.74
	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)

Source: Comisión del Mercado de las Telecomunicaciones, Informe Anual (2003, 2004).

Table 3: Sample descriptive statistics

Variable	#of observ.	Mean	Standard dev.	Min	Max
Market share, UK	575	0.091	0.045	0.012	0.259
MS (over potential market), UK	575	0.059	0.032	0.01	0.194
Relative price, UK	575	0.751	0.212	0.480	0.995
Relative advertising, UK	575	0.132	0.158	0.000	0.421
Price, UK	575	0.480	0.153	0.285	0.661
Advertising $\times 10^{-6}$, UK	575	0.031	0.048	0	0.185
Market share, Spain	575	0.039	0.036	0.003	0.206
MS (over potential market), Spain	575	0.024	0.025	0.002	0.14
Relative price, Spain	575	0.769	0.219	0.322	0.985
Relative advertising, Spain	575	0.064	0.189	0	0.842
Price, Spain	575	0.637	0.170	0.3	0.819
Advertising $\times 10^{-6}$, Spain	575	0.007	0.019	0	0.081
Dummy April-August (UK only)	575	0.257	0.438	0	1
July	575	0.108	0.310	0	1
August	575	0.108	0.310	0	1
Christmas	575	0.016	0.124	0	1
Bank Holidays, UK	575	0.023	0.149	0	1
Bank Holidays, Spain	575	0.028	0.165	0	1

Table 4: Informative statistics

	2003		2004		2003	2004
	Advertising	Market share	Advertising	Market share	Ratio MS/A	Ratio MS/A
	$(A)^*$	$(MS)^{**}$	$(A)^*$	$(MS)^{**}$		
	(I)	(II)	(III)	(IV)	(II/I)	(IV/III)
Telefónica de España (11822 & 11818)	0	51.7	10.1	30.1	NA	2.97
TPI (11888)	45.1	29.5	29	49.1	0.65	1.69
Telegate (11811)	22.9	9.5	20.1	11.4	0.41	0.57
Conduit (11850)	15.5	4.2	3.7	2.3***	0.27	0.62
MGA (11824)	15.6	NA	26.6	4.8	NA	0.18

(*) As percentange of total advertising; Source: Initiative España

(**) As percentage of total revenues; Source: CMT Informe Annual (2003, 2004)

(***) January-October; Source: company accounts

Table 5: Results: multiplicative and additive models

Variables	Additive[I]		Multiplicative[II]	
	(A)	(B)	(A)	(B)
$relP_t$	-0.0992**	0.0477	-0.5233**	0.2406
$relA_t$	0.2516*	0.0762	0.0206***	0.0114
Constant	0.1830*	0.0423	-2.0361*	0.2041
Time dummies				
Apr.-Aug. 03	-0.1457*	0.0217	-1.2855*	0.3305
Bank Holid.	-0.0403*	0.0068	-0.6969*	0.1160
July	0.0141***	0.0083	0.1368	0.1837
August	0.0374*	0.0135	0.2851	0.2769
Christmas	-0.0195	0.0121	-0.2505***	0.1338
Year 03	0.0117	0.0159	0.2291	0.1496
Tuesday	-0.0027	0.0020	0.0092	0.0220
Wednesday	-0.0044**	0.0019	-0.0043	0.0234
Thursday	-0.0040***	0.0022	0.0058	0.0342
Friday	-0.0072*	0.0020	-0.0416***	0.0245
Saturday	-0.0580*	0.0037	-0.7144*	0.0324
Sunday	-0.0825*	0.0048	-1.2733*	0.0423
# observ.	573		573	
R-squared	0.607		0.731	
TESTS				
Exogeneity of prices	0.2780		0.0590	
$\chi^2(1)$: p-value	0.5978		0.8080	
Hansen J statistic of overid.	0.2830		2.0110	
$\chi^2(2)$: p-value	0.8679		0.3659	

Notes: (A): coefficient estimates; (B) standard errors robust to autocorrelation and heteroscedasticity; Endogenous regressors: Relative advertising; Instruments: (Total advertising-Advertising of entrant) dated in t, t-1 and t-2. (*) Significant at the al 1%; (**) Significant at 5% level; (***) Significant at the al 10% level.

Table 6: **Results: logit demand model**

Variables	**Logit [III]**	
	(A)	(B)
P_t	-2.0382*	0.5526
A_t	4.9356*	0.5468
Constant	-0.7884**	0.3310
Time dummies		
Apr.-Aug. 2003	-0.7978*	0.1219
Bank Holidays	-0.6660*	0.1334
July	0.0814	0.0994
August	-0.0767	0.0754
Christmas	-0.3363*	0.1121
Year 03	0.4714*	0.1512
Tuesday	0.0085	0.0248
Wednesday	-0.0135	0.0227
Thursday	-0.0034	0.0352
Friday	-0.0510**	0.0233
Saturday	-0.7175*	0.0288
Sunday	-1.2887*	0.0378
# observ.	573	
R-squared	0.901	
TESTS		
Exogeneity of prices	2.4980	
$\chi^2(1)$: p-value	0.2868	
Hansen J statistic of overid.	0.0320	
$\chi^2(2)$: p-value	0.8581	

Notes: (A): coefficient estimates; (B) standard errors robust to autocorrelation and heteroscedasticity; Endogenous regressors: Advertising; Instruments: (Total advertising-Advertising of entrant) dated in t, t-1 and t-2
(*) Significant at the 1%; (**) Significant at 5% level; (***) Significant at the 10% level.

Table 7: Damage estimates and number of lost calls (Model [III] = 100).

	Model	#of calls	Lost profits
PANEL A			
Using observed data (prices and advertising)			
Additive	I	86.13	101.33
Multiplicative	II	119.49	113.69
Logit Demand	III	100.00	100.00
PANEL B			
Using UK data (prices and advertising)			
Additive	I	99.58	49.82
Multiplicative	II	139.51	36.34
Logit Demand	III	165.86	43.32

Computed over 19 months (April 2003 – October 2004),

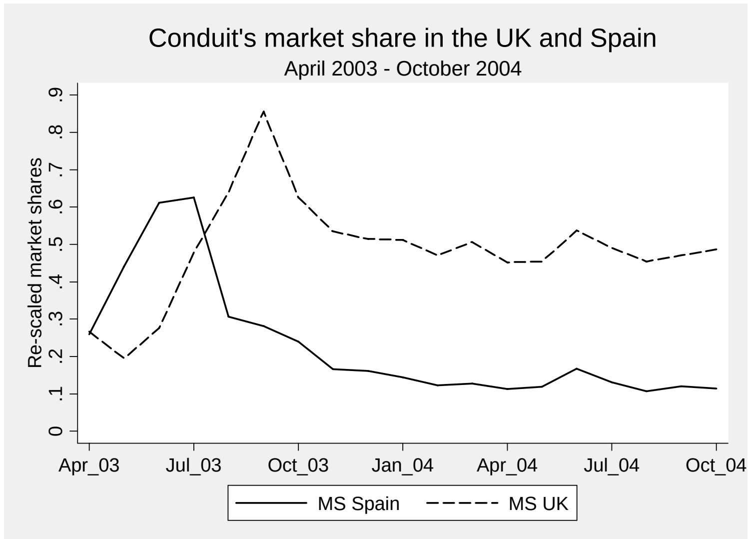
Table 8: OLS estimates of Conduit's market share with monthly data

Variables	Additive model		Multiplicative model	
	(A)	(B)	(A)	(B)
$relP_t$	-0.0957*	0.0291	-0.6404***	0.3067
$relA_t$	0.0848**	0.036	0.0046	0.0063
Apr.-Aug. 03	-0.0852*	0.0168	-0.8354*	0.2408
Constant	0.1722*	0.0251	-2.4053*	0.1181
#of observations	19		19	
Adjusted R^2	0.56		0.39	

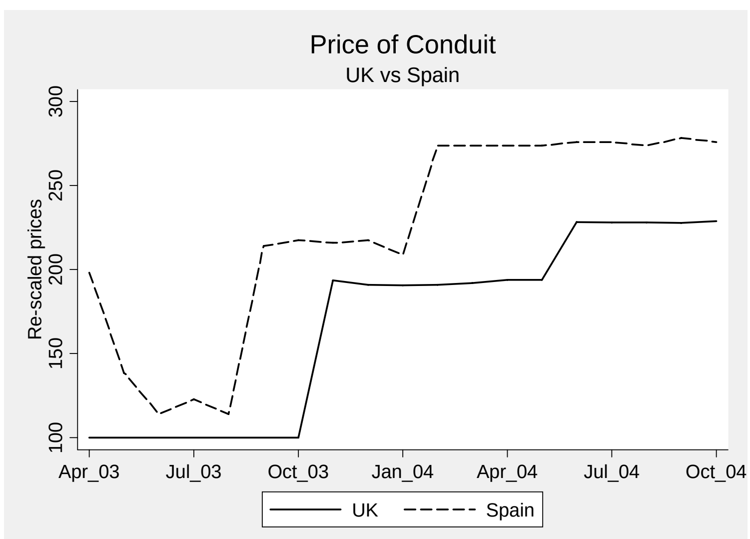
Notes: (A): coefficient estimates; (B) standard error
(*) Significant at the 1%; (**) Significant at the 5%; (***) Significant at the 10%

Table 9: Damage estimates and number of lost calls obtained with monthly data. Each cell is expressed as a proportion of the estimates obtained with model [I] and daily data

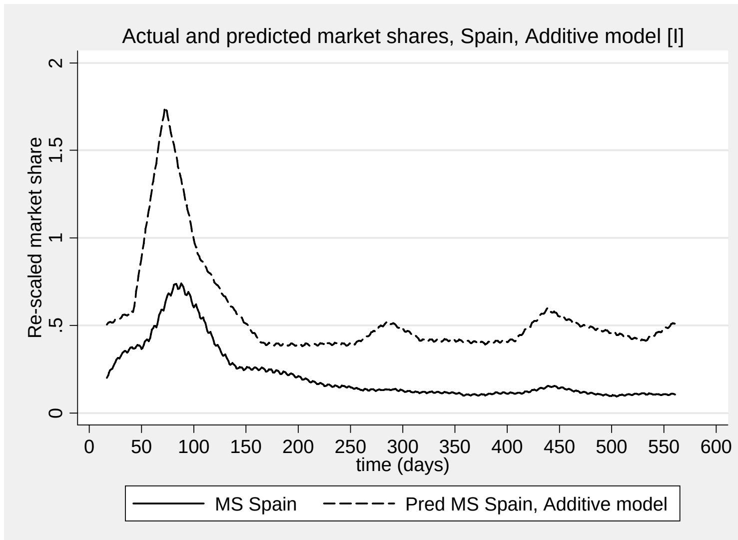
	#of calls lost	Lost profits
Additive model	96.0	106.4
Multiplicative model	96.5	108.9



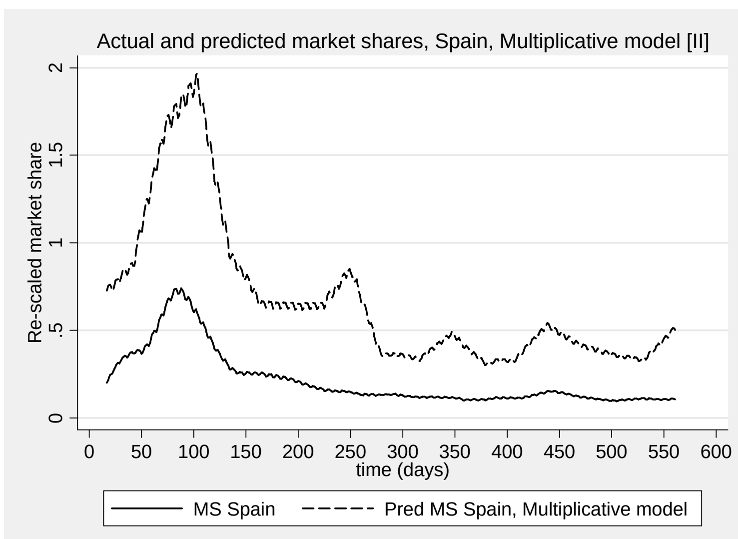
Graph 1



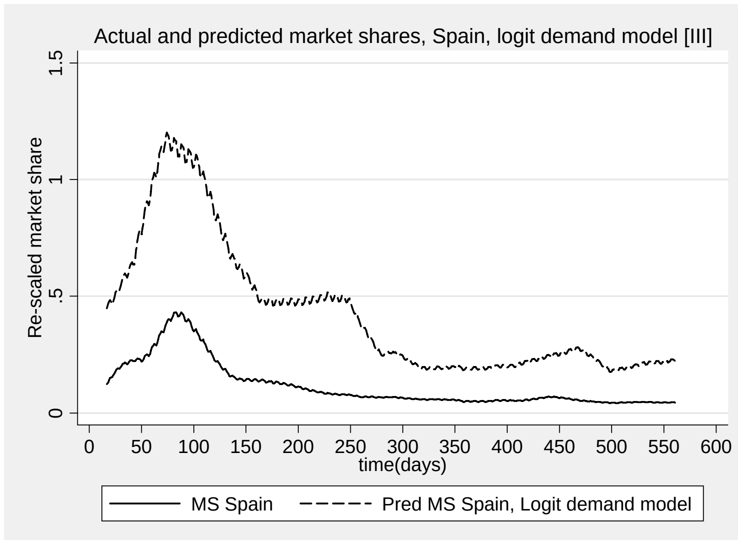
Graph 2



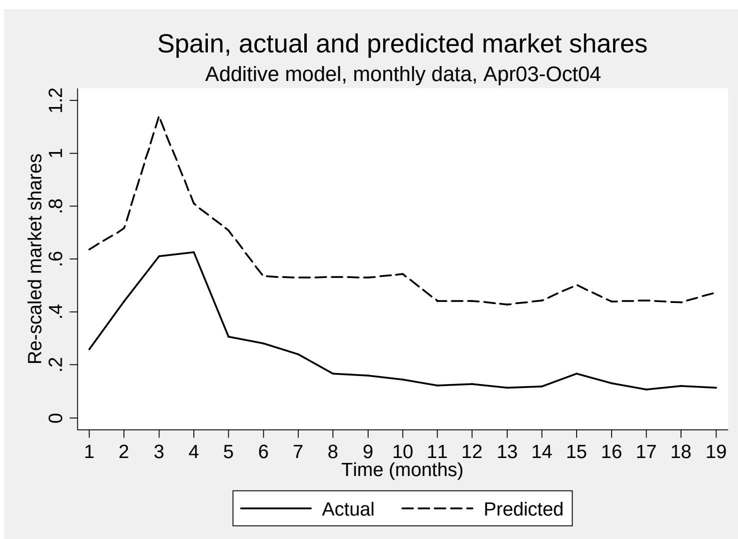
Graph 3



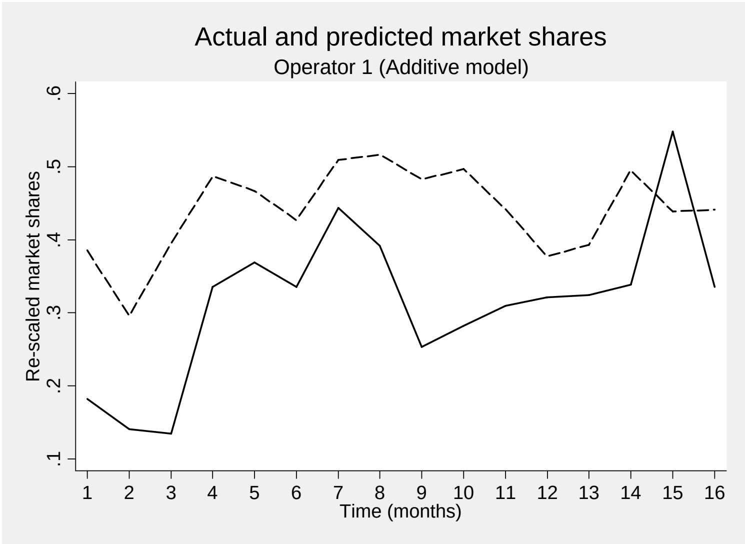
Graph 4



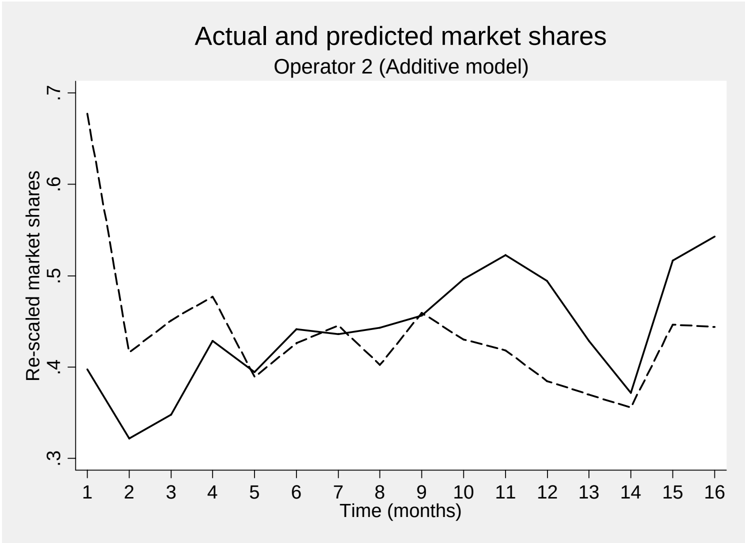
Graph 5



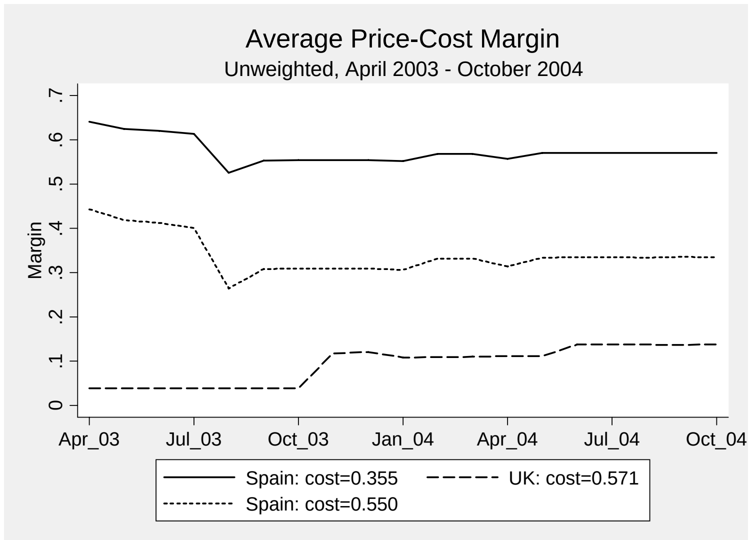
Graph 6



Graph 7



Graph 8


Average Price-Cost Margin
Unweighted, April 2003 - October 2004
Margin
0
.1
.2
.3
.4
.5
.6
.7
Apr_03
Jul_03
Oct_03
Jan_04
Apr_04
Jul_04
Oct_04
Spain: cost=0.355
UK: cost=0.571
Spain: cost=0.550

Graph 9

Figure 1: Effect of cost raising strategies on the injured party

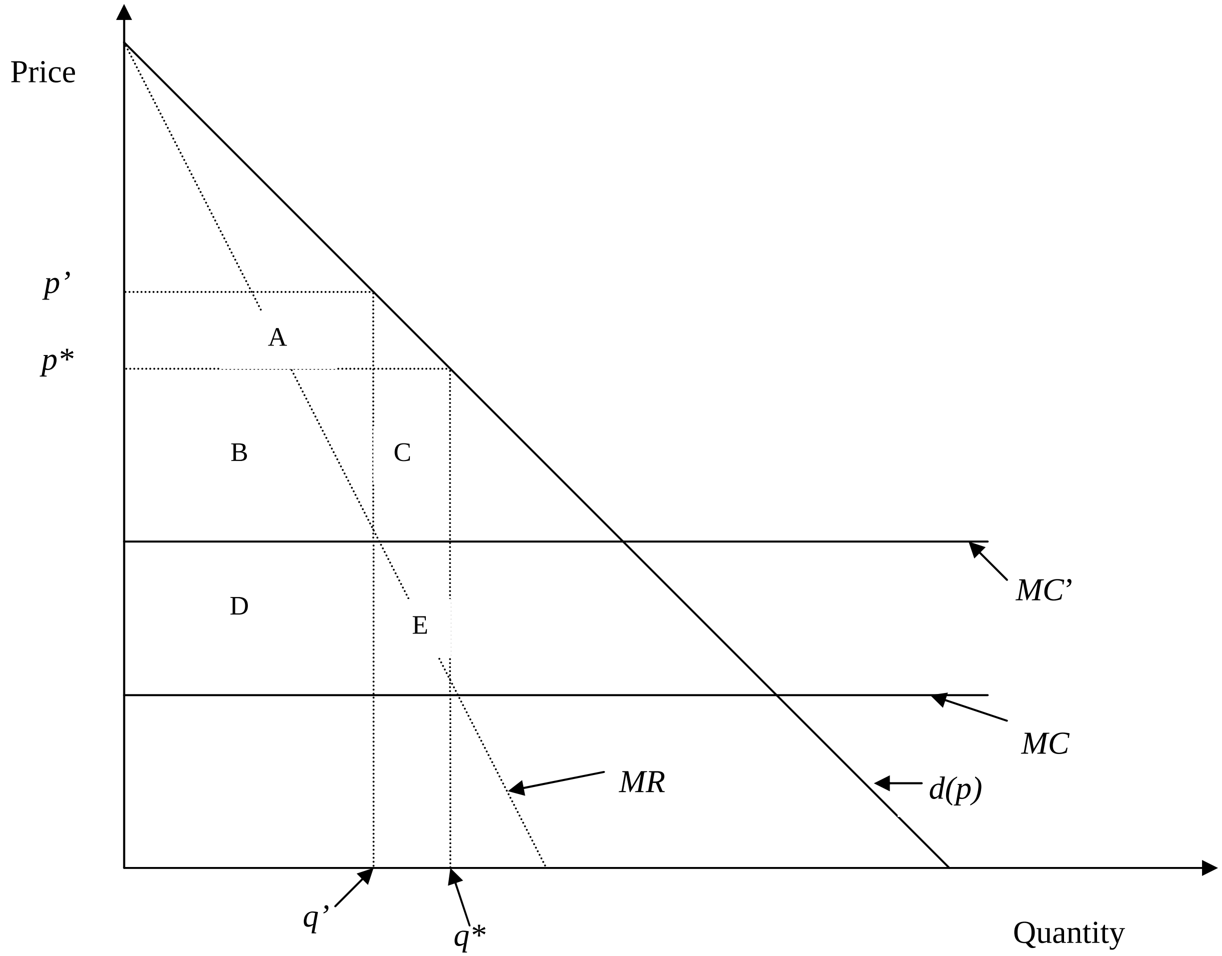


Figure 2: Evolution of an entrant's market share not subjected to an abuse (continuous line) vs. an entrant subjected to forced "quality deterioration" (dotted line)

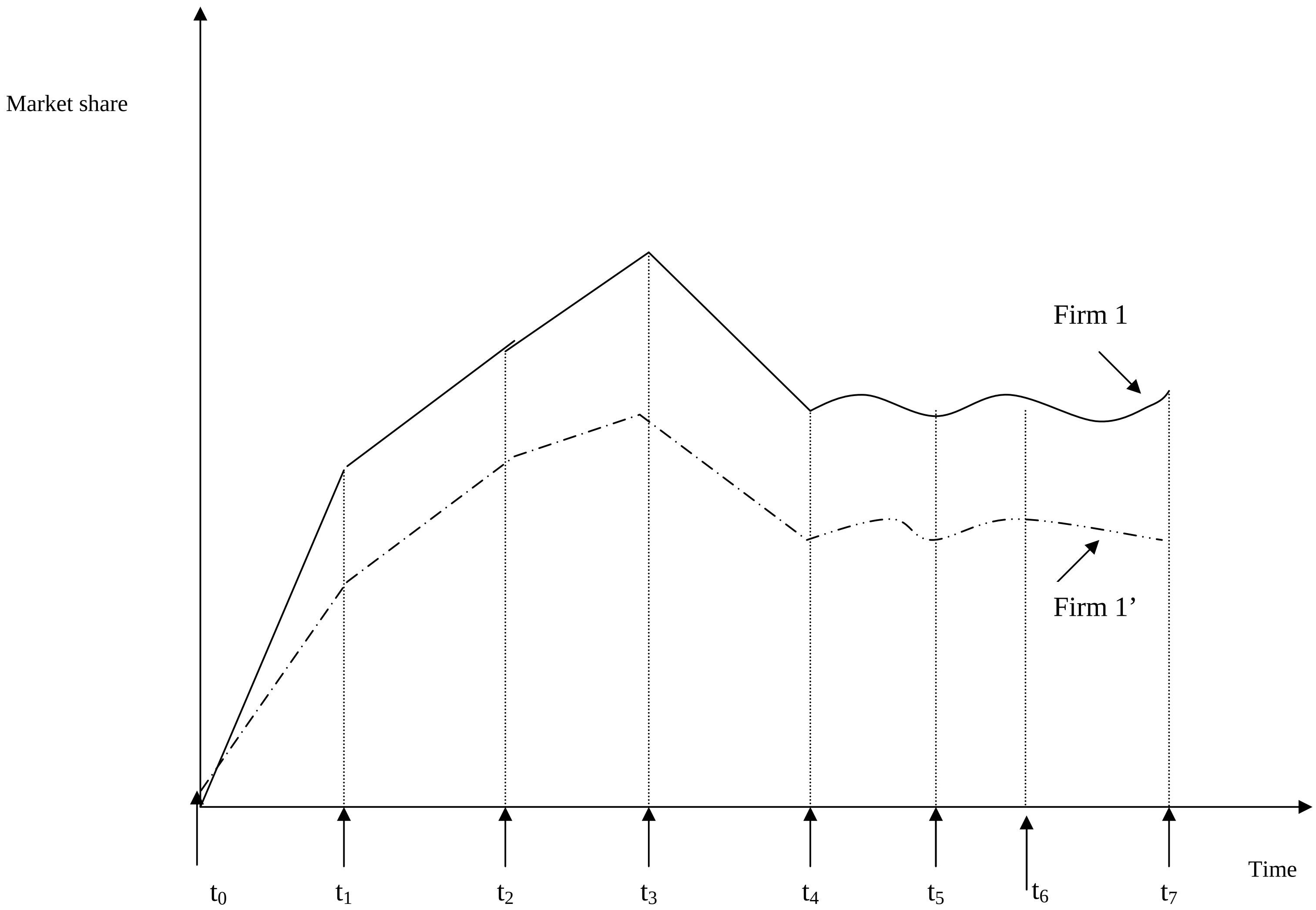


Figure 3a: Situation faced by an entrant subject to forced quality deterioration (QD) and facing inflated costs (RRDC)

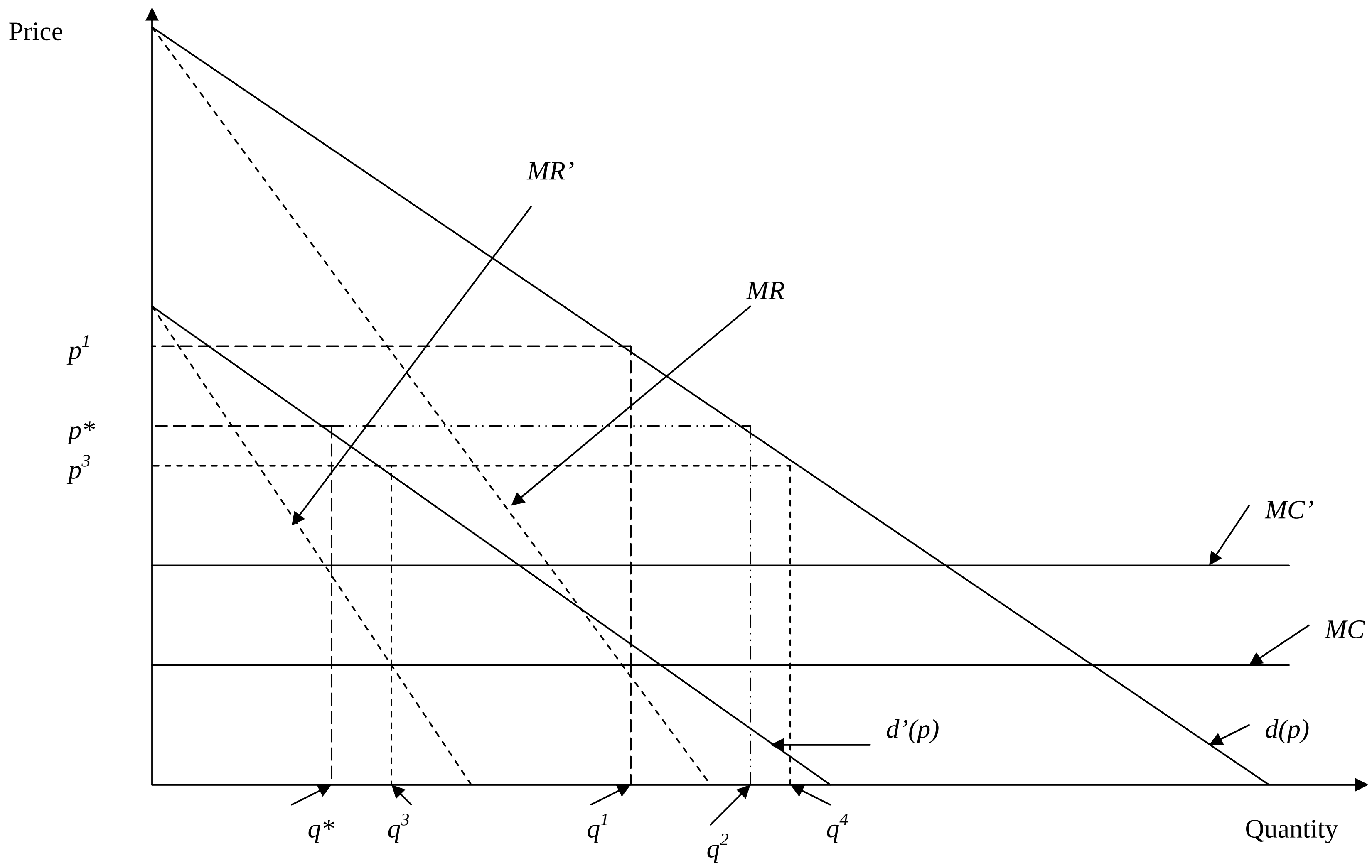


Figure 3b: Tougher competition in the absence of abuse