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Wolfgang Briglauer, Kurt Reichinger*

Chances of Contestability in Communications

A Sector-Specific Application

For EU electronic communications markets, a new regulatory framework was enacted in 2002. On the whole, this regulatory framework is designed to ensure the transition to general competition law. With respect to market analysis the directives,¹ in conjunction with the Commission's SMP-Guidelines,² outline a three-stage market analysis process: preliminary definition of the relevant communications markets, the examination of effective competition on those markets (=competition analysis) and the discussion of appropriate regulatory instruments. For each stage of the analysis the arguments based on contestable markets theory have been presented both by the relevant legal documents and by some scholars and proponents of that theory.³ The latter even argue in favour of a strict application according to the (regulatory) policy implications of the theory of contestable markets.

Concerning market definition issues there is, first, a questionable distinction with respect to the concepts of "potential competition"⁴ and supply-side substitution put forth in the SMP-Guidelines.⁵ Secondly, the European Commission introduced the so-called "three criteria test" (TCT) as a further market definition concept next to the standard tools accruing from competition law. Though conceptually flawed⁶ TCT serves as a "filtering tool" when considering whether a market should be regulated by competition law alone, or whether the market is susceptible to *ex ante* regulation. Market delineation results should be subject to an additional requirement for *ex ante* regulation and might therefore differ from those obtained under competition law.⁷ In its Recommendation, section 2.2, the Commission lays down three criteria (to be applied cumulatively) for identifying relevant markets:⁸

- the presence of high and non-transitory entry barriers
- dynamic aspects: does the market tend towards effective competition (without *ex ante* regulation)

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- the relative efficiency of competition law.

The first criterion makes direct reference to the height of market barriers, while the second and third criteria do so only in an indirect way. However, the investigation of market barriers within the TCT acts as an immediate transition towards competition analysis, where market barriers constitute a similar vital analysis element. As we shall see, contestability theory is associated very much with exactly that kind of analysis, i.e.

¹ Especially Articles 14-16 of the Framework Directive (2002/21/EC).

² European Commission: Guidelines on market analysis and the assessment of significant market power, 2002/C 165/03, SMP-Guidelines, Brussels 2002; henceforth also referred to as the "SMP-Guidelines".

³ Cf. most notably works by G. Knieps: Regulatory reform of European telecommunications: Past experience and forward-looking perspectives, in: European Business Organization Law Review, Vol. 2, 2001, pp. 641-655; G. Knieps: Sector-specific regulation of German telecommunications, in: G. Madden (ed.): World Telecommunications Markets – The International Handbook of Telecommunications Economics, Volume III, Cheltenham 2003, Edward Elgar, pp. 383-399; G. Knieps: Telecommunications markets in the stranglehold of EU regulation: On the need for a disaggregated regulatory contract, in: Journal of Network Industries, Vol. 6, 2005, pp. 75-93; as well as other German scholars such as U. Immenga, C. Kirchner, J. Kruse, G. Knieps: Telekommunikation im Wettbewerb – Eine ordnungspolitische Konzeption nach erfolgreicher Marktöffnung, Munich 2001, C. H. Beck; and C. Growitsch, T. Wein: A Revised Theory of Contestable Markets – Applied on the German Telecommunication Sector, working report, University of Lüneburg, 2002, <http://web.abo.fi/fc/eunip/fp/Growitsch-Wein.PDF>. Indeed, contestable markets theory evoked intense discussions and responses (cf. Monopoly Commission: Wettbewerbsentwicklung bei Telekommunikation und Post 2001: Unsicherheit und Stillstand, expert report, Bonn 2001; Monopoly Commission: Telekommunikation und Post 2003: Wettbewerbsintensivierung in der Telekommunikation – Zementierung des Postmonopols, expert report, Bonn 2003) with respect to the German telecommunications market; for a shorter and preceding work of this article (in German) cf. also W. Briglauer: Können Festnetzmärkte bestreitbar sein?, in: Wirtschaftsdienst, Vol. 3, 2004, pp. 193-200, which lines up with the critique of the Monopoly Commission.

⁴ "Potential competition" and "contestable markets" are used interchangeably in economic terms.

⁵ European Commission: Guidelines on market analysis and the assessment of significant market power, op. cit., § 38.

⁶ For a criticism of this approach cf. W. Briglauer: Market Analyses under the New European Communications Framework – Some Conceptual Issues, in: P. J. J. Welfens, M. Weske (eds.): Digital Economic Dynamics – Innovations, Networks and Regulations, 2006, Springer, pp. 63-90, chapter 3; and S. Loetz, A. Neumann: The Scope of Sector-specific Regulation in the European Regulatory Framework for Electronic Communications, in: German Law Journal, Vol. 4, No. 12, 2003, pp. 1307-1334, chapter III.

examining the height and importance of the entry and exit barriers of the markets under consideration.⁹

Thirdly, advocates of contestability based approaches argue that *ex ante* regulation is only justified with respect to monopolistic bottleneck segments, which are characterised by the simultaneous existence of a natural monopoly and irreversible (sunk) costs. All other markets are deemed to be “sufficiently” contestable and should thus not be subject to regulation. In this view competition analysis and the discussion of appropriate regulatory instruments are obviously intrinsically tied to each other and will thus be considered together in our analysis.

In regulatory practice fixed voice telephony retail markets took centre stage in the overall discussion on communications. Our analysis will also target these markets, while we shall also consider the pronounced vertical market relationships. Given the required forward-looking *ex ante* perspective rapid innovation and technological progress within those markets will be taken into account. In doing this, we wish to provide a very precise application on the basis of real market behaviour and relevant business models as well as technological features (such as IP-based telephony).

The paper is organised as follows. First, we present the underlying assumptions of contestable markets theory and the results they produce. This is supplemented by a review of the main criticisms that have been brought forth since the theory was established by Baumol, Panzar and Willig in their famous 1982 book.¹⁰ We then attempt to provide an in-depth application, whereby detailed reference is made to the technological, institutional and operational layer. Although some of our empirical estimates are gathered from the Austrian market situation our results and policy implications should hold quite generally for electronic communication markets.

⁷ Results may also differ because sector-specific analyses have generally to be based on a forward-looking perspective, taking potential future market developments explicitly into account. Apart from merger analysis dominance cases in competition law focus on past market behaviour and market outcome.

⁸ European Commission: Recommendation of 11 February 2003 on relevant product and service markets within the electronic communications sector susceptible to *ex ante* regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services, OJ 8.5.2003 L 114/45, Brussels 2003; European Commission: Commission Staff Working Document Public Consultation on a Draft Commission Recommendation, second edition, Brussels 2007, http://ec.europa.eu/information_society/newsroom/cf/itemshortdetail.cfm?item_id=2824.

⁹ Accordingly, the SMP-Guidelines (§ 78) explicitly mention “absence of potential competition” as a possibly relevant criterion in measuring the market power of an individual undertaking.

¹⁰ W. J. Baumol, J. C. Panzar, R. D. Willig: Contestable Markets and the Theory of Industry Structure, New York 1982, Harcourt Brace Jovanovich.

Model Framework

The theory of contestable markets was claimed to be a significant generalisation of the neoclassical theory of perfect competition. Accordingly, efficient market outcomes should no longer be dependent on the assumption of a large number of price-taking firms active within the respective market. Furthermore, contestability theory was initially advanced as a guide to identify precisely market areas where intervention (or regulation) was justified.

The main results of contestability almost immediately derive from the respective definitions. In the case of single product firms¹¹ with identical technologies given by total cost function $TC(q_i) = F + cq_i$ with fixed costs F and marginal costs c and assuming that inverse aggregate demand is given by $p=D(Q)$ an industry configuration (with incumbent’s prices p_i at q_i) is said to be¹²

- feasible, if
 - at p_i the quantity demanded equals q_i , i.e. $D(p_i)=q_i$;
 - the incumbent makes a non-negative profit, i.e. $p_i q_i \geq F + cq_i$
- sustainable, if
 - no potential entrant (e) can make a strictly positive profit by undercutting p_i while producing no more than the quantity demanded at the lower price, i.e.
 - \exists no $p_e < p_i$ and $q_e \leq D(p_e)$ and $p_e q_e \geq F + cq_e$
- contestable, if
 - a feasible industry configuration is sustainable.

It follows from these definitions that in a contestable market each active firm earns just zero economic profit and price is not less than marginal cost. Likewise, a contestable market minimises the cost of total output production.¹³ A contestable market structure therefore guarantees the same efficiency properties as perfect competition without requiring an atomistic market structure. Despite the fact that the actual incumbents might be few in number (due to scale economies possibly only one) their “market power” is fully restricted by the threat of potential entry.

Absence of Market Barriers

Although the results of contestability are strictly static in nature, the underlying definitions simultane-

¹¹ Contestability theory can be extended to multi-product firms as well; indeed, multi-product firms operating in the vicinity of the relevant market seem to be the most obvious candidates for potential competition (cf. Robert Cairns, Dhanayshar Mahabir: Contestability: A Revisionist View, in: *Economica*, Vol. 55, 1988, pp. 269-276).

¹² O. Shy: *Industrial Organization – Theory and Applications*, Cambridge, Mass. 1995, MIT Press, p. 207.

¹³ For straightforward “proofs” cf. S. Martin: *The Theory of Contestable Markets*, 2000, Purdue University, pp. 6-9, <http://www.mgmt.purdue.edu/faculty/smartin/aie2/contestbk.pdf>.

ously imply some kind of out-of-equilibrium behaviour that enforces the static results. Concretely, critical assumptions of contestability refer to market barriers on the one hand and pricing behaviour and pricing expectations on the other hand.

“[A] contestable market is one into which entry is absolutely free, and exit is absolutely costless.”¹⁴

In the following, market barriers are understood in broad terms as described by the classical definition by Stigler:

“[A] barrier to entry may be defined as a cost of producing ... which must be borne by firms which seek to enter an industry but is not borne by firms already in the industry.”¹⁵

With free market entry entrant firms face no form of competitive disadvantage compared to the incumbent firm. Thus there must be no asymmetries with respect to production technology or access to (essential) inputs on wholesale markets. Likewise, there are no informational asymmetries regarding the whole value chain of the relevant production process, and no legal or institutional barriers (such as patents) exist. On the consumers' part there must not be any preferences favouring the incumbent firm, which might be due to loyalty, goodwill, brand names and associated reputation effects or any other incumbency advantages; instead, consumers act fully rationally and immediately, and products are fully homogenous (with no degree of product differentiation in the relevant market).

Irrespective of the above, market entry will also fail if there are significant transaction costs on financial markets.¹⁶ Lenders might not be able to distinguish appropriately between potentially successful entrants and those who will fail (the “lemons”). As a consequence of this kind of imperfect information financial markets suffer from Akerlof's “lemon problem” which implies that entrants as a group would be confronted with higher capital costs. Entrants' cost of capital will thereby be higher (higher risk premium) the more expenditures are sunk.

Market exit is only costless when sunk costs are zero, which means that all entry related costs are fully recoverable. Various technical definitions of sunk costs

¹⁴ W. J. Baumol, J. C. Panzar, R. D. Willig, *op. cit.*, pp. 3-4.

¹⁵ J. G. Stigler: *The Organization of Industry*, 1968, University of Chicago Press, p. 67, quoted from W. K. Viscusi, J. M. Vernon, J. E. Harrington: *Economics of Regulation and Antitrust*, Cambridge 1995, MIT Press, p. 157; according to this definition, it is apparent that sunk cost also imply an entry barrier, since they constitute costs which are crucially relevant in the decision-making process of the entrant but are at the same time irrelevant to the incumbent (because they are already sunk and no longer included in the incumbent's opportunity costs).

¹⁶ S. Martin, *op. cit.*, p. 19.

exist in the academic literature; for our purposes, however, it is reasonable to adopt Baumol's understanding:

“[S]uppose that a unit of capital purchased at a price of β per unit could be sold or utilized elsewhere ... for a unit salvage value of $\alpha \leq \beta$. Thus it is possible to parametrize continuously the degree of sunkness of capital from zero ($\alpha = \beta$) to absolute sunkness ($\alpha = 0$).”¹⁷

Given this definition, “sunkness” is aligned to the resale possibilities of (physical and intangible) assets. However, as mentioned above, resale markets might be subject to the “lemon problem” whenever potential purchasers cannot clearly evaluate the quality of the assets. Besides, the degree of sunkness will be highly correlated to asset specificity, since secondary usage will then be highly limited by definition.

Even if sunkness could be minimised with regard to physical assets, sunk investments in intangible assets are involved in virtually all entry situations. Prior to market entry the potential entrant will have to invest in market research to collect necessary information, whereby this sort of information will – as well as any organisational efforts – typically only be valuable to the entrant firm as long as it stays in the market.¹⁸ Also, while in the market firms will typically have to invest in marketing and advertising campaigns to build up a brand name and attract customer awareness. In case of market exit, however, who would pay for a brand name that failed? Most of these expenditures are thus sunk in nature and especially important whenever products are differentiated. In technologically progressive industries firms will also have to invest in knowledge and R&D activities, which are intrinsically sunk.

It is evident that factually all products are differentiated at least to some degree, that markets with (approximately) zero sunk costs do not exist nor do we observe completely symmetrical constellations among incumbent and entrant firms in real industries.

Entry Lag versus Price Adjustment Lag

“Second, the potential entrant evaluates the profitability of entry at the incumbent firms' pre-entry price.”¹⁹

The second assumption again makes reference to the overall analysis of market barriers. However, it has evoked considerable discussion in the contestability

¹⁷ W. J. Baumol, J. C. Panzar, R. D. Willig: *Contestable markets: an uprising in the theory of industry structure: reply*, in: *American Economic Review*, Vol. 73, No. 3, 1983, pp. 491-496, here p. 494.

¹⁸ Cf. S. Martin, *op. cit.*, p. 18.

¹⁹ W. J. Baumol, J. C. Panzar, R. D. Willig: *Contestable Markets and the Theory of Industry Structure*, *op. cit.*, pp. 3-4.

literature. We shall therefore deal with this question separately.

The entry lag denotes the time between the noticeable market entry of the new firm and its ability to sell its products on a significant scale to consumers. The price adjustment lag denotes the time between the noticeable market entry of the new firm and the effective price response of the incumbent firm.

Whenever there are irrecoverable costs associated with market entry – which will most likely be the case – then the length of time for which the entrant can recover all its (sunk) costs before the incumbent is able to respond is of crucial importance for a rational entrant. In the case of a significant price adjustment lag market entry could become profitable despite some level of sunkness ($\alpha < \beta$). If, however, the incumbent's price responses are sufficiently fast then the potential entry will never occur since – even if entry and exit costs were low – it would be unprofitable.

Generally speaking, the entrant, in making his decision, will have to take into account the nature of post-entry competition. However, according to the definitions of contestability theory the entrant is not allowed to take into account the possible price reactions of the incumbent since sustainability is defined with regards to a given industry configuration (p, q). “Hit and run” entry is supposed to take place given the profitability based on pre-entry prices. In contrast, the incumbent firm must believe that the entrant's decision is based on the assumption that the incumbent will not change its prices. However, price-taking behaviour would only be possible in the case of an atomistic market structure as assumed by the theory of perfect competition, and is highly implausible in the case of concentrated oligopolies. It is generally accepted that oligopolists would be aware of their mutual interdependencies. However, when the entrant only comes into the market on the basis of expected post-entry profits, then the threat of hit-and-run competition is mitigated to a large extent and long-run equilibrium will no longer be achieved.

The last resort of contestability refers to the possibility of long-term contracts creating price-rigidity on the part of incumbents as well as offering protection to the potential entrant from the incumbent's retaliation.²⁰ But whenever a large-scale entry is needed in order to produce efficiently, such an insulation strategy is unlikely, especially with regard to transaction costs, demand uncertainties, and other informational asymmetries (as mentioned above). Besides, such broad-scale contracting would likely make the incumbent

aware of a future entrant and increase its responsiveness. Even if protection via long-term contracting were possible to a certain extent, it is evident that the same strategy could be applied by the incumbent firm, making it partly resistant towards potential competition. Beyond long-term contracting proponents ultimately refer to any kind of impediment that could somehow delay the price-adjustment lag, even making reference to regulation (!):

“Even if such contracting is not feasible, it is still possible for *regulation*, costs of communicating price revisions, or other impediments to delay an incumbent's effective price response ...”²¹

Robustness of Contestability Theory

All in all, contestability theory seems to be a priori highly unlikely for any real market situation since the “strong” assumptions and model predictions never hold in reality.²² However, contestability (just as any other theory) must not be judged only on the realism of the underlying assumptions. Instead, the important question is that of the robustness of the theory.

Let F_{α}^i denote (initial) sunk costs incurred prior to market entry and F_{α} sunk costs incurred in the interval between actual market entry and feasible market exit (at exit period X).²³ $F_{\beta-\alpha} = F - F_{\alpha}^i - F_{\alpha}$ denotes recoverable fixed cost. π stands for profits of entrant (e) and incumbent (l), respectively, and let T denote the period when the incumbent can react by cutting his price. Due to our above considerations we will define T in relative terms taking entry lag (λ^e) and price adjustment lag (λ^l) into account:

$$1) \quad T = \begin{cases} \frac{\lambda^l}{\lambda^e} \dots \text{if } \frac{\lambda^l}{\lambda^e} > 1 \\ 1 \dots \text{if } \frac{\lambda^l}{\lambda^e} \leq 1 \end{cases}$$

An entrant rationally taking into account price reactions of the incumbent firm will only enter if the present value (PV) of his income stream is positive, i.e.

²¹ Cf. W. J. Baumol, J. C. Panzar, R. D. Willig: Contestable markets: an uprising in the theory of industry structure: reply, op. cit., p. 493.

²² For various critical appraisals cf. inter alia J. Tirole: The Theory of Industrial Organization, 2000, MIT Press, pp. 310-311; M. Armstrong, S. Cowan, J. Vickers: Regulatory Reform: Economic Analysis and British Experience, 1994, MIT Press, pp. 103-106; W. K. Viscusi, J. M. Vernon, J. E. Harrington, op. cit., p. 161; and W. G. Shepherd: The Economics of Industrial Organization, 1997, NJ: Prentice Hall.

²³ For simplicity we assume that there is no uncertainty about the level of sunk costs; instead, the entrant is assumed to know that level when he decides on entry. Furthermore, we assume that post-entry sunk costs are distributed uniformly throughout the period of market activity.

²⁰ Cf. S. Martin, op. cit., pp. 14-15.

$$2) \quad PV^e = \pi^e = \pi^i \int_{t=1}^T e^{-rt} dt - F_{\alpha} \int_{t=0}^X e^{-rt} dt > 0.^{24}$$

From equation 2) we infer that the likelihood of entry, i.e. the entrant's discounted profit π^e , increases as T and π^i become larger,²⁵ and decreases as F_{α} becomes larger and the longer capital is committed post entry (i.e. until exit is possible at time X). As a necessary condition a market can only be contestable if $T > 1$ (irrespective of the level of pre-entry prices and sunk costs!) even if T is large entry will only occur if sunk costs are sufficiently low simultaneously. Stiglitz²⁶ showed that for a homogenous Bertrand game even small sunk costs would lead to a market outcome where the incumbent firm makes a monopoly profit (π^i). If, however, the potential entrant engages in product differentiating activities sunk costs will also no longer be at a negligible level. Eventually, equation 2) is driven by the intensity of post-entry Bertrand price competition, which highlights the importance of expectations on firm behaviour. As argued above, price-taking behaviour would however be unrealistic in case of large-scale entry.

To sum up, the theory also seems to be unsustainable with regard to its robustness. We prove this on empirical grounds below for communications markets.

An Application to Communications

As argued in the introduction our application is targeted towards fixed voice telephony retail markets. Indeed, the most substantial changes that came along with the new recommendation of the European Commission on relevant communications markets refer to these markets.²⁷ According to the new recommendation markets for national and international calls should no longer be subject to *ex ante* regulation. By and large the Commission substantiates these changes with regard to the increasing importance of broadband connections and associated technological innovations

²⁴ For a similar presentation cf. M. Schwartz: The Nature and Scope of Contestability Theory, in: Oxford Economic Papers, Vol. 38 (Suppl.), 2006, pp. 37-57, who shows that any entry can be restricted if the incumbent can respond sufficiently fast.

²⁵ The same holds for any initial sunk costs F_{α}^i .

²⁶ Cf. J. Stiglitz: Technological Change, Sunk Costs, and Competition, in: Brookings Papers on Economic Activity, Vol. 3 (Special Issue on Microeconomics), 1987, pp. 883-937.

²⁷ Cf. European Commission: Recommendation of 11 February 2003 on relevant product and service markets within the electronic communications sector susceptible to *ex ante* regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services, op. cit., for the "old" recommendation as well as European Commission: Commission Staff Working Document Public Consultation on a Draft Commission Recommendation, op. cit., for the "new" recommendation.

(most notably, IP-based telephony) on the one hand, as well as (in part only recently) imposed regulatory instruments on the wholesale layer (such as Unbundling, Naked DSL, Wholesale Line Rental, Carrier Selection) on the other hand. Accordingly, we shall focus our analysis on all the involved and relevant business models in which we examine the role of a potential entrant already operating near the target market.²⁸

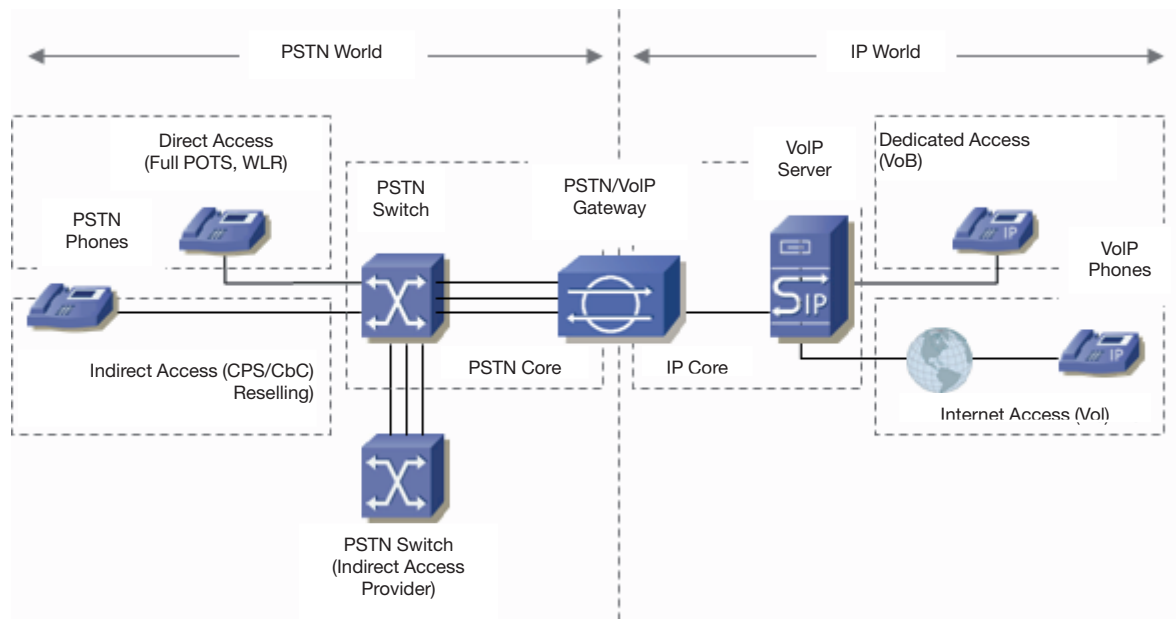
Figure 1 provides a simplified overview of the different provider strategies for offering voice services. On the left-hand side, a traditional voice service provider is shown with his own PSTN²⁹ core network (switch) and customers attached using the provider's own access network typically based on copper lines (Direct Access). This scenario also allows for another business strategy called Indirect Access, meaning that outgoing calls are routed to an alternative operator with his own switch by means of a carrier identification code, i.e. Carrier Preselection (CPS) or Call-by-Call (CbC). Another possibility shown in Figure 1 is the utilisation of an incumbent's voice product (primarily targeted at access lines) called Wholesale Line Rental (WLR), which typically requires a billing system to be installed by the entrant. Another wholesale product (typically offered by CPS providers on an unregulated basis) is Reselling of voice minutes, enabling entrants to concentrate on marketing and sales activities selling a CPS voice product to their customers.³⁰ Looking at the right-hand side of Figure 1, a VoIP scenario is illustrated: a VoIP provider is shown with his own equipment, i.e. a VoIP proxy server and a gateway providing the necessary protocol translations between the PSTN and IP worlds. Two scenarios are distinguished: Voice over Broadband (VoB) is VoIP provided on a managed IP (access) network, while Voice over Internet (VoI) uses the public Internet for providing voice services. Typically, the latter has lower quality as transport is often provided on a best effort basis on the Internet.

²⁸ As indicated in footnote 11 contestable market theory best (if at all) describes competition among multi-product firms already operating in the vicinity of the target market. Therefore, if contestability turns out to be unlikely with regard to those candidate firms, this must hold a fortiori for any potential entrant that appears from nowhere (as was implicitly assumed by the theory). Furthermore, confining our analysis to the potential threat of multi-product firms operating near the target market also implies that we do not consider actual competition from mobiles. As opposed to potential competition from outside the market, intermodal platform competition stemming from the mobile sector already brings about actual and increasing competition within fixed network markets. The same holds, more or less, for cable operators insofar as they have already upgraded their networks in order to be able to offer voice telephony in recent years. Thus competition due to activities from cable operators has to be characterised to a large extent as actual and intramodal.

²⁹ Public Switched Telephone Network.

³⁰ Reselling of minutes based on CPS products is a business case that comes in different flavours, e.g. with the entrant using an own carrier identification code, without an own code, based on toll-free or premium rate numbers.

Figure 1
Voice Services in both the PSTN and the IP World



The amount of investment necessary for adaptations in technology, internal and external processes and relations for an operator entering the market depends on the service(s) already offered and those service(s) that should be offered after such a move. Table 1 presents an exemplary overview regarding the variety of issues to be taken into account when an Internet Service Provider (ISP) initially offering non-voice services based on local loop unbundling (ULL) enters the voice telephony market to offer services based on Voice over Internet (VoI), Voice over Broadband (VoB), Reselling, Wholesale Line Rental (WLR), Carrier Preselection/Call by Call (CPS/CbC) or Full POTS/ISDN, respectively. The table differentiates between new installations that are mandatory for operation in the new field of business (marked with “ • ”) and those that may possibly be needed in addition (marked with “ (•) ”). Some of these installations may already be in use, others may have to be newly installed (marked with hatching). The last column gives an indication of the amount of sunk investment in relative terms that is connected with each business case should an entrant later decide to leave the market again.

If the new voice service is classified as public telephony, the provider needs to obtain a general authorisation, which may be an administrative and financial burden. As public telephony is provided with telephone numbers as addressing elements, those have to be obtained, managed internally and processes for number portability have to be put in place. Depending on the type of technology used, it may become necessary to install or lease PSTN or VoIP equipment.

Furthermore, arrangements for interconnection (IC) have to be prepared. This ranges from contractual negotiations with the incumbent or other alternative operators on both the domestic and international levels to setting up interconnection links or obtaining space for collocation. Typically, an ISP does not have a billing system in place as is required for voice telephony business. This is necessary for customer billing (retail) as well as interconnection billing (wholesale). Depending on the type of voice service offered it may become necessary to provide the customers with corresponding customer premises equipment, e.g. VoIP phones, analogue terminal adapters or specific voice modems. This may raise additional expenses for support issues, e.g. service personnel or call centre agents. Another major cost factor is external communications, i.e. the marketing necessary to promote the new voice service and to build a new customer base. Finally, vendor relations have to be established or strengthened to get the support necessary for setting up the new business.

However, not all items from Table 1 are necessary for all types of services. If an operator e.g. decides to move into “Minutes Reselling”, the list of activities necessary is significantly reduced to: obtaining a general authorisation, dealing with numbering issues, negotiating the Reselling contract, and starting with marketing and advertising activities.

The indications given on the amount of sunk investment associated with each item listed in Table 1 are grouped into three broad ordinal categories (↑ low; ↑↑ medium; ↑↑↑ high), but have to be interpreted carefully such as this classification heavily depends on

Table 1
Moving from Internet Services based on Local Loop Unbundling to Voice Services

From ULL ISP to ...	Vol	VoB	Re-selling	WLR	CPS CbC	Full POTS	Sunk Investment
General Authorisation (voice)	(•)	•	•	•	•	•	↑
Numbering / Number Portability	(•)	•	(•)	•		•	↑
Switch (owned / leased / shared)					•	•	↑↑
VoIP Server	•	•					↑
PSTN/IP Gateway	(•)	•					↑↑
Access Network (Last Mile)		•				•	↑↑↑
IC Links / Pops	(•)	•			•	•	↑↑
Service/Fault Clearance		•				•	↑↑
CPE ¹ (e.g. ATA ² or voice modem)		•					↑
WLR Contract				•			↑↑
Reselling Contract			•				↑
IC Contracts (national/int'l)	(•)	•			•	•	↑↑
IC Billing (voice)	(•)	•			•	•	↑↑
Customer Billing (voice)	(•)	•		•	•	•	↑↑
Customer Relations	•	•	•	•	•	•	↑↑
Vendor Relations (voice)	•	•			•	•	↑
Marketing and Advertising (voice)	•	•	•	•	•	•	↑↑↑

- ... to be newly implemented
- ... mandatory for operation
- (•) ... possibly needed for operation

¹ Customer Premises Equipment. ² Analogue Terminal Adapter.

the specific situation of the market and the provider(s) involved. Investment in general authorisation and numbering issues is deemed to be rather low in comparison with other factors and therefore the associated sunk investments are also low. Investment in technical equipment such as PSTN switches, VoIP proxy servers or gateways are a more critical issue with regard to sunk investment risk. Although technical equipment can be sold to other providers, it has to be taken into account that product and innovation cycles are rather short in the telecommunications sector, and therefore a significant amount of sunk investment has to be expected. The same is valid for investment in interconnection measures (such as interconnection negotiations, interconnection links, collocation space or points of interconnection), where it is rather unlikely that the market can be left without significant loss of

investment. The same holds true for investment in billing systems which typically brings a large amount of system integration measures which cannot be recovered when leaving the market. The largest risk of sunk investment, however, comes with access network activities on the one hand and voice service-specific marketing measures on the other hand. Operators investing in their own access networks have significant advantages with regard to quality and product differentiation, but are facing high sunk investments when leaving the market. The same holds true for marketing measures that cannot be recovered adequately when leaving the market, even when strong trade marks have been established for certain products.

Considering an ISP that offers non-voice services based on bit-stream access³¹ entering the voice market, the issues to be taken into account are quite similar to those listed in Table 1. For the WLR case, exactly the same issues as in Table 1 are relevant for market entry. For the Vol case, one major problem for a bit-stream access-based provider is the quality of service achievable using the bit-stream access wholesale product, as the access network and its associated quality parameters are not solely manageable by the new voice service provider, but depend on the quality parameters provided by the wholesale offer as well as other providers' wholesale activities. A further drawback is the prevalent coupling of bit-stream access products to an existing incumbent voice telephony line, making it especially difficult for a bit-stream-based operator to offer (another) voice service to the customer. In this context, the availability of naked DSL³² bit-stream services is considered a key for breaking that entry barrier into voice business, although it currently does not have a big relevance regarding market figures. Concluding, moving from bit-stream access to a Vol service obviously bears a higher risk than from ULL. Moving from bit-stream access to VoB, CPS, CbC or Full POTS/ISDN shows no difference to Table 1, as the same access network-dependent issues occur.

Table 2 shows the situation for a provider already offering public voice telephony services based on Vol and wanting to enter a voice market higher up the so-called "ladder of investment", e.g. offering services based on VoB, Reselling, WLR, CPS/CbC or Full

³¹ Bit-stream access describes a broadband wholesale product allowing a beneficiary to use the broadband infrastructure of another provider (e.g. copper line, xDSL modem, DSLAM and backhaul infrastructure) to provide its own broadband services. Typically, the incumbent operator is deemed to have SMP on the related wholesale broadband access market and must therefore provide non-discriminatory bit-stream access to alternative operators.

³² Naked DSL refers to the possibility of using DSL services without mandatory use of traditional voice telephony on the same line; Naked DSL Bitstreaming is the corresponding wholesale product.

Table 2
Moving from Vol to Voice Services Higher Up the Value Chain

From Vol to ...	VoB	Reselling	WLR	CPS CPC	Full POTS	Sunk Investment
General Authorisation (voice)	•	•	•	•	•	↑
Numbering / Number Portability	•	(•)	•		•	↑
Switch (owned / leased / shared)				•	•	↑↑
VoIP Server	•					↑
PSTN/IP Gateway	•					↑↑
IC Links / Pols	•			•	•	↑↑
Access Network (Last Mile)	•				•	↑↑↑
CPE (e.g. ATA or voice modem)	•					↑
Service/Fault Clearance	•				•	
WLR Contract			•			↑↑
Reselling Contract		•				↑
IC Contracts (national/international)	•			•	•	↑↑
IC Billing System (voice)	•			•	•	↑↑
Customer Billing System (voice)	•		•	•	•	↑↑
Customer Relations	•	•	•	•	•	↑↑
Vendor Relations (voice)	•			•	•	↑
Marketing and Advertising (voice)	•	•	•	•	•	↑↑↑

■ ... to be newly implemented
 • ... mandatory for operation
 (•) ... possibly needed for operation

POTS/ISDN, respectively.³³ Again, the amount of sunk investment to be expected when leaving the market is indicated in the right-hand column. Table 2 illustrates that a provider already offering voice services needs significantly less effort for moving up the voice business value chain than a non-voice service provider. Typically a voice service provider already possesses a general authorisation,³⁴ has numbers – however not necessarily geographic numbers – allocated and related procedures implemented, and equipment in the network and at customer premises available. One

³³ Although Vol constitutes a communications service it is generally not deemed to be a “relevant” product within voice telephony markets (in contrast to VoB); cf. European Commission: Commission Staff Working Document Public Consultation on a Draft Commission Recommendation, op. cit., section 4.2.

³⁴ Table 2 considers the Vol provider entering the market to be a provider of public voice telephony with corresponding general authorisation. A different case would be a Vol provider offering Internet-only voice services without the need for prior registration (e.g. Skype classic). Such an operator would have to obtain a general authorisation when entering the market.

of the major challenges for such a provider is access to the customer that can be assured either by newly building a network or by cooperating with an established access network operator. Interconnection agreements may have to be set up (or upgraded) and billing systems installed. Customer and vendor relations typically are established already, which allows the operator to concentrate on promoting the new voice service by means of marketing activities. Although Table 2 shows five possible migration scenarios for a Vol operator, only the first case is of significant relevance in practice, i.e. moving from Vol to VoB. The remaining options would mean that the Vol provider has to switch technology as Full POTS/ISDN, CPS/CbC and WLR are all based on TDM technology, as are most Reselling offers. Moving from VoIP to TDM technology is very unlikely as this would mean a step backwards in the advent of all-IP next generation networks.

Not all the issues mentioned in Tables 1 and 2 have the same relevance for residential customers and business customers alike. Some issues like general authorisation, number portability or interconnection agreements are necessary for both customer segments, of course. Other issues, like the technical equipment necessary for providing specific services, may be different depending on the segment addressed. Addressing the residential customers segment needs systems prepared to serve large numbers of customers while products designed for business customers typically have to meet higher quality demands for a smaller number of customers. Regarding customer care, the focus on the residential market is to serve a large number of customers with similar problems, while on the business market a small number of customers will demand support in rather diverse and customer-specific issues. The same holds true for marketing activities that (may) strongly differ between residential and business segments, with the latter requiring significantly less advertising expenditure. The business segment, on the other hand, demands customer-specific key account management activities.

Further Asymmetries between Incumbent and Entrant

According to Stigler’s definition of market barriers these must be understood in broad terms including any asymmetries between incumbent and entrant firm. In the markets considered here, possibly relevant asymmetries can be identified with regard to access to inputs, to customer information, business relations and demand. In the following, the main and most dis-

tinct³⁵ asymmetries which are not explicitly captured in Tables 1 and 2 will be described.

Access to inputs and production technologies. One of the major differences between an incumbent operator and an entrant is the fact that the former can typically rely on its own infrastructure for provisioning a large variety of different services. The entrant on the other hand is typically dependent on wholesale inputs from the incumbent and/or alternative providers that often act as direct competitors at the retail level. In addition, some wholesale products are only available due to regulatory intervention (e.g. ULL, Naked DSL, CPS, CbC or WLR), which may imply that entrants have only a restricted or limited product spectrum at their disposal. One example of this category of asymmetry is the application of local loop unbundling. While ULL in principle should give an alternative operator the possibility to get easy access to an incumbent's subscriber line, the practical problems faced by alternative operators can be manifold. These range, e.g., from cost factors related to the adaptation of collocation space to backhaul issues and delays in provisioning and broadband quality issues of the unbundled loop. These problems have in common that the alternative operator is highly dependent on the "goodwill" of the incumbent operator, as not each and every transaction can be monitored by the regulatory authority that has imposed the remedy.

Information and business relations. Some possible asymmetries e.g. vendor relations, research and standardisation activities, political standing, credit rating etc. are closely related to the difference in size between incumbent and entrant. One example is the involvement of incumbent operators in standardisation bodies like ETSI, ITU, IETF, IEEE or ANSI, which provides them not only with information but gives them direct influence over the technologies and standards to be introduced in the future. At the same time these activities strengthen the relationship with vendors which are also deeply involved in standardisation issues. In combination with cooperation in R&D this can build a strong link between the production industry and incumbent operators.

Demand side. Focussing on the demand situation, it is the incumbent that benefits most from economies of scale and scope. Evidence shows that incumbent operators can base their calculations on a larger number of users while entrants face high demand for innovative products at low prices from a smaller number of

users. Therefore entrants cannot realise a comparable return on investment under similar conditions as an incumbent operator. A good example is the broadband Internet access market, where incumbent operators can typically rely on a large number of "low and medium users" who are fairly satisfied with the services offered, while entrants have to attract new customers with more innovative products that offer e.g. higher speeds or larger download volumes at the same (or a lower) price as the incumbent operator. Often, his small number of "power users" is harder to satisfy and needs more support than the incumbent's users. The same phenomenon can be observed in narrowband voice telephony markets where entrants are typically faced with a higher percentage of price sensitive consumers and an incumbent typically operates "captive consumers".

Price Adjustment Lag, Entry Lag and Exit Lag in Practice

As outlined above, the entry lag denotes the time between the noticeable market entry of the entrant and its ability to sell its products on a significant scale to consumers while the price adjustment lag denotes the time between the noticeable market entry of the entrant and the effective price response of an unregulated³⁶ incumbent. The exit lag denotes the time between actual significant or noticeable market entry and the first date of possible market exit.

Price adjustment lag. The relevant period of time depends on a number of factors related to type and characteristics of the product concerned, as well as the organisational ability of the incumbent operator to react in a timely manner. At least the following aspects may have to be taken into account:

- assessment of entrant's product and/or price by incumbent operator
- adaptation of incumbent operator's technical infrastructure
- adaptation of incumbent operator's billing and rating systems
- adaptation of incumbent operator's internal and external (administrative) processes
- price difference
- perceived demand elasticity of incumbent firm.³⁷

³⁵ This means that we take into account that a number of entrants have a strong international backing with some of them even being incumbent operators in their respective home countries. Therefore, the potential drawbacks discussed here do not necessarily reflect the situation for each and every entrant on the market.

³⁶ An unregulated incumbent with regards to calls markets serves as the relevant benchmark, since deregulation on even those markets is demanded by the proponents of contestability based arguments. Here we ignore further complexities that might arise when we consider that the incumbent firm in most cases prices via a menu of two-part tariffs where the access charge is/remains typically regulated. However, our conclusions with regard to contestability theory will remain unaffected.

When reacting to a competitor's market entry, a competitor's new product or altered prices, the incumbent operator will first assess the situation to decide whether a response is necessary at all. The incumbent's marketing and sales divisions will evaluate commercial implications and analyse possible reaction strategies while the technical division may look for the preferred way to implement a new product or product alterations. If the product is already within the incumbent operator's portfolio it is merely a commercial decision whether and under which commercial conditions the product can be offered. In this case the price lag can be expected to be not much longer than about 6 weeks, in urgent cases that lag may come down – within an optimised decision-making environment – to as short as 2 weeks. Assuming the product not to be within the current portfolio, that time lag may increase, however. This could be the case when technical adaptations in the incumbent operator's infrastructure become necessary preconditions for delivering the service to the end-customer. Taking into account the maturity of voice telephony products, however, the number of innovative product features that could be expected to bring the incumbent operator under pressure in this regard seems to be limited. Furthermore, incumbent operators typically are well aware of the product innovations available and have the necessary vendor relations to react rather quickly to any such potential threats, or even to be ahead of any entrant.

Entry lag. The relevant period of time depends on a number of factors that are mainly related to the type of service to be offered when entering the market. As illustrated in Tables 1 and 2, it is comparably easy to enter the market as a reseller, as this only needs a general authorisation, a reselling contract with a minutes wholesale provider, and marketing and advertising activities. Major issues, such as numbering, interconnection or billing can be managed by the reselling wholesale partner, and therefore they do not affect time to market. General authorisations are typically published by the authority responsible. Furthermore, this is a precondition for getting a 10xx carrier identification code or for getting access to telephone numbers later. As these actions have to be taken before actual market entry, the incumbent most surely will become aware of an entrant's activities denoting the point of noticeable market entry. Under these precon-

ditions market entry for the reselling case should be possible within a timeframe of about 6 to 10 weeks. The higher up the value chain, the more time will be necessary to deal with teething troubles that may occur when entering the market.

Another option is WLR, which brings a similar entry lag as the reselling case with the major difference of a customer billing system being needed by the entrant. However, pre-testing³⁸ and process adaptations may bring the entry lag timeframe up to 8 to 14 weeks.

The more entrant-owned infrastructure involved in a business case, the longer the entry lag will become. Considering the CPS and CbC cases, infrastructure issues concerning switching and transmission equipment, as well as interconnection will occur. As this typically involves testing and adapting procedures, the entry lag increases. Therefore a timeframe of 3 to 6 months until the product can be sold in significant quantities seems to be an appropriate estimation. An even longer timeframe is to be expected when the entrant is building its own access network (or at least parts of it) before entering the market,³⁹ although in this case a complementary approach will be chosen, using appropriate wholesale offers for complementing the access network already existing or being built.

Finally, the market segment addressed also has to be taken into account. Moving into the residential customers segment obviously is a more complex issue with regard to marketing and advertising expenditures. On the other hand, addressing the business segment may demand a higher grade of tailor-made products with defined service quality and related first and second level support. Depending on the specific needs of the customer segment addressed the entry lag timeframes estimated above may vary.

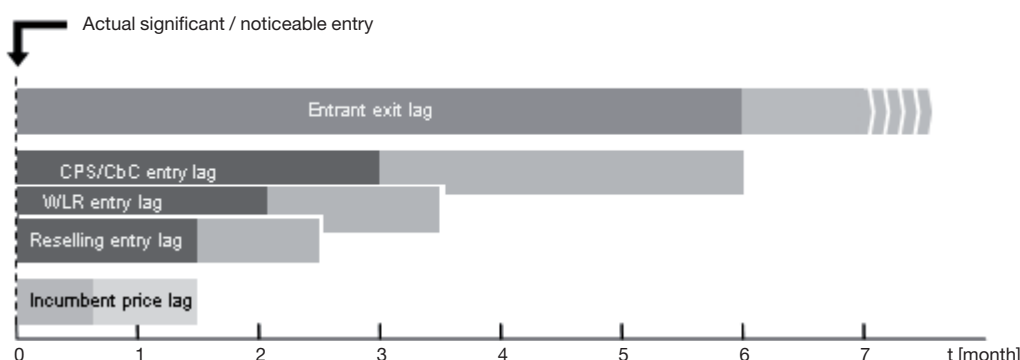
Exit lag. With respect to the exit lag (X) as defined above several relevant factors can be identified. From an economic point of view, a decent period of time for market development is needed until success or failure of market entry can be evaluated. Estimation for such a time period is 6 months minimum. Another factor setting the exit lag is the duration of contracts signed in conjunction with market entry. Contracts regarding infrastructure, e.g. leased lines, switches or regulated products, such as ULL or WLR, typically require a me-

³⁷ Whereas the before-mentioned bullet-points address the technical and organisational feasibility of the incumbent firm to adjust prices, the incumbent firm may not have the economic incentive to adjust prices. Demand side barriers (or asymmetries) might lead to highly inelastic demand (at least for some consumer segments). Likewise, the incumbent firm might be obliged (by regulation or marketing requirements) to set uniform prices for all geographical areas. However, such strategic pricing considerations already imply some kind of deviation from the homogenous contestability framework.

³⁸ In most cases WLR will be a regulated wholesale product used by NRAs as a remedy for operators with SMP on (retail and/or wholesale) access markets.

³⁹ It is almost the same with mergers as a mode of market entry. Likewise, market entry by cable operators upgrading their network (allowing for voice telephony) will also be associated with time frames far beyond those required by contestability.

Figure 2
Estimated Range of Entry Lag, Price Adjustment Lag and Exit Lag



dium to long-term involvement of the entrant,⁴⁰ which supports the exit lag estimation of 6 months minimum. The resale of technical equipment, e.g. TDM switches, VoIP servers or billing systems no longer needed due to market exit has no restricting effects on the exit lag as infrastructure can also be sold after market exit. Generally speaking, the higher up the value chain an entrant is operating and the more own infrastructure is involved, the longer the exit lag has to be estimated. Empirically, market exit often takes place via company take-overs,⁴¹ which lead to a substantial consolidation process in fixed network voice telephony markets in recent years. Yet the market transactions involved to complete such takeovers are likely to cause similar exit lags.

Policy Implications

Contestability cannot be applied as a direct guide for regulation or deregulation since its predictions can be turned upside down by only gradually changing the underlying assumptions. Contestable markets theory would imply that no regulation is needed even in the case of just a single firm being active in the market. However, both technology and price adjustment mechanisms reject the applicability of the contestable markets theory.

“[T]he theory of contestable markets can no longer be said to apply where technology requires firms to be large relative to the market. The theory of contestable markets applies where efficient firms can be so small that they make decisions taking price as given.

This, of course, is the usual size condition imposed for applicability of the theory of perfectly competitive markets.”⁴²

“However, for most industries, especially those that have typically been associated with the concept of natural monopoly, prices adjust much more quickly than can capacity. Accordingly, this approach to a contestable market equilibrium does not appear to be of much practical interest either.”⁴³

In the same way the early enthusiasm by proponents and applicants of the theory has been fully at odds with the empirical evidence even in those markets that were said to be a flagship of contestability.⁴⁴ However, contestability provides some insights into the importance of market barriers and the role of sunk costs in monopoly and oligopoly industries. This, however, basically just points to the necessity of sharpening the focus on market barriers and their importance on performance and efficiency; this relation is, of course, well known in traditional industrial economics and goes back to the work of J. S. Bain. Accordingly, some scholars even only attribute merit to contestable markets theory with respect to the involved elaboration of associated multi-product cost concepts:

“While contestability has had theoretical interest it seems not to have fulfilled its promise. What the theory has added to industrial economics is an intensification of interest in the effects of both economies of scale and scope.”⁴⁵

⁴⁰ In Austria, for example, the following periods of cancellation are in use for regulated wholesale products: Reference Interconnection Offer – notice of cancellation every half year with a cancellation period of 4 months; Reference Unbundling Offer – notice of cancellation every quarter of a year with a cancellation period of 4 months; WLR Offer – notice of cancellation every half year with a cancellation period of 4 months; the respective decisions of the Austrian regulator (RTR/TKK) are available at: www.rtr.at.

⁴¹ Many of them are additionally motivated by fiscal incentives on the part of the overtaking company.

⁴² S. Martin, op. cit., p. 11.

⁴³ P. L. Joskow: Regulation of Natural Monopolies, Centre for Energy and Environmental Policy Research, 05-008 WP, 2005, p. 27.

⁴⁴ With regards to the airline industry W. J. Baumol, R. D. Willig: Contestability: Developments since the Book, in: Oxford Economic Papers, Vol. 38, 1986, pp. 9-36, here p. 25, had to admit that “there is a significant positive correlation between profits and concentration in airline markets. Thus the threat of entry does not by itself suffice to keep profits to zero.”

⁴⁵ D. Jacobson, B. Andresso-O’Callaghan: Industrial Economics and Organization, 1996, MacGraw Hill, p. 21.

“Hit-and run” surface defined by T and sunk costs (F_α)

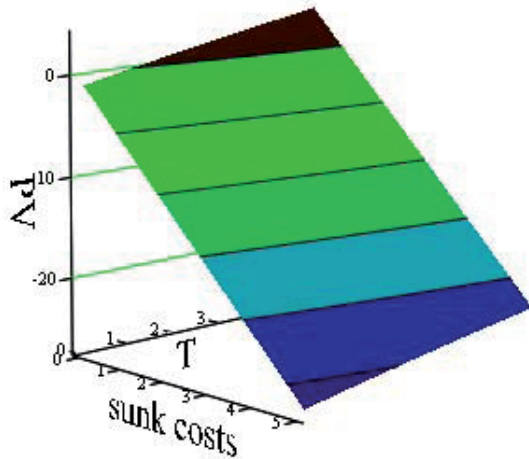
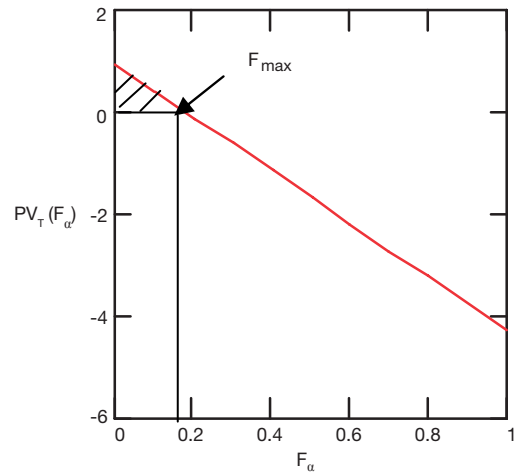


Figure 3

Present value (PV_T) as a function of F_α when $T=2$



The above conclusions are reinforced when we take into account the characteristics of network industries such as communications. To begin with, we wish to apply the potential entrant’s calculus (as captured in equation 2)) to the above analysis by using a simple simulation. After this, we refer to an illustrative empirical market observation which clearly indicates the non-relevance of contestability.

For the following simulation we normalized π^l to unity; sunk costs are therefore to be interpreted with respect to this level of π^l . According to equation 2) we also had to determine the level of interest rate and exit lag. For the interest rate we set $r=0.05$, for the time of possible market exit we set $X=6$.⁴⁶ The analysis above suggested that T and X are both to be measured by monthly periods. Figure 3 depicts the resulting “hit and run” surface on the left: Sunk costs (or F_α) on the x-coordinate and the ratio of price adjustment lag and entry lag (T) on the y-coordinate simultaneously determine the profitability or present value (PV) of the entrant.

The left-hand side of Figure 3 shows that the entrant can expect positive profit (PV or π^e) after entry only within a rather limited area (the top triangle). Moreover, this would require that even if T is unrealistically high (say $T=2$) fixed costs must be rather low. The right-hand side of Figure 3 shows that for $T=2$ sunk

costs must not be more than about 18% (F_{max}) of the incumbent’s profit. If more realistically we let converge $T \rightarrow 1$ – as indicated by our above analysis and Figure 2 respectively – then the term $F_{max}/\pi^l \rightarrow 0$. The “hit and run” surface therefore seems to be too steep to crest even for the least costly business cases (simple minute reselling).⁴⁷

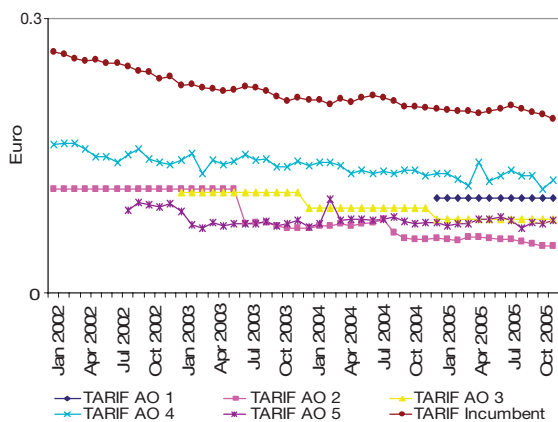
In addition, it is empirically manifest that diverse non-pricing asymmetries (as described above) imply that the incumbent’s profit will show a certain degree of inertia. In other words, entrants will only be able to gain a fraction of π^l , which will be especially true with regards to the entrant’s first market periods. This point might be easily illustrated by past pricing patterns. Concretely, Figure 4 provides a comparison of average tariffs with real market data for the Austrian market for the years 2002-2005. Figure 4 focuses on the residential market for international calls since this market is deemed to be most competitive within all fixed retail voice telephony markets, precisely because market barriers are rather low (with the market being “closest” to contestability).⁴⁸ Despite that, we observe significant and stable pricing mark-ups by the

⁴⁶ Both parameters are thus set in a rather “conservative” way: (i) interest rates around 10% typically resemble the (average) incumbent’s capital costs in regulatory praxis (for European evidence cf. Cullen International: Cross Country Analysis – Benchmarking of key regulatory topics across 17 countries, August 31, 2007, Table 9, <http://www.cullen-international.com/documents/cullen>); (ii) market exit after 6 months seems to be just as cautious when one takes into account that even optimistic business models will consider that time frame for successful market development only (let alone the duration of basic wholesale contracts).

⁴⁷ Note also that the profitability of fully service-based business cases will again be contingent on the competitive conditions *within* the market. Whenever there is no dedicated *ex ante* obligation for reselling activities (which is typically the case for minute reselling as opposed to CPS/CbC) expected profitability is thus only indirectly derived from the incumbent’s pre-entry profits.

⁴⁸ Accordingly, this market was among the first to be deregulated; for European evidence cf., for instance, M. Cave, U. Stumpf, T. Valletti: A Review of certain markets included in the Commissions Recommendation on Relevant Markets subject to ex-ante Regulation, independent report, Warwick/Bad Honnef/London 2006, p. 9, http://europa.eu.int/information_society/policy/ecomm/doc/info_centre/studies_ext_consult/review_experts/review_regulation.pdf; or Cullen International: Cross Country Analysis – Market analysis database, 2007, <http://www.cullen-international.com/documents/cullen>.

Figure 4
Average Residential Prices for International Calls – Data for Austria



Source: RTR.

incumbent firm with respect to the group of all relevant (as measured by market shares) alternative operators (“AO”).⁴⁹ (Massive) price undercutting behaviour on the part of the alternative operators has atrophied the incumbent’s market share during the observation period. However, these market share shifts were due to *actual* intra market competition. Moreover, the incumbent still (after years of undercutting!) holds by far the highest market share with concomitant profits on that market which is clearly not in line with the predictions of contestability as outlined above.

Concerning market definition, there is a questionable separation between the concepts of “potential competition” and supply-side substitution put forth in the SMP-Guidelines.⁵⁰

“A third source of competitive constraint [in addition to demand and supply side substitution] on an operator’s behaviour exists, namely potential competition. The difference between potential competition and supply substitution lies in the fact that supply side substitution responds promptly to a price increase whereas

potential entrants may need more time before starting to supply the market. Supply substitution involves no additional significant costs whereas potential entry occurs at significant sunk costs.”⁵¹

Thus, according to the SMP-Guidelines the speed of reaction marks the significant difference. When referring to contestability theory, however, this differentiation does not hold. Instead we found that entry, as one of the underlying crucial assumptions, must take place quickly without the need for substantial and time-consuming additional investment expenditures. Only this allows potential entrants to take advantage of any profit opportunities in the respective market. Without this, “hit and run entry” would not work, neither potentially nor actually. If at all, the hypothetical nature of the mere threat of potential entry as opposed to actual supply-side competition might be seen as a relevant distinction. However, appraising the actual/potential extent of supply-side substitution seems to be a rather hypothetical task in many situations anyway. Thus these boundaries inevitably become blurred, which might be a reason why the SMP-Guidelines loosen the strict assignment concerning potential competition in footnote 24:

“What matters however is that potential entry from other suppliers is taken into consideration at some stage of the relevant market analysis, that is either at the initial market definition stage or at the subsequent stage of the assessment of market power (SMP).”⁵²

Final Remarks

Our paper clearly points out that an abstract reference to contestability based arguments can by no means provide guidance for *ex ante* regulation or competition policy. This holds especially true for communications markets where (actual or potential) competition problems are directly related to the market structure characteristics of network industries. Mistakes made in the deregulation of airline industries – based on the influential power of early contestability literature – should not be repeated with regard to communications markets more than 20 years later. Baumol et al. later explicitly denoted the theory’s main contribution “... as a guide for regulation, rather than as an argument for its elimination”.⁵³ In particular, the theory rightly draws attention to the importance of a proper understanding and in-depth analysis of market barriers and structures. Even if the SMP-Guidelines (§78) list “absence of potential competition” next and co-equal to several other market structure related criteria

⁴⁹ The Austrian market situation is by no means a particular case. Rather, we observe such pricing patterns across most European member states; cf. European Commission: European Electronic Communications Regulation and Markets 2006 (12th report), COM(2007) 155, Brussels 2007, http://ec.europa.eu/information_society/policy/ecomm/implementation_enforcement/annualreports/12threport/index_en.htm, volume 2, figures 113-116.

⁵⁰ The following draws on W. Briglauer: Market Analyses under the New European Communications Framework – Some Conceptual Issues, op. cit., pp. 67-68.

⁵¹ European Commission: Recommendation of 11 February 2003 on relevant product and service markets within the electronic communications sector susceptible to *ex ante* regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services, op. cit., § 38; although a large portion of (both academic and political) literature adopted this trichotomy of competitive forces, this is not the case throughout.

⁵² European Commission: Guidelines on market analysis and the assessment of significant market power, op.cit.

⁵³ W. J. Baumol, R. D. Willig: Contestability: Developments since the Book, op. cit., p. 27.

that are regarded as relevant for analysing markets, one should not be confused. This just indicates that the criteria listed in §78 come from case law and thus do not constitute a coherent economic framework.

Of course our application was subject to some rough interval estimates. Although we showed that our policy implications should be fairly stable, the estimations involved and expert opinions might well differ in international comparison and are thus naturally open to further discussion.

The focus of our paper implies that it solely examines relevant forms of potential competition within the wireline sector (intramodal). However, the mobile sector has become the most important real threat for fixed voice telephony markets in recent years. Possible future changes in market definition and associated *ex ante* retail obligations will thus have to be primarily ascribed to intermodal platform competition ("fixed-to-

mobile substitution").⁵⁴ Surprisingly, the Commission's justification⁵⁵ with regard to the deregulation of fixed line retail call markets still focuses on intramodal competition (ignoring intermodal competition almost entirely).

⁵⁴ Cf. for instance the final decision of the Austrian regulator (RTR/TKK at http://www.rtr.at/web.nsf/englisch/Telekommunikation_Regulierung_Entscheidungen?OpenDocument) which recently imposed (April 2007) a so-called "quasi-ex post" retail regulation on calls markets: Mobile competition was deemed to be significant yet not sufficient with regard to market definition (in order to define a common fixed-mobile market) and competition analyses (SMP was still found); therefore a more light handed form of retail regulation – in terms of a transition from classical *ex ante* regulation towards "quasi-ex post" – was considered to be justified. For more detailed descriptions cf. W. Briglauer, M. Ertl: Dynamische und marktspezifische Übergänge zwischen Ex-ante und Ex-post am Beispiel der Festnetzregulierung, in: *Netzwirtschaften & Recht*, Vol. 3, 2007, pp. 103-109.

⁵⁵ European Commission: Commission Staff Working Document Public Consultation on a Draft Commission Recommendation, op. cit., section 4.2.