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SECTION 3. General issues in management

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The liberalization process of telecommunications and the role of the national regulatory authorities in pricing policies: a case study from Greece

Abstract

The European Union (EU) decided to fully liberalize the telecom markets of all member states by January 1998 with some exceptions where extra time was given. The scope of this paper is to show primarily the liberalization process that took place in the telecommunication markets in the EU, emphasizing the pricing policies for regulation, and then to investigate the role of National Regulatory Authorities (NRAs) along with two case studies from the Greek telecoms market. The research has evidenced that the basis of the liberalization process is the cost orientation principle. For this reason an appropriate costing system for regulatory reasons must be developed by the incumbent operator which will incorporate specific essential principles before its approval by the NRA. For fixed voice telephony cost orientation, two different methodologies are examined and explained in detail: the Fully Distributed Cost (FDC) and the Long-Run Average Incremental Cost (LRAIC). NRAs have to play an increasingly important role for the sector and pricing policies.

Keywords: telecommunication services, national regulatory authority, cost orientation, wholesale and retail pricing, alternative networks, costing systems.

JEL Classification: M11, L11, M21.

Introduction

Historically, Telecommunications in Europe were characterized by natural monopolies, fully regulated by the state authorities, and in particular the Ministry of Transport and Communications and the Ministry of Finance. The former had an important role in the operation of the state monopoly, beginning from the hiring of new employees until the investment planning within the country or abroad. The latter had to approve any increase in tariffs, since telecoms were considered an essential service for citizens and therefore were a part of the social policy for any government. This status started to change in early 1980s, when initially the United Kingdom became the first EU member state which liberalized its telecommunications sector by privatizing at the same time the former state monopoly British Telecom (B.T.). Thereafter, liberalization became the European policy, in the beginning with the liberalization of telephone terminals and value-added services until the full liberalization of fixed voice telephony by 1998.

However, it is important to make clear that European Commission's (EC) liberalization policy based on the World Trade Organization's (WTO) Agreement on Basic Telecommunications Services did not enforce its Member States to privatize their established state monopolies. The operational status of those monopolies was allowed to be decided on a national basis and this was the reason for the establishment of an independent NRA. Alternatively, new entrants

would have to compete with an established organization, fully or partially owned by the state. Therefore, regulator had to be independent from the state and the state-owned operator. In other words fair regulation could not be assured and investors would be reluctant to invest their money in this business.

That is why, especially at the first phases of liberalization, a detailed regulation is required. More analytically, new entrants need to buy wholesale services from the former monopoly (upstream market) and at the same time to compete with it in the retail (downstream) market. Regulation becomes more essential when an established operator provides services in both the upstream and the downstream markets, i.e. it is vertically integrated. In this case, regulation policy in the EU, is based on the principles of cost orientation which call off the cross subsidization between services.

1. The deregulation process in the European Union

Until early 1990s telecoms were seen as natural monopolies. That is, one provider was considered to serve the society more effectively than more competitors could do. This idea was based on significant economies of scale and economies of scope. In this case, marginal cost is below average cost. Therefore, when the incumbent implements a pricing scheme based on LRAIC, it has a loss which must be covered. This can be done either with the financing from the state budget or through the subsidization of this loss by increasing prices in services which are used by other consumers' categories.

Another problem for pricing schemes based on cost orientation is the absence of incentives for decreasing costs. In reality when prices set at the level of the cost then there is a reversed incentive to increase the costs in order to increase also the selling prices. In this case the former monopoly has no incentives to become more efficient.

The role of the NRA is to encourage competition and at the same time to monitor the market in order to avoid price squeeze, predatory pricing and excessive pricing practices by the incumbent¹. At the same time though, the NRA must ensure that the incumbent will be able to cover its costs and obtain a reasonable rate of return for the maintenance and the modernization of the network.

In the first years of liberalization, the NRA has to set specific obligations on the incumbent in order to protect the newcomers. The liberalization process aims at the improvement of the quality of services and at the introduction of new innovative services. At the same time though, the NRA aims to decrease the prices and to increase the variety of the services for consumers in order for them to find the provider which fit them more. Over this first stage of deregulation, the legislation was based on three Directives and one Regulation. That is the Directives for Fixed Telephony 98/10, for Leased lines 92/44, for Interconnection 97/33 and the Regulation 2000/185 for Local Loop Unbundling (LLU). The Directives were incorporated in the national law with a secondary legislation (e.g., Presidential Decrees or Ministerial Decisions), whereas the Regulation was already a part of the national regulation and no further implementation actions were required. The second stage of deregulation, in 2002, was based on new Directives which were closer to the competition law and more specific for the relevant markets in electronic communications. The purpose was to find more operators that might have significant market power and place certain obligations on them too.

According to the EU experience on the deregulation process, just before the official liberalization date, the NRA takes three actions. The first one is to grant licenses to alternative operators and the second to incorporate in the national law all the obligations of the former monopoly towards its competitors². The third action by the NRA is to complete the rebalancing of prices for the incumbent. That is to stop cross subsidization. If this does not take place, then, the incumbent will charge very high tariffs for long distance and international calls which means that mainly company clients will leave for other operators.

At this first stage of liberalization, the NRA sets detailed ex-ante conditions that the incumbent has to follow and in case of violation, the Regulator calls the incumbent for a hearing and a fine is possible to be imposed against monopolistic actions. The monitoring of the market is daily and the NRA consults not only with the market players but also with other Regulators in the EU for exchanging views. Also, special regulators' groups are established at a medium and a higher level where in the first one the personnel of the NRAs discuss problems and exchange views and in the latter the presidents of the NRAs do the same. Also, regular submits in different states take place in both cases. It is important to mention thought for those opposing the liberalization process based on the position that telecoms are an essential service for all citizens, no matter their economic strength or their geographic location, that the incumbent operator is appointed as a Universal Services Provider. This means that the former monopoly is responsible to offer a basic package of services to every citizen even when this is not profitable for the incumbent. Although, other providers can ask to become USPs, in the case of EU there are not such cases.

At a later stage, the NRA moves to an ex-post regulation where it examines if there was a violation of the legislation by the incumbent and a fine is set. However, while in the beginning the NRA's policy is to set tariffs for wholesale services in order to allow a margin profit for competitors, at a second stage the NRA may allow higher prices for wholesale services in order to strengthen competition also in networks.

2. Costing methodologies and costing principles

One may ask why prices in telecommunications must be cost oriented since, according to the economic theory, in a fully competitive market, the forces of demand and supply set the prices towards their marginal cost. In the case of telecommunications, where there is a legally competitive market, but for several years it was a monopolistic market with an established provider, the NRA represents, in a way, the consumers. In the same way that in a free goods market, consumers are expected to buy a homogeneous product from the producer with the lower price, in the case of telecommunications the NRA sets directly the prices at their marginal or average cost, i.e. where they should be set within a competitive market. In this sense, cost is a sufficient benchmark when competition doesn't exist.

In telecommunications, cost causation principle is implemented with the methodologies of Activity Based Costing (ABC) for the calculation of operational cost and Network Costing (NC) for the calcu-

¹ The two case studies of this paper are based on the theory of price squeeze.

² That is mainly the conditions and the tariffs for interconnection, access (LLU) and lease lines.

lation of network cost. The ABC methodology was defined by Kaplan and Cooper in 1991 and focuses on the cost of activities instead on the cost of infrastructure. This methodology is the proper one in the case of calculation of different activities offered by the same infrastructure. With ABC it is difficult to cross-subsidize by transferring costs from one service to another. On the other hand, ABC is not an efficient methodology since all costs, including inefficient ones, are taken into consideration for the final pricing of the services. Apart from ABC, the NC methodology is also implemented for the calculation of the cost which is related with the maintaining and the modernizing of the telecom networks. Finally, the third part of the total cost which is incorporated in the telecom services is the cost of capital which is employed by the company in order to provide its services. The allocation of the capital cost is based on the weighted average cost of capital (WACC).

The WACC is the reasonable rate or return which is allowed for the incumbent to receive for the provision of retail and wholesale services. The rate of return of the former public monopoly for each service equals the capital employed for this particular service multiplied by the estimated WACC. Because it is very difficult to estimate different WACCs for each service, it is common to estimate the return for the cost of capital for each service by the WACC of the company. However, this is not absolutely correct since some services incorporate higher risk and therefore must have greater required rate of return than other services that incorporate lower risk or they are risk-free. In other words, by taking into account the risk premium of the telecom market as a whole, it ignores the fact that sub-sectors (wired-line, wireless, data communications, etc.) represent different levels of risk. It would appear rational then to use different WACCs for each of the activities, based on their relative risk. The finding of a different WACC for each activity though is a very difficult issue and that's why in most cases regulators use one WACC for all the services it offers in the market.

For regulation purposes, there are specific costing principles that need to take place. The first one is the cost causation principle, according to which cost is determined by the reason that creates it. This determination is either direct or indirect (allocation of cost with the use of routing factors). To ensure the implementation of cost causation principle the ABC and NC must be implemented. The second principle is objectivity, according to which costing relations must be objective, without any deformation of one service's cost in favor of another one (i.e. no subsidization). The third is the transparency principle which means that audits by the NRA must take place annually and a letter of compliance with the ap-

proved costing methodology must be sent to the EC. The costing methodology must also be easily auditable and verifiable. Furthermore, for transparency reasons, the accounting separation of the incumbent operator between the businesses of retail, access, interconnection and other is necessary.

For fixed voice telephony, cost orientation is based mainly on two different standards which allow the full coverage of direct and indirect costs. The first one is based on FDC with Historic Costs basis (FDC-HC) and the second is based on with Current Cost basis (LRAIC-CC). The choice of the methodology is at the discretion of the NRA but in the EU member states the FDC-HC is implemented mainly for the retail services while LRAIC is implemented mainly in the case of wholesale services. The LRAIC of a service is equal to the total cost of the company minus the cost of the total company if it continues to provide all the provided services except the examined one. The sum of LRAIC of all services is less than the total cost of the company due to the existence of common costs.

The following graph depicts the incremental and the fixed common and joint costs between access, switching and transmission. As it is shown, between the access, switching and transmission networks there is a part of the cost which is fixed (joint and common) and refers to the entire telecom network. Furthermore, between the switching and transmission networks there is a fixed (joint and common) cost, whereas each of the three networks is also characterized by a part of cost which is referred to the supply of services exclusively from one part of the network and therefore it is this network's incremental cost. It is also noted that between the switching and transmission networks there is a fixed (joint and common) cost.

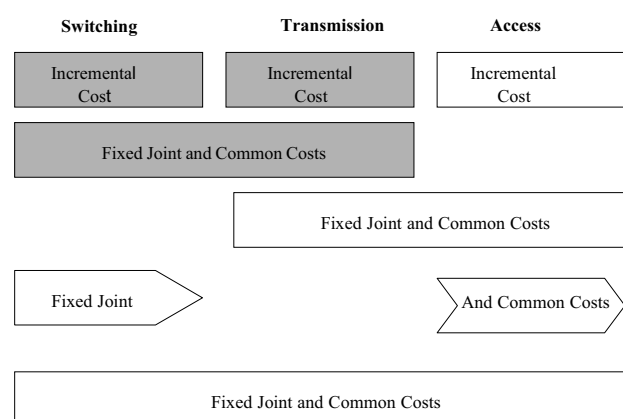


Fig. 1. Incremental, fixed common and joint costs between access, switching and transmission

The LRAIC-CC is a forward looking methodology which is mainly used for the audit control of wholesale services, like interconnection and Local Loop

Unbundling (LLU). In the first years of liberalization, until the incumbent builds its LRAIC model, the NRAs can implement FDC-HC for the services of LLU. In the case of interconnection, for the first years of liberalization, the NRAs implement the best current practice methodology (in the EU, best current practice was based on the Recommendation 98/511/EC of the 29th July 1998). In the mid-run though EU favors the LRAIC methodology because it is a better approach for efficient pricing, since it takes into account only the costs which are created because of the operations of the new entrant.

Another important part of the audit controls for NRAs is the accounting separation in four different businesses that is network, access, retail and other business and the determination of the transfer prices which are exchanged between these businesses. Attention must be also given to the costing models and in particular at the top-down and bottom-up models. The top-down model is a costing model which is used by all the NRAs and takes into account all the materialized costs. This model is useful especially in the case of costing for the retail services. On the contrary, bottom-up models are techno-economic models which plan the network from scratch in the most efficient way and therefore tariffs become much lower. This model is useful mainly for wholesale services. However, it is difficult to implement it, because the incumbent may lose a lot of capitals and as a consequence it may ignore the network's maintenance. Therefore, an adjusted form of bottom-up models is a hybrid model that takes into consideration the existing network and makes some efficiency adjustments which lead to lower tariffs at a less percentage than bottom-up model.

The incremental cost (IC) of a service defines the lowest price at which a service can be charged, since it includes only the costs which change in the short run, assuming that the services supplied by the incumbent are invariable. The term of incremental cost in the short run includes only the variable cost (incremental and common) which relates to the examined service. Therefore, in comparison with LRIC which refers to the long run, the IC does not include the fixed cost which refers exclusively to its supply (direct fixed cost). The Stand Alone Cost- (SAC) for a service sets the highest possible price at which a service can be charged. This can happen only if we assume that the incumbent operator offers only this particular service and therefore it can not take advantage from the economies of scope. Therefore, for the estimation of the stand alone cost of a service, further to the direct variable and common variable cost which is related exclusively with its provision, it includes also any other fixed cost (direct, common and joint cost).

Therefore, the relation between IC, LRIC, LRIC + and SAC could be presented as:

$$IC \leq LRIC < LRIC+ \leq SAC . \quad (1)$$

In the following table the different costing standards are depicted along with the types of cost which are included in each one while costing a telecom service.

Table 1. Costing standards and types of costs

	Variable cost	Fixed cost		
	Direct and common costs	Direct cost	Common cost	Joint cost
IC				
LRIC				
LRIC+			Mark up	Mark up
FDC			Allocation	Allocation
SAC				

The above table shows that the costing standards which are used more often are the FDC and the LRIC+.

When economies of scope are present, it means that it is in the interest of the society if only one company produces all the services instead of each service was produced by a different company. In other words, it is cheaper for the society if the services are produced together, due to high common and joint costs. In this case, incremental costs for each service, X and Y, will be less than the total costs of the company and cost allocation with LRIC which is based on incremental cost will not allocate the entire incurred costs of the firm, since when incremental costs are added the joint and/or common costs of services X and B are left behind. On the contrary, with FDC methodology it is ensured that all costs, including the joint and common costs, are allocated.

Another costing standard is the Stand-alone Costs (SAC) which measures out the cost of a service independent of the other services which are also produced by the company. With SAC the regulator takes into account all the costs that are directly related to the production of the examined service and every shared cost which is related to the production of this service (i.e. variable cost, fixed cost, common and joint costs and sunk costs). When the SAC standard is used for pricing, the market can not meet economic efficiency. Contrary to SAC, the standard of Embedded Direct Costs (EDC) takes into account the directly and indirectly distributed variables and fixed costs only. Marginal Costs is another methodology which is not used often because it does not cover the joint and common costs (there are no mark-ups). With Marginal Costs only the direct variable costs of a given service are included.

The LRAIC takes into account cost changes when a particular service increases or decreases by a significant and discrete increment. When the increment is a single unit, incremental costs equal marginal costs. However, because the increment is significant, apart from the direct variable costs also capital and fixed costs are taken into account. It is important though to say that since LRAIC takes into account the long-run period, this means that all costs are considered variable. Therefore, long-run incremental costs include capital and the volume-sensitive costs related to substantial change in production. Since incremental cost represents only the additional cost, the fixed common costs are not taken into account, like it happens with the marginal cost methodology. Therefore, in order to recover common and joint costs, the need of mark-ups is necessary in order to ensure the financial viability of the company. Usually the regulators calculate the LRAIC cost of each component using the equal proportionate mark-up (EPMU).

Since LRAIC is a forward looking cost standard it means that it requires assets to be audited using current value. For this reason, the usual costing methodology is the modern equivalent asset (MEA) approach. The price of the asset with the lower cost can be found today in the market that offers at least equivalent functions and output with the valued asset in question. This idea is based on the assumption that a new comer that enters the sector today will acquire from the market the assets with the latest technology.

Another important issue in costing of telecoms is the depreciation and amortization method which is used during audit controls. Depreciation must be allocated in such a way that charges a fair percentage of the value of the asset to each accounting period which is expected to benefit from the use of the particular asset. The main characteristics of depreciation are that calculations use the expected lifetime of the assets and not their accounting lifetime and fully depreciated assets which are yet in operation receive a value in current cost accounting (CCA). In order to be easier to find the depreciation that comes from fully depreciated assets, some incumbents keep a book value 2 in their accounts. For assets which are restated in the regulated accounts on a current cost basis, use the net replacements cost method.

3. Costing in mobile telephony

Mobile telephony in Europe developed quite differently to fixed telephony. Since mobile telephony was a new product, no single operator had incumbency power, in contrast to the fixed telephony sector where the formerly-state owned providers domi-

nated each national market. Typically, national regulatory authorities licensed several mobile operators and today in most European countries, 3 or 4 or more mobile operators compete for customers, with no one operator having a dominant market position. Regulation of the mobile sector has reflected this more competitive market environment, and price regulation is much less extensive than in the fixed telephony sector. Price regulation in European Union countries has focused on two areas.

Firstly, the European Commission and the national Regulators regard mobile call termination as potentially a bottleneck service. If a subscriber of Operator X wishes to make a voice call to a subscriber of mobile Operator Y, Operator X needs to buy wholesale call termination services from Operator Y in order to connect the call. Regulators believe that operators (i.e. Operator Y) providing call termination services have monopoly power since other operators (like Operator Y) have no practical alternative to paying the price demanded if they wish to offer comprehensive services to their subscribers. Thus, other operators become price-takers in the call termination market. Regulators have also taken the view that mobile operators have taken advantage of this monopoly power in order to set excessive charges for call termination. As a result, most EU regulators have imposed an obligation on operators to set cost-orientated rates for call termination, as a proxy for the charges that would apply in a competitive market.

Cost-orientation for mobile call termination raises several further complex issues that EU Regulators have tackled in different ways. These include (a) whether operators should be required to move immediately to cost-orientated charges or whether they should be allowed to reduce rates progressively over a period of years (a "glide path"); (b) whether all mobile operators in a national market should be set the same charges or whether smaller operators or new entrants should be allowed to levy higher charge ("asymmetry"), at least for a transitional period; (c) how these termination costs should be defined, for example, the extent to which operators should be allowed to recover common and fixed costs through termination rates.

Secondly, in 2007 the EU issued a Regulation concerning wholesale and retail international roaming charges. The EU argued that roaming charges set by mobile operators were excessive, in relation to the costs of providing the services and also that, due to the cross-border nature of roaming, individual national regulators lacked the powers to impose controls on roaming charges. The Regulation sets ceilings on the wholesale charges that one operator may make to

another operator for providing a roaming service and also sets ceilings on the retail roaming tariffs which operators may offer to subscribers. The European Commission argues that these ceilings have been set on the basis of the costs which operators incur in providing wholesale and retail roaming services. For example, the cost of wholesale roaming is closely linked to the costs of providing mobile call termination services (discussed above). However, these ceilings are common across the 27 member countries of the European Union, covering more than one hundred operators, so they are not defined precisely on the basis of the costs of each operator.

4. Future trends in pricing telecommunications

According to the competition law, competition authorities in EU often have to inspect the prices and costs of firms which have abused their dominant position. In the telecommunications sector, there are special independent regulatory authorities which regulate the sector. In the first years after liberalization, regulation was stricter than in the later years based primarily on the ex-ante telecommunications law whereas in the next years it moved towards ex-post competition law.

As the EU Commissioner Viviane Reding declared in ECTA's conference in 2006, the liberalization of telecoms markets in Europe has been a success story. The 1998 legislative package liberalized all telecom goods and services whereas the 2002 framework gave more emphasis on achieving fully competitive markets in a convergent and technologically neutral environment. Today, the NRAs must restrict their interventions but become more focused and efficient. The main goal of the coming years must be to promote competition and investments in the markets, and in particular in trans-national markets and for cross-border services.

As the competition becomes more intense though, retail offers are expected to increase. Broadband services are already offered bundled with voice telephony, fixed or mobile. It is not either surprising to see cross-promotion of Internet and other services with the offer for free PCs in order to sign contracts for specific period, e.g. three years for ISP subscription or to offer free Internet with residential local loop charges. In this sense, incumbent operators have already acquired or merged with mobile operators and internet providers. According to market analysts, incumbents and alternative operators are expected to deliver real benefits to consumers by widening the choice of available tariffs and offering lower prices on key services. The incumbents and alternative operators are expected to strengthen the competitive process as alternative operators are expected to introduce competing price plans and of-

fers, also based on voice telephony and broadband services. In the coming months it is expected to introduce a variety of differentiated charges by time of day and day of the week.

At the same time, the NRAs must monitor closely the market in order to ensure that differentiated pricing will be clear and understood by the consumers. Market analysts argue that differentiated charging is liked by consumers and can expand the market as a whole, with more calls in total (for the incumbent and alternative operators), as differentiating charging makes consumers better off. At the same time differentiated charges are, also, expected in wholesale services, to reflect the move to differentiated retail prices. Volume discounts reward high spending consumers, since the cost savings from "bulk sales" are passed onto them. Such discounts are common in some member states whereas in others are not. More common though is to see such tariff packages offered by mobile companies. Simple volume discounts on local, national and fixed to mobile calls, similar to the international discounts are currently available to consumers in almost all the EU member states. Overall, the new pricing schemes lead to a more competitive dynamic fixed telephony market in EU to the benefit of the EU businesses and the citizens. Broadband is, also, developed very fast and bundling of telecom services is currently very common in the EU member states.

As far as the regulation is concerned, it seems that in order to give a push in the sector the EC examines the case to separate structurally incumbents into three businesses. The business of fixed line access network services, the wholesale business and the retail business. Regulators have to achieve the goal for stronger competition and thereby more investment in Europe. Therefore, the move from service-based to infrastructure-based competition must be enhanced. Regulation must, also, follow the right policies to facilitate convergence and promote broadband for all businesses and citizens in Europe. However, in order to enable broadband growth the existence of alternative infrastructures is necessary, e.g. cable networks, wireless or fibre infrastructures.

The most serious discussion that takes place today within the EU is whether there must be a structural brake of the incumbents between wholesale and retail services. The UK is again the first member state that took such measures and the results for the market and the competition were very positive. However, there are other member states which do not accept to implement this process in their markets.

5. Case studies

As already discussed, the NRA is responsible for regulating and monitoring the telecom market. After the first years of liberalization the incumbent is

heavily regulated, which means that it is not possible by any way to proceed with offers to its customers, either based on volume or period of contract.

In the case of Greece the first time the incumbent operator attempted to carry on offers after the liberalization era was in 2003. The result though was not as expected for the former monopoly since the NRA did not allow the offer as it was planned but put specific prerequisites in relation to the wholesale services towards alternative operators.

At the end of the day, both offers were failed to pass the regulatory audit, according to the commercial (market-oriented) policy restrictions imposed on the incumbent.

The numbers which are used in the following cases are not accurate but they are good proxies, based on our analysis and the experience of telecom experts in Greece.

5.1. Weekend's offer. The incumbent operator Hellenic Telecommunication Organization (HTO) submitted to National Committee on Telecoms and Post (EETT) on March 27th, 2003 an epistle where it was informing the NRA that tariffs of fixed telephony's long distance and international calls would be reduced. In more detail, the long distance on Sundays would be charged as local calls whereas tariffs of international calls towards three nations would be reduced too. It is important to mention though that in order to enjoy these offers, the household user has to pay a monthly bill of at least 20 euros and the business user at least 50€. Furthermore, according to the HTO's offer, the discounts would be higher when the bill is higher.

The NRA called HTO at its premises on the 14th of April 2003 in order to express their view and give answers to EETT's Committee. On the 21st of April, HTO submitted to the NRA its memorandum. One day later, after its session, EETT called again HTO into an official Hearing on the 22nd of April 2003 since the HTO had already begun to advertise the offer into broadcasting without EETT had come to a decision first.

The Regulator sent questionnaires to alternative operators in order to estimate the impact of HTO's offer on their business plans. At the same time EETT's experts begun to study the case law of the European Court and in particular the cases of AKZO, Tetra Pack and Michelin. At last, on the 16th of May 2003, EETT voted down for the offer in total based on both the telecommunications law and the competition law. The NRA's decision was based on the fact that HTO's offer was concentrated on the services of long-distance and international calls where most of its competitors were interested more.

The NRA's decision was taken having in mind that HTO had failed to meet its obligations concerning LLU and its failure to set cost-oriented prices for leased lines per type.

At the same time, the NRA saw a hidden offer of HTO since the discounts were related to the bill that was paid and therefore this was a motive to make more calls not only in weekends but everyday, including local calls (the 20€ minimum and the level of the bill was determined by all types of calls, including local calls, during the entire week). Therefore, the offer was in reality for the whole week and in this way it had a serious effect on competition, since the offer proposed by HTO could mean the violation of cost orientation obligation for all its services as a regulated entity with significant market power in every relative market of fixed voice telephony. In this way, the NRA decided to reject ad interim the first offer by HTO since the full liberalization of 2001, until it would study in detail the available data and take its final decision. The HTO appealed to the Courts in order to cancel the NRA's Decision but its request was rejected. A few days later, EETT announced its final decision for the rejection of the offer and the HTO pleaded again, this time for EETT's final decision against its discount offer.

5.2. Christmas offer. Another case that came under the NRA's examination was a Christmas offer by HTO. According to this offer, for eight days, end-users would be able to call everywhere in Greece (long-distance calls) at a local call's charge. Even though, EETT's inquiry to other EU member states showed that such offers were very common, in the HTO's case the Greek NRA was very strict and at the end rejected also this offer. In reality the decision was trying to press the incumbent to solve other important problems like the cost orientation of leased lines and the LLU.

Since the offer of HTO was only for eight days, it becomes interesting to make an attempt as external observers to estimate whether this offer could harm competition. In order to come to a conclusion it is important to estimate in the beginning of our investigation, which might be the impact of this offer on HTO. In order to come to our conclusion we will use same figures which are hypothetical and base in our experience as experts in the telecom and regulatory economics. At first, we estimate that HTO would have around 2 billion national call minutes in the year 2002. We also assume (since the Christmas offer was the first of this kind no data was available. We therefore don't know whether national traffic is normally higher or lower than usual over Christmas days) that the eight days of the offer are typical days like the other days of the year. Therefore, we esti-

mate that national call minutes over these 8 days will be equal to approximately 44 million. This means that without the offer, HTO's retail revenues from these calls would be equal to 44 million $\times$ €0.063 = €2.8 million (It is in reality higher than this, because OTE has unit charging, not per second charging, but using 6.3c and 2.6c for the call costs is not a bad approximation for present purposes).

The effect of the Offer depends on the price elasticity of demand for national calls. If we assume that elasticity is -0.5, then the price reduction is from 6.3c/minute to 2.6c/minute, or about 60% reduction. Hence, given an elasticity of 0.5, calls will increase by 30%. That is, minutes will increase from 44 million minutes to 57 million minutes. Therefore, with the offer, HTO's revenue would be €1.5 million and then the cost to HTO is €1.3 million. Of course, we should assume that HTO is not a charity and expects to get this back over time, through stimulating more calls once the offer period is over and perhaps stimulating more local and international calls during the offer period.

To conclude, the impact on alternative operators (OLOs) is, also, examined. Initially, it is shown that the impact on the OLOs depends on whether HTO's extra traffic comes through customers switching from the OLOs, or from existing incumbent's customers. For someone who has the required data, this could be a very interesting case to model it and empirically investigate it. However, such data are not easily provided so some theoretical assumptions based on our expertise must be made. In this view, it is assumed that most of the extra HTO's traffic would be from existing customers since (a) the OLOs were small anyway, so they simply could not have that many minutes for HTO to attract; (b) OLOs were believed to have a lot of business customers, who would be less affected by the offer since they would anyway make fewer calls than average over the 8 day holiday period; (c) a lot of the extra HTO's minutes would come from people who would anyway call using HTO, but will now make longer (in time) calls.

According to analysts, over the 8 day period, calls originating from OLOs networks might be around 6 million national call minutes. This means that the worst case scenario for the OLOs is that over the offer's period, they would lose all their national traffic – that is, they lose 6 million call minutes (this looks an extreme assumption). However, 6 million minutes represented nearly half of the assumed increase in HTO volumes, and it seemed unlikely that so much of HTO's increased volumes would come directly from the OLOs, rather than from more calling from existing HTO customers. Also there is normally a degree of inertia or loyalty among cus-

tomers, such that not every OLO customer would switch back to HTO in response to their offer. For example, OLOs were currently significantly cheaper for national calls, but this had not yet led to HTO losing all its national traffic. Finally, OLOs had time to put together pricing and marketing strategies to counter-attack against HTO and reduce the amount of lost traffic.

An alternative assumption would be that the OLOs would reduce the potential losses in traffic through taking counter-measures, plus they would benefit from customer inertia or loyalty, such that they would lose half their national traffic over this period. Clearly, OLOs' costs would be lower as well since they would save on interconnection payments to HTO. According to estimations, an alternative operator's average interconnection payment was around 1.8 c/minute, to which they added around 0.5c/minute for their own circuits. Compared to this 5c/minute charge for national calls, this points to a gross margin of 2.7c/minute for an alternative operator. If we consider as representative this cost for all the OLOs then the combined loss to all the OLOs together would be of the order of €80 thousand, with an upper limit of €160 thousand. Such amount is difficult to convince that it could force OLOs to get out of the market and therefore, strictly speaking, as economists, it is difficult to agree with such decisions by NRAs. However, every decision is a political decision which is based not only on economic arguments but on legislative interpretations too.

5.3. Conn-X. This case is very interesting because it had ended with the highest fine by EETT to HTO since the liberalization took place in 2001. On the 30th of September 2004 the alternative operator Tellas (a subsidiary of the state energy provider DEH) accused HTO for the incumbent's broadband offer Conn-X and its overall policy for the development of ADSL. On the 12th of October 2004 the NRA called HTO to a hearing which was repeated on the 2nd of March 2006. The NRA's decision was published on the 26th of July 2007 and HTO appealed against it to the Courts. Some analysts noticed that the decision was taken almost two years after the accusation of HTO, establishing for this period an insecure operational environment for fast internet in Greece. It was also criticized that EETT's decision was not independent of the case of Telefonika where the regulatory authority and the EC imposed a high fine for similar reasons.

According to Tellas, the HTO squeezed the profits of the OLOs (HTO is dominant in upstream and downstream markets) for access to ADSL. The tying of access which is offered by HTO with its service called "fast internet" which is offered by HTO's subsidiary OTEnet. According to Tellas, with this

discreet policy, HTO harms competition and further to that, it gives the wrong impression that Tellas can not compete with HTO.

According to EETT, the incumbent abuses its dominant power in the access market and the services markets. More analytically, HTO has abused its dominant power in the wholesale broadband market through its DSL network and in the services market with the abuse of its dominant power in the retail broadband access through xDSL technology and the retail broadband market in the internet through xDSL technology.

With EETT's decision, HTO had to pay 20.000.000 euros for violation of the competition law and 100.000 euros for the violation of the telecommunications law. This fine was the highest in the telecoms market since the day of full liberalization and among the highest ever by any other authority, including the competition authority. The HTO appealed to EETT's decision to the Greek Administrative Court.

Conclusions

The liberalization process was agreed within a global environment under the umbrella of World Trade Organization during the Uruguay Round which was completed in the mid 90s with the introduction of services in the final agreement. After the agreement, the EU decided to liberalize fully the telecom markets in all its member states. The word "full" refers to the liberalization of voice in fixed voice telephony. For a successful process towards full liberalization, it is necessary to establish from the beginning a national regulatory authority which will regulate and monitor the sector in order to protect at the first stages of liberalization the alternative operators from the incumbent's abusive practices of its dominant power. In this way the consumer and the social surplus is maximized in the long run.

The most important policy instrument for a regulator is its power to impose cost oriented prices to the wholesale and retail services offered by the incumbent. This means that the parts of network which are owned by the incumbent – but are essential for the viability of the alternative operators – have to be available at cost oriented prices and on a fixed time schedule delivery. Such services are the interconnection to the incumbent's core network and the access to its local loop.

Also, leased lines are of high importance for the construction of a network by other operators. Such lines are considered both wholesale and retail services, since the incumbent offers them to both its competitors and its users, mainly the biggest ones.

The NRA has to make sure that the incumbent uses the proper costing system in order to ensure that its competitors do not pay its inefficiencies. However, the incumbent has to compensate for its entire cost in order to ensure that the network will not come into jeopardy and at the same time it will be not only maintained but modernized too. Therefore, the incumbent has been compensated for the cost which is recorded in its books. This can be done through its retail services, by its final users. In this way the two different costing standards can create a profit margin for alternative operators which are considered to be more effectively structured compared with the incumbent which was exploited by politicians during its operation as a natural state monopoly.

Another issue for the NRA is to ensure that everybody in the geographical territory of a member state will have a telephone at a reasonable price, no matter its location or its economic capability. This is called as the universal service obligation and it is imposed on the incumbent operator unless other operators are interested to become universal service operators. For the cost which represents this obligation, the universal service provider can ask for compensation if the NRA agrees that the cost is unfair for the incumbent, i.e. it is higher than the tangible and intangible benefits for the incumbent for being a universal service provider.

Finally, it is again noted that NRAs have to play a very important role for the sector. Their policy making, especially in costing and pricing monitoring, has to take into account that it has to send the right signals to all the participants of the sector. The economic signals have to promote the undertaking of new investments (investment ladder) and the deployment of new technologies. Also, the incumbent must have the necessary motives to maintain and modernize its network infrastructure, whereas the newcomers must also have a motive to invest and not just become resellers of the incumbent.

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