Regulatory Aspects of Converging Mobile and Fixed Telephony - The case of the Danish "Duet"

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1. Introduction and purpose

In October 1997, Tele Danmark and its subsidiary company TDM entered into a contract of service provision, allowing Tele Danmark, as the first telephone company in the world, to offer an integrated fixed and mobile telephone service - “The Duet System” - where the customer only needs one telephone number. Competing mobile network operators have argued that Tele Danmark is abusing its strong market position, derived from ownership of the wires, connecting consumers to the network - “the local loop” - and that competitors are effectively prohibited from providing a product similar to Duet.

The purpose of this paper is to investigate the implication for competition of convergent fixed and mobile telephony, and to assess whether the current Danish telecommunication legislation will have to be changed to safeguard competition and, if so, to propose and to discuss different ways how this could be done. Section 2 presents the Danish market for telephony and section 3 describes the Duet system. To evaluate the consequences for competition, it will in section 5 be discussed how competing mobile network operators under the current Danish legislation, presented in section 4, can provide a competing product to Duet. Section 6 examines to which extent Tele Danmark has an incentive to extent its monopoly in the market for wire-line access into the market for mobile telephony and discusses the potential effects on competition and welfare, along with section 7. Different legislative changes will be proposed and evaluated in section 9.

On April 23, 1998, during the final stage of writing this paper, a new bill with changes to the telecommunication legislation was proposed. In the final week up to the proposal two new sections where added, both with direct relevance to (and actually caused by) the problem discussed in this paper. If implemented this change will represent a drastic legislative change with a fundamental impact on competition and will therefore be mentioned briefly in section 10.

The paper focuses on the Danish case. However, the system is the first of its kind in the world. It is therefore interesting to discuss whether similar regulatory problems will arise in the rest of the EU and the United States, when this new technology is introduced there. This will be examined briefly in section 11 before section 12 concludes the paper. The main conclusion is that the local loop should be unbundled and that an immediate effort should be invested in determining procedures for establishing the price of this local loop.

2. The Danish market for telephony (facts)

To give the reader an idea of the actual and potential competition in the Danish market for telephony, let us first mention the key players and facts of the industry: **Tele Danmark (TD)** is the Danish incumbent telephone operator. It was created in 1990, as a state owned holding company to take over and integrate four regional telephone companies and the State Telecom Service. After the flotation of shares in 1994, the government reduced its share of the stocks to 51% and in October 1997 the remaining stocks were sold to American Ameritech and TD itself, allowing Ameritech to acquire 42%, becoming by far the majority

stockholder. In spring 1996, the exclusive rights of TD to operate and provide fixed network infrastructure were abolished. There are currently a few resellers of minutes, who are chosen by carrier-select (4 digits). Carrier pre-select is scheduled for January 1, 1999. TD continues to have a monopoly over the provision of fixed local access and with that the subscription, due to its 100% ownership of the wires from the central office to the end user - the local loop.

When in 1992 GSM was introduced in Denmark, licenses were given to **Tele Danmark Mobil (TDM) -** a subsidiary of TD - and **Sonofon -** owned by four companies, among others American Bell South. In March 1997, licenses to a new GSM system, DCS 1800, were assigned to the above two companies along with French **Mobilix** and Swedish **Telia**. Finally, there is a fifth company **Debitel** who only resells mobile minutes from the other four networks and only to certain segments of the market.

At the end of April 1998, Sonofon, Mobilix and Telia all announced that they would establish their own fixed backbone networks. Mobilix has entered into an agreement with the Danish railroad operator and are in addition building infrastructure in the larger cities. Telia has started an experiment with a cable TV network, and all three companies will all share excess capacity on the fibers that control the electricity network. With their own backbone in place, the companies will in the near future be able to bypass TD's access to the larger urban customers. The fixed network (soon networks) is almost fully digitized and there are no regulatory distinctions between local and long distance telephony.

3. The Duet system:

In this section the agreement between TD and TDM and the new technology will be examined. Through an agreement with TDM on service provision, TD has been able to offer a new product to its customers: a subscription integrating the cellular phone, the fixed network phone and a common answering machine (similar to voice-mail). Formally, TD buys a certain amount of minutes from TDM with the purpose of reselling them in Duet. This will show to be an important feature.

The customer only has one telephone number to the outside world. When a call is made to this number, it is automatically directed to the mobile phone if it is turned on and to the fixed phone if the mobile phone is turned off. If the phone is not picked up it is redirected to the answering machine[1]. The automatic redirection costs 10 cents per minute (the regular price for redirecting the home phone to a cellular phone is 35 cents). This fee is only paid if

[1] Technically, when a number of a Duet-customer is dialed, the call is first directed to a central office. There it is checked whether the automatic redirection facility is turned on or not. If it is not turned on, the call is placed to the home phone. If the home phone is not picked up the call is forwarded to the answering machine. If the automatic redirection is on, it is then checked whether or not the cellular phone is turned on. If the cellular phone is turned on, the call is then made to that phone. If the cellular phone is not picked up, it is forwarded to the answering machine. If the cellular phone is turned off, the call is placed to the home phone. Again if the phone is not picked up it is forwarded to the answering machine. The home phone as well as the mobile phone has to be connected to a digital central office to make the system work.

the call is in fact redirected to the mobile phone. In addition the customer is provided with some new facilities such as call-waiting for free.

It is possible to call directly to the two phones using two separate phone numbers and when a call is made between the home phone and the cellular phone the price is only the 10 cents per minute, no matter where in the country the customer is. Due to the reduction from two to one subscription, the customer will save $ 55 on the subscription alone. The customer can use his pre-existing fixed as well as cellular (GSM) phone.

TD markets the system and holds the full relationship to the customer. Thus the customer receives only one bill. The one number, one bill and the lower subscription cost make this new product (using TDM's mobile network) very attractive to consumers compared to a cellular subscription with a competitor (Sonofon, Mobilix or Telia).

The Duet-system has been judged to be a great success. According to the press Duet has already gained more than 75,000 subscribers, which is around 5% of the market for mobile telephony, in less than 6 months. There are no estimates on how many of these customers were previously with a competitor, TDM, or did not have a cellular phone. But the main competitor Sonofon has lost customers, indicating that the Duet system, not surprisingly, is taking away customers from the competitors.

4. Relevant current Danish telecommunication legislation

To a large extent, the Danish telecommunications legislation is an implementation of EU telecommunications directives. In addition to the important **requirement of network operators to interconnect**, three basic principles apply to agreements of interconnection. **Transparency** should be induced through making agreements of interconnection publicly available. A network operator with a strong market position has to provide interconnection at terms and prices that are **non-discriminatory**, and beginning in January 1, 1999 these prices shall be **cost based.** Costs are represented by Long Run Average Incremental Cost (LRAIC)[2].

In June 1997, when the legislation was modified to implement new directives and recommendation of the European Commission, the definition of interconnection, and thereby the kinds of agreements covered by the Act, was changed to be in accordance with the EU directive - service provision was left out. According to the interpretation of the National Telecom Agency (statement of February 6, 1998), the agreement at hand is therefore not presently covered by the Telecom Act. This is because it only concerns reselling minutes and not actual transfer of the traffic to TD's own network. The agency,

[2] **LRAIC** is a forward looking measure that reflects what the costs of interconnection would have been if it had taken place on a technically optimal network instead of the current network, where the technology may be obsolete, that may be inefficiently run, loaded by stranded costs etc. The LRAIC-price, which is the LRAIC cost plus a "reasonable profit" has the theoretical advantage of reflecting what the price would have been in a competitive environment. The main problem is that it in practice (as known from the US and the UK) has shown to be quit complicated to calculate these cost.

however, also finds that this consequence of the changed definition was *unintentional*. Having read the comments to the law we agree with this position and note that agreements like Duet technically involve interconnection between the two networks. It is therefore recommended here that the definition be changed (back) so that it includes such agreements.

Whether intentional or not, the changed definition implies that the general law of competition and not the Telecom Act covers such agreements. In a statement of January 14, 1998 (enclosed to the statement of the National Telecom Agency), the Danish Competition Agency concludes that the Duet-agreement does not a priori conflict with the basic principles of the competition law. However, given the strong market position of the two companies, it is noted, the actual use of the contract should "not imply a limitation of access to the market or a practice that distorts competition to the benefit of the involved parties". Even if the Telecom Act had applied, the principle of non-discriminatory prices could not have been used. This is because TDM is the seller of minutes not TD. Thus it would be TDM not TD who would be obliged to sell minutes on the same terms to the competitors – this is irrelevant unless these mobile prices are below the cost of the competitors.

According to the act of June 12, 1996 on public mobile communication, mobile operators who are licensed to establish and run a public network are **required to accommodate service providers** (in this case TD) and allow them to use the network and basic services of the licensee. Such requirements were *not* established for the operators of fixed networks!

5. How can the competitors provide a product comparable to "Duet"?

Due to the above requirement of accommodating service providers on mobile networks, TD could request to become a service provider on the competitors' networks, reselling their minutes as well, but has not requested to do so. As will be discussed later, TD does probably not have an incentive to enter such agreements, since TDM is a subsidiary of TD. In any case, such an agreement is not desirable to the competitors since they would lose the direct relationship to the customer.

TD has offered the competing mobile network operators a solution where the relationship to the customers is preserved. However, the price of redirection offered to the competitors are similar to the price offered to the regular fixed network customers (without Duet): a $ 7 quarterly fee plus the current minute rate, which is 33 cents[3]. This should be compared to the 10 cents, charged to "Duet"-customers. It seems obvious that entering such an agreement will be a losing business for the competitors if they want to offer competitive prices. Also, the customers will still receive two separate bills.

In Denmark, competition *does* exist on fixed telephony. However, this takes place only on minutes, not on the subscription. TD still owns and operates the local loop 100%. To use

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[3] These are the prices from Monday through Saturday 8 a.m. to 7.30 p.m. At other times the rate is 17 cents (price list for "Duet" of November 17, 1998). All prices are including 25% VAT.

another carrier, customers have to dial four additional digits while placing a call. For the mobile network operators to be able to offer a service similar to "Duet", they will have to acquire the entire subscription to the fixed network or to bypass the local loop by installing their own connection. The competitors may buy subscriptions from Tele Denmark and then resell them to the customer. The customer will then never see a bill from Tele Denmark. Instead of the call first being made to a central office on the fixed network, it could now be made to a central office of the mobile network that then decided whether or not to redirect the call to the fixed network. According to the Telecommunication Act, TD is obliged to terminate such a call. The switching fee could then be avoided. However, Tele Denmark has recently changed the rules for subscribing on the behalf of another user. This has been possible because it is a term that did not need permission from regulators to be changed.

A competitive product without using the local loop of TD

The fundamental question we are trying to answer is to what extent competitors should have access to using the local loop. It is therefore important to examine to which degree they can provide a similar product without using this access, through e.g. an entirely mobile based product – or to put it differently to which degree the local loop is an "essential facility"[4]. It will in the following be discussed to which extent the cellular phone can substitute the fixed phone. The lower the substitutability of competing products, the less buyers will respond to a price increase by switching to a competitor, and the higher will therefore be the benefit from raising the incumbents prices.

Only a few years ago mobile telephony was considered a complement to fixed telephony. It was too expensive to even be considered for basic everyday telephony. In addition people did not want to give out their phone numbers because they were charged for the mobile part of a received call. As a result the mobile phone could not substitute the fixed phone. Instead it was a complement in the sense that it increased the use of the fixed telephony network due to an increasing amount of calls from the mobile phones to the fixed network (and to some extent from the fixed network to the mobile network). Lower mobile rates just increased the demand for fixed network services.

In recent years, however, mobile **per minute rates** have dropped rapidly even though they are still substantially above the rates for fixed networks. This is especially true in Denmark. From April 1, 1998, the rates of Tele Denmark for fixed telephony were lowered and now range between 4-7 cents per minute. Only a few months ago, the mobile rates were about 25 cents per minute, but the cheapest of the mobile competitors, Telia, has just lowered its per minute rates 40% to 11 cents (March 27, 1998) and the competitors are expected to follow. However, average prices still remain 2-5 times higher than for the wire-line telephone.

In the EU, the **prices of incoming calls** are not paid by the called party, and do therefore no longer constitute a barrier to entry. In the US the called party still pays. This discourages customers from giving out their number and using the cellular phone as their home phone.

[4] An **"essential facility"** is "central and necessary to the production process in a downstream market (meaning that without access to the facility, production is impossible) it is a monopoly or bottleneck, and it is not economically replicable by competitors" (Harris & Kraft, 1997). It is characterized by large economies of scale.

Another important issue is **number-portability**. A main (switching) cost of effectively substituting the fixed telephone with a cellular phone is that the customer will have to change telephone number. Number-portability has not yet been introduced either in Denmark, the rest of the EU or in the US (unless the incumbent's service is resold). According to a recent EU directive, number-portability should be required if technically possible either by re-routing the call to the new number for "a reasonable fee" or by giving the callers an indication of the new number, without charging the called party for this service[5]. In Denmark where the networks are fully digitized, actual number-portability should be in place by July 1, 1999 for fixed local access providers (EU requests by January 1, 2000) and on January 1, 2001 for mobile operators (like the rest of the EU)[6]. The removal of this major barrier to entry will drastically increase competitors' possibility of introducing pure mobile based competition – but not until 2001!

"Home zone" pricing. In 1998 Telia, Sonofon and TDM have all introduced a new service where the customer can select a "home zone", typically around 1 square km. The customer can call from within this zone at daytime prices between 8-11 cents and outside the zone at around 33 cents[7]. This seems like a close mobile-based substitute to Duet except for the fact that the customer will still have to change telephone number and calls can not be made between the mobile and the home phone. More importantly the home zone prices are still almost the double of the prices for wire-line telephony.

The quality. The mobile phone will only be a good substitute if the quality is perceived by the consumer to be sufficiently similar to that of the fixed phone. For most users, the quality refers to the voice quality, but the speed of data-transmission becomes more and more important as well. Not many years ago, the voice quality was significantly lower than on the fixed network and data transmission was slow if at all possible. The digital technology (e.g. GSM) and the recent improvements of it, has made it possible to improve the voice quality and the speed of data transmission, but the fixed wire-line still remains superior when it comes to larger amounts of data.

Interconnection prices between mobile and fixed networks. As noted by the European Commission[8], interconnection charges between fixed and mobile networks have tended to be considerably higher than interconnection charges between fixed networks. As it also notes there is no justification for these differences since the cost of conveying a particular call from a particular point of interconnection to the end user on the fixed network is basically the same whether the call originates on a mobile network or another fixed network.

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[5] The European Parliament and Council: "Directive 97/EC on the application of open network provision (ONP) to voice telephony and on universal service for telecommunications in a competitive environment", January 14, 1998, Article 15 (4)

[6] Status report on European Union Telecommunication Policy, January 1998. Page 23.

[7] Prices are taken from a news paper article in "Berlingske Tidende", March 15, 1998 (before Telia's price cut on basic mobile telephony).

[8] Commission recommendation on interconnection in a liberalized telecommunications market. Part 1 – Interconnection pricing. October 15, 1997. Section 5.1.1

Following Farrell (1996), it is not difficult to account for these differences. When setting interconnection charges, the entering mobile network needs the agreement much more than the incumbent fixed network operator. This creates great asymmetry in bargaining power and the agreement will as a result typically be asymmetrical in favor of the incumbent. For an established fixed network, typically covering another region or country, the situation is very different. Here both parties need the agreement (and the products are complements). We can therefore expect much lower and symmetrical interconnection charges. Since these asymmetries arise from differences in bargaining power and not from differences in costs, it would therefore be natural to require that mobile and fixed network operators paid the same charges for interconnecting with a fixed network[9].

If mobile network operators were faced with lower interconnection charges they would be able to lower their retail prices, thus making their products a more attractive substitute for the fixed telephone. The fixed network operator will always have an incentive to set high interconnection/call determination prices. But the incentives will be even greater when mobile telephony is seen as a substitute to fixed telephony because the consumers who give up mobile telephony due to the high prices may switch over to the fixed network operator.

Turning the cables

Another way of bypassing the local loop is to use the existing cable network. The possibility is only mentioned and shall not be explored further. In the US it has proved much more complicated than expected. Telia is currently experimenting with the technology in Denmark, where an additional problem is that TD actually owns most of the cables! This is therefore likely to become a problem of it's own that regulators ought to worry about in advance (e.g. whether or not the cable entity should be separated from the rest of TD).

6. Monopoly leveraging through tie-in

In the following it will be investigated whether TD has an incentive to use it's monopoly power over the local loop to gain a competitive advantage in the provision of mobile telephone service.

The basic idea of the old leverage theory is that a company who has a monopoly in market A can tie another product, sold in a competitive market B, to its A product and thereby monopolize the B market as well, to the extent that B consumers needs A. The monopolist can for instance make his A product incompatible with competitors B product or she can bundle the goods so that A only can be bought together with the monopolist's B product. In the Duet case, A would represent the market for fixed wire-line local access and B the market for mobile telephony. In Duet A and B are bundled together. The consumer can still buy A and B separately but for many consumers the bundled good will be highly preferred to buying A and B separately, due to the shared telephone number etc. If the consumer wants this integrated service she has to buy both products together from TD.

Indeed this is a requirement of the Commission for the application of its "best practice" interconnection charges set out in the recommendation. (Section 5.1.1).

At first it may seem very intuitive that the monopolist has incentives to distort competition in market B since it will be able to get a higher mark-up on its B product; and for many years the US courts accepted this argument. The leverage theory came under heavy critique, however, especially by the Chicago school (Whinston (1990) mentions e.g. Burstein (1960) and Posner (1976))[10]. The theory is criticized for not providing a motive for the monopolist to monopolize the B market. The point is that, absent price-discrimination, the monopolist will have no incentive to charge above marginal cost for the B product. Consumers have a certain willingness to pay for the two products together. As long as the price of product A is not so high that it discourages the consumer from buying both products, the monopolist can extract his monopoly rent through a high price on A. When A and B are complements, a low B price will actually increase the demand for A and will be in the interest of the monopolist.

This reasoning is often referred to as the “one monopoly rent theory”. There is only one rent to be extracted and the outcome (prices and quantity) as well as the monopolists profit can in the standard case be shown to be the same, whether A and B are provided by an integrated monopolists (bundled) or by an A monopolist and a competitive B industry. The one monopoly rent arguments is *not* applicable to the Duet case, however. TD *do* almost have a monopoly on providing wire-line access to consumers but the price it can charge is regulated. The price of wire-line telephony access (A) therefore is much lower than the monopoly price[11], and the full monopoly rent can not be extracted here. As a result TD has an incentive to extract some of that consumer surplus in market B, through higher prices on mobile telephony. This can be done because these prices are not regulated.

When introducing Duet, there might be an incentive to keep prices close to average prices for mobile telephony to encourage consumers to switch to this new product and maybe to avoid the attention of regulators. Indeed, the per-minute prices in Duet were similar to those charged by its subsidiary company and the main competitor Sonofon. When Duet has achieved a certain market share, however, one might fear that TD chooses not to match the prices of the mobile market. Even though consumers can get a better price on mobile telephony from the competitors, they are likely to remain with TD because they will be willing to pay this extra price for having one telephone number etc. In this way TD would be able to expand its monopoly power (for wire-line access) into the market for mobile telephony and get a higher mark-up, thereby appropriating the efficiency gain from integration in the future instead of right now.

Actually, none of the prices in Duet are regulated because the law of universal service provision does not cover such products. TD can therefore potentially extract a larger share

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[10]For a critique of the critique see Whinston (1990), who emphasizes the importance of the changed structure of the tied good market.

[11] A liberalization of the market has taken place, allowing resellers to enter. However they only provide minutes and primarily long-distance calls. Here only the access to the fixed line and the adherent telephone is relevant. If it were not for regulation TD would be able to charge more for access almost ignoring resellers. Actually TD just received approval from the National Telecom Agency to raise its subscription fees and lower its per minute charges. This was seen as a way of adjusting prices to cost but also helps Tele Denmark compete against its competitors.

of the consumer surplus when the local fixed network access are provided in a Duet subscription instead of a regular subscription. From an economic perspective, it seems difficult to find a rational for the subscription and wire-line per minute prices not being regulated, when offered in Duet, when they are outside of Duet. Regulators should follow these prices in the future. Keeping a higher markup will have the additional attribute of keeping the market share down and maybe avoid otherwise potential antitrust charges.

Welfare

Society is interested in efficient production and efficient allocation (we will ignore distribution between producers and consumers). Two types of inefficiencies may arise from the case at hand. First of all, prices could be set far above costs; inducing consumers to under consume, creating a traditional dead-weight loss. As explained above, this might happen because TD can set per minute charges on mobile telephony above the competitive price on mobile telephone minutes. The more elastic the demand for mobile telephone minutes is, the more the demand will be distorted and the larger will be the welfare loss. Societies second concern is that TD may choose its subsidiary company TDM as the provider of telephone minutes even though some of the competitors might be able to supply the minutes at lower costs.

In the spirit of the Chicago school, a case can be made that TD (if it maximizes profit) has the right incentives to choose the cheapest supplier of mobile minutes, given that it can extract the surplus of the supplier. This could be done either through buying the minutes at marginal cost and reselling them with a profit or buy allowing mobile providers to compete for customers on the mobile part, and then charge them a fee per minute – basically the same thing. It could then be argued that its subsidiary company TDM has been chosen simply because it is the most efficient supplier.

In our view the value of this argument is questionable. First of all, it may not be possible for TD to extract the entire surplus, created buy such an agreement of service provision. As soon as the mobile company is chosen and the system is working, there is likely to be cost associated with shifting supplier, which gives the chosen company at least some bargaining power, allowing it to extract some of the surplus. Also it may be a lot easier for TD and TDM to come to an agreement on the price for the mobile minutes sold, since these will only affect the *distribution* and not the *level* of profit between TDM and TD. Distribution is less important since they are affiliated companies.

Instead of choosing one company as the provider, TD could allow suppliers to compete against each other. For instance TD could charge a fee for redirection and let the providers set the additional per minute charges. Consumers could then choose the provider they want. TD could set the fee for redirection so that its profits are maximized[12]. With this solution mobile prices offered in Duet would supposedly follow the regular mobile per minute prices (down) to the benefit of consumers.

[12] An alternative way to extract consumer surplus is the Duet subscription. Surprisingly the Duet subscription is not regulated since the law of universal service provision does not cover Duet. A much higher subscription fee however would probably scare of consumers.

However, a main benefit for TD from tying-in mobile service is that future mobile minute prices in Duet can be kept higher than traditional mobile minutes, when first the consumers have become used to the product. With this alternative solution TD would only earn money on redirection and it would have to charge a much higher redirection fee to make up for the foregone profit on minutes. While it may be acceptable not to lower per minute cost it will not be acceptable to raise the redirection fee. To incur the same profits at a given redirection fee, present (total) prices would therefore be higher and future (total) prices lower. Charging a higher present (total) price would slow down the introduction of Duet, since consumers are assumed to compare the price of Duet-minutes to the price of non-Duet minutes. TD would therefore favor the TD/TDM solution.

A second and probably more controversial point is that even if TD would gain from choosing the most efficient company, it may still want to choose its subsidiary company, simply because management *perceives* this to be beneficial. As mentioned earlier the argument of the old leveraging theory seems very intuitive, and management may well have the same impression as economists had for decades. Leaving aside the "economic man" for a moment, we should also be aware that the relationship between the management of TD and TDM are likely to be a lot closer than the relationship to other mobile companies. "Rationally or not", TD may therefore have an incentive to help its subsidiary company in the competition with its competitors. The fact that TDM is guaranteed a large amount of future minutes sold to TD facilitates capacity investments. Due to economies of scale, TDM may also gain a competitive advantage over its competitors in the market for regular mobile telephony. TDM might be willing to sell minutes to TD at marginal cost just to acquire the larger capacity that allows it to produce regular mobile minutes at lower costs.

If in fact an inefficient firm is chosen, it is irrelevant whether this is due to rational greed or to a bureaucratic firm, failing to exploit opportunities. In both cases a welfare loss will be incurred. In a competitive industry a badly managed firm would only hurt itself, but when it has market power it might hurt consumers as well.

To sum up, regulators should definitely worry about TD choosing TDM simply because it is the affiliate firm and not because it is the most efficient supplier. Two types of welfare loses are incurred from choosing an inefficient firm. On the production side the goods are produced at higher cost. On the demand side some consumers do not consume, even though they would be willing to pay more than it would (potentially) cost to produce additional minutes. It is not sure, however, that TDM is in fact not the most efficient firm, and even if some efficiencies are incurred we would always have to compare those to the best real alternative policy, which might introduce some inefficiency of its own (different policies will be discussed later).

Transaction cost and economies of scope

Because of the close relationship between TD and TDM transaction cost are likely to be lower, for instance because of the fact that the parties trust each other. Viewed separately this would favor an agreement between TDM and TD, since some transaction cost can be avoided. In addition there might be some economies of scope in the production of wireless and wire-line telephony. At least some cost can be saved on marketing the product, when

only TD appears as the seller. Here it is less clear, however, that provision of an identical product marketed by a competitor (reselling the wire-line access of TD) would be any different.

"Brand name leveraging"
TD has a well-recognized brand name, established partly through advertisement but primarily through its historic monopoly status in the market for wire-line telephony. It is associated with high quality and reliability. This seems to be the typical case for providers of wire-line access. If we for a moment ignore the integration of the two networks, and think of Duet as a way of selling mobile minutes together with fixed line minutes, we can think of Duet as a way of selling mobile minutes under the brand name of TD. Since the subsidiary company is already called Tele Denmark Mobil, it is uncertain how important this is - but in general it could be. This is naturally conflicting with the interest of competitors. We could also see it as TD channeling its existing customers to its subsidiary company by recommending its "own" product.

The implications for welfare seem less clear here. Consumers may actually get a higher utility of buying a brand name (rationally or not). Also some advertisement could potentially be saved, which is particularly important when introducing a new product that, in the absence of consumer confidence and brand name recognition, would demand substantially more advertising. The negative effect arises from the possible increase of market power to TD in the market for mobile telephony, allowing it to charge above competitive prices.

Incentive to raise rivals cost
As described earlier rivals actually do have a possibility of providing a product similar to Duet since they can buy the redirection service of TD. TD can price this service as it wants. It is far from obvious that TD would want to prevent competitors from using this service, since it could provide TD with substantial revenues. If TD were rational, it would prefer competitors to supply instead of TDM as long as the profit from whole-selling redirection was higher than the profit of providing the minutes itself.

Because mark-ups on mobile phone minutes are substantial it seems clear, however, that TD has a (rational) incentive to keep rivals cost (and prices) high and provide the mobile customers itself. In addition TD might simply want to keep its prices high because it (irrationally) believes that what is bad for the competitors is good for TD. The price TD has offered for redirection is currently 3 times higher than the price offered in Duet!

7. Some overall aspects for competition and welfare

It is difficult to assess the overall effect for competition of the introduction of new products like Duet, integrating already existing telecommunications services. There is no doubt that these integrated products of all kinds of telecommunications services, including data-transmission, paging, fixed and mobile telephony, internet, different media etc, are the products of the future. Since Duet is only the beginning, this also makes the problem at

hand even more interesting. Much more analysis will have to be devoted to these integrated products in the future.

There seems to be no question that the introduction of products like Duet hurts competitors, but as economists/regulators we should always remember that the purpose of antitrust policy is to protect competition and not to protect the competitors. First, we note that such integrated products not only represent bundling. They are simple new products, and as such, they may expand the total market and increase competition. Many customers will not be interested in this integration (one number service) and may prefer to buy the goods separately or only one of them. Even if competitors can not supply a similar product at competitive prices, TD will therefore never be able to monopolize the market for mobile telephony. However, it also seems clear that competition for mobile minutes may be distorted in the substantial part of the market where consumers are interested in the integrated product.

If TD remains the only provider of Duet-like products, competitors will be forced to come up with new innovative products (for instance purely mobile based) and overall competition for telecommunications services *might* as a result be increased. Similarly the mobile companies will be encouraged to enter the market for wire-line telephony, to some extent through facility-based entry and to some extent through reselling. This may also spur competition as long as regulators make such entry possible, e.g. through allowing competitors access to the local loop.

Consumers greatly benefit from the new possibilities offered by Duet and there is no doubt that welfare has increased with the introduction of Duet compared to the situation before. The concern, however, is that consumers will not enjoy the same future reduction in per minute prices as they otherwise would have, because TD, as explained earlier, not will be forced to follow the competitors' prices down. It is impossible to evaluate how large the distortion on demand will be, but it seems unlikely that it will be even close to the welfare gains from the new product. However, as foresighted economists/regulators we should not only compare the scenario of Duet to the scenario without Duet, but also to the scenario with Duet provided in a different regulatory/legislative environment than today. We should ask ourselves how the benefits of Duet could be sustained, while at the same time, encouraging a maximum amount of competition without distorting the investment incentives for coming up with similar innovative products in the future. Before investigating different legislative solutions to the problem, let us mention the recent statement of the European commission.

8. Statement by the European commission

Upon request by a Danish politician in the European Parliament, the European Commission has looked into the case to investigate whether the Duet concept and the practice of TD violate the treaty of the European Union. In its (preliminary) brief answer it is left to national regulators to take action, but it is clearly stated that "..where such services are introduced by dominant operators, the impact for competitors both on the fixed and mobile

telephone markets would have to be assessed. In particular, the possibility of offering such services would have to be open to all fixed and mobile operators on a non-discriminatory basis, and cross-subsidies by the incumbent to its mobile operation would have to be excluded" (emphasis added). The commission states that it will contact the Danish competition and telecommunications authorities and, if necessary, investigate the details of the arrangements. The statement does not recommend specific actions, but it is clearly stated that the competitors should be able to offer a similar service, which appears to point to more favorable access to the local loop.

9. Possible solutions and comparison with the present state

There seems to be at least five legislative solutions to the regulatory problem:

A. Prohibiting products like Duet
B. Divestiture of the mobile company (TDM) and the fixed local access provider (TD)
C. Requiring the mobile operator (TDM) to market the product, reselling the wire-line access of the fixed local access provider (TD)
D. Unbundling the local loop
E. Allowing consumers to choose which Duet-mobile operator they want

A. Prohibiting products like Duet

If one only focused on securing competition for mobile telephony, the easiest solution would be to ban integrated products like Duet. This would be a major fallacy, however, since it would ignore the great welfare benefits created by the introduction of this integrated product. Consumers profit from one telephone number, one bill, new facilities, and lower total prices. Even if some price distortion or production inefficiency were incurred this welfare loss would probably by far be outweighed by the increased value to consumers.

B. Divestiture of TD and TDM

As discussed, the incentive of TD to choose TDM, even in the case where it is not efficient, arises because TDM is the subsidiary company of TD. As long as TDM gains more than TD looses from such a contract it is therefore likely to take place. The obvious solution to avoid these kinds of cross-subsidizing issues would be to fully separate the companies as two legal entities with separate owners. Since TD was privatized including TDM, such an action would be politically problematic. Also it does not seem to be follow the principle of competition in the overall market for telecommunications instead of in each separate market. The integration of mobile and fixed telephony along with other telecommunications services seems to be the future trend. Splitting up companies would just eliminate some economies of scope in the production of these products. Possibilities for competition between companies offering these integrated services should be favored instead.

C. Requiring the mobile operator to market the integrated products

A more appealing regulatory solution would be to require such integrated products to be marketed by the mobile network operators instead. They could then buy the services they need of the fixed network operator. Turning the agreement on its head would allow competitors access to the fixed network at the same prices as the affiliated company. With

the same input prices the market would make sure that the most efficient provider provided the mobile part of the product. This way, the question of number-portability would also be avoided.

There might be certain technical features, that make provision of the combined good by the fixed network operator more cost efficient than by the mobile operators. Also, there is the question of switching cost, brand loyalty, brand recognition etc. Even though the product will be exactly the same consumers might prefer the fixed network operator whose name and quality is well known. The introduction of this new service could therefore potentially be slowed down.

The solution will probably not be politically feasible. It will seem unfair to prohibit the wire-line operators to market the product. In Denmark where the product has already been introduced (and invented) by TD such a solution should be ruled out. In countries where there is competition in the market for mobile telephony but not in the market for wire-line access and where investment in this new technology has not yet been made (digitalization can be ignored since this would take place anyway) politicians/regulators may consider this third solution.

D. Unbundling the local loop

The most straightforward regulatory approach for a regulator, regarding the local loop as an essential facility, would be to simply unbundle this element of the network and allow competitors to either buy or lease it from TD. Competitors would need the copper-wires, signaling, and the phone number (call determination). This would to a large extent level the playing field and allow competitors to offer an identical product to Duet without consumers having to change phone number. Even with competitive prices, consumers might be reluctant to switch, however. For one they might fear a worse quality, but more importantly they will have to cancel their subscription with Tele Danmark first. It is quite expensive to sign up again, and consumers may therefore not be willing to take the risk of having to switch back to TD. This however is something competitors would just have to accept.

If indeed the local loop were an essential facility (which seems to be the case with the current mobile and cable technology, but can be disputed) unbundling the local loop would also be the natural recommendation of economic theory. Competitors could then compete over providing the remaining parts of the telecommunication service in which the economies of scale and density are of a smaller magnitude. In addition to increasing the competition for these combined products, it would also promote the development of all kinds of new telecommunications services that uses the wire-line access.

The solution of unbundling definitely seems to be the best to promote competition but do also raise a number of concerns for the regulators:

Regulators should precisely determine which parts of the network are indeed essential facilities, so as to limit the opportunities of competitors to simple buy TD's new technology at cost-based prices ignoring the R&D cost of TD. Otherwise, incentives to come up with new innovative products like Duet would be seriously distorted. The cost of unbundling

should also be taken into account. In some cases it may not be technically feasible for the incumbent local access provider to unbundle the local loop or it will impose tremendous cost. In the cases where this can be documented the requirement should naturally not apply.

Unbundling of the actual facilities instead of the entire access service seems to be the best approach. It makes it a lot easier for regulators to determine the costs because we are dealing with equipment and because there are fewer shared cost. If facility prices are set properly the regulation of service prices can be removed since the competition will prohibit service providers from charging above competitive prices. To the extent that competing national network backbones exist (which they soon will in Denmark) regulation of all service prices except for the local loop could be eliminated. Thereby the regulatory problem of how to price and regulate new products disappears.

The largest problem for regulators will be to determine the principles for establishing the price of the local loop. The principle of cost based prices (LRAIC) are generally accepted and would be a naturally benchmark. But, as will be discussed in the following, regulators have to take a variety of issues into consideration.

Allowing competitors access to the local loop on favorable terms substantially reduces their incentive to invest in alternative forms of access, that in the long run might have been beneficial. In the presence of competing local loops, the market could effectively choose the superior technology for different kinds of telecommunications services and regulation would be unnecessary. Requiring unbundling may also pose distortions on the incentive to maintain and develop the network if the operator can not reap the benefits through ownership. Who should e.g. pay for fixing a broken wire, upgrading the technology, or installing a second line? Such details would have to be thought of in advance but could to a large extent be negotiated between the parties.

This leads us to the issue of universal service provision. Competitors will only lease the local loops of the most profitable customers (“cherry picking”) and TD will be left with all the less profitable consumers. To the extent that cross-subsidies have taken place between consumers, e.g. from urban to rural users, an access deficit may occur: the revenues of providing access can not cover the costs. Because TD would continue to face a requirement of universal service provision, competitors that do not face similar constraints should contribute to the cost of universal service provision. This could take place through a universal provision fond where all service providers paid according to their revenue and where the operator, providing the access, received these funds for providing the access. Ideally, operators should be able to compete for these funds/subsidies. Alternatively, the price of using the local loop could incorporate such payments buy being above cost (typical in urban areas).

A problem related to universal service provision is the fact that the actual line (subscription) is priced below cost whereas the minutes are priced above cost. The actual cost of terminating or setting up a phone-call is close to zero (compared to the price). The fixed telephone operator (TD) therefore recovers a large part of the fixed cost by providing the service (minutes). A retail price on the subscription minus a discount would ignore this

price/cost structure. The true cost of the line would be undervalued and the fixed telephone operator (TD) would be forced to operate with a loss. Prices therefore need to be cost based. Estimating these cost will require much future work by regulators as well as network operators.

Due to the problems of estimating these cost an alternative temporary solution will here be presented. The solution is proposed because it is practical, because it seems effective and fair, and especially because it is unorthodox. The method is called pendulum arbitration or "the baseball rule" and has e.g. been used for setting interconnection charges in Guatemala (Spiller & Cardelli, 1997). Because the parties involved generally have much better information than the regulators do, it is often preferable to allow these parties to negotiate the terms of a contract instead of imposing them. However, due to conflicting interest negotiation may not be possible and arbitration will be needed. Also regulators might want to correct for the highly asymmetrical distribution of bargaining power, arising from the fact that the incumbent (TD) do not need the agreement where as the competitors do.

The main idea of the baseball rule is that the regulator/arbitrator in case of a dispute only can choose between the final offers presented by the disputing parties and not any compromise solution. If it is known in advance that the arbitrator will choose the fairest offer, each party gains from making its offer marginally fairer than the opponent's expected offer. As a result both parties have strong incentives to reach a negotiated agreement rather than resorting to arbitration (Spiller & Cardelli, 1997). The solution appears to be a viable untraditional alternative. The regulator/arbitrator should clearly specify which parts of the local loop that has to be offered to the competitors, be committed not to make compromises, and specify the principle, according to which, it will make its decision (e.g. the offer that appears to be closest to some cost measure).

Finally, from a more "ethical" point of view, we note that unbundling of the local loop implies expropriation of TD's property. When TD was sold, one of the things buyers bought was the local loop. Investment calculations have also taken ownership of the local loop as given. A fair price would therefore have to provide TD with some compensation for the loss of the exclusive property rights to the local loop. From a short run efficiency point of view, the cost of using the local loop should be close to marginal cost which are close to zero but this would seriously distort future investment incentives due to the reduced "credibility" of assigned property rights. In countries where privatization has not yet taken place, these problems could be avoided by setting the terms for the provision of the unbundled loop (unbundling requirement and price cap) prior to selling the governments stocks. The stocks could then be valued accordingly.

E. Allowing consumers to choose which Duet-mobile provider the want

If politicians want to allow competitors into the business, but do not want to give them direct access to the local loop on favorable terms, it might simply be required that consumers, when buying Duet, are allowed to choose which mobile company they want. Consumers would still get only one bill (similar to long distance/local bills in the US).

This solution would imply that some transaction costs were wasted, but would safeguard competition, increase the likelihood of the most efficient provider being chosen, and put additional pressure on TDM to minimize cost.

One persuasive argument against such a solution would be that in addition to transaction cost it is more efficient to have one provider since it will be easier to forecast the amount of needed minutes from each supplier. A case could be made that investment in capacity would be closer to the optimal level with only one supplier. This is arguing that economies of scale are present. If this were indeed true and we were dealing with a natural monopoly (in the provision of minutes to Duet), we would just have to regulate the price of these minutes. Such reasoning would discourage TD from making such a case. It is also hard to see why this should be the case when it is not the case for mobile telephony in general. It is probably appropriate to mention here, that "all" the technology does when a call is made to the Duet number, is to look up in a database where the customer wants her call and whether or not the mobile phone is turned on. It then redirects the call to the right phone or the answering machine. Whether or not this phone is on a TDM's network or on a competitors network seems (almost) irrelevant. This last solution would allow competitors into the business, but would (probably) still prevent them from having the entire relationship with the customer.

Summing up
The most important goal is to ensure overall competition in the market for telecommunications and consumer access. Either competitors should be able to compete without access to TD's wires (e.g. with pure mobile-based products) or competitors should be allowed to lease unbundled elements (primarily the local loop and maybe redirection) from TD at reasonable prices. If regulators want to encourage facility-based entry, prices for unbundled elements should be kept high. If on the other hand duplication costs are judged to be too high, cost based prices should be favored. Unbundling the local loop seems to be the most desirable and politically feasible solution to the problem even though it raises many concerns, especially with regard to setting the price. If politicians do not want to touch TD's property rights to the local loop, it could instead be required that consumers were allowed to choose their preferred mobile operator in Duet.

10. The proposed Danish bill incorporating service provision

On April 23, 1998, a bill was proposed, scheduled to implement the remaining parts of the EU directive[13]. According to an employee in the ministry that wrote the bill, the two sections on service provision were added in the last week before the bill was proposed. This was a direct consequence of the regulatory problem posed by Duet and may also have been influenced by the statement of the European Commission.

[13] Revised directive 98/10/EF of the European Parliament and Council "on the application of open network provision (ONP) to voice telephony and on universal service for telecommunications in a competitive environment"

First of all, it enlarges the previous definition of interconnection to include all kinds of service provision so that the legislation beginning July 1, 1998 also will cover the Duet agreement with the demand for transparency and non-discrimination. This was already expected. Much more important and much less expected, the bill also proposes that providers of public networks with a strong market position (more than 25% of the relevant market[14]) are required to engage in agreements of service provision. Even more noteworthy the National Telecom Agency obtains the right/requirement to decide that prices be cost based (LRAIC) when it finds it necessary to ensure real competition.

If implemented (almost certain to be), the bill will require TD to lease the local loop as well as the necessary signaling to its competitors on request. If the National Telecom Agency judges it to be necessary to sustain competition prices shall be cost based. This should provide the competitors with the possibility of offering a competitive product to Duet, especially now when they in the near future will have their own backbone structure. This solution has already been discussed in the previous section.

11. A potential regulatory problem in the EU or in the United States?

As set out in the introduction, the main goal of the report was to discuss the regulatory problem Duet has posed in Denmark and propose and evaluate different solutions to this problem. Because the technology will soon spread to the rest of the world, however, it is appropriate to finish by examining whether a similar problem will arise elsewhere. The case of the EU and the United States in particular will be examined in this section.

Even though some parts of the telecommunication legislation in the **EU** are minimum or optional harmonizing most is total harmonizing. Therefore national legislation tend to be very similar. Denmark has one of the most progressive legislation, with regard to liberalization of the sector. When the technology is introduced in the rest of the EU, which it will be in the near future, similar problems are therefore likely to arise with the current regulation. According to an employee in the National Telecom Agency, Belgacom (who is partly owned by TD) has recently introduced a similar product in Belgium, which has caused great problems for the competitors and concern of the Belgian regulators.

A more interesting question is whether this new technology will pose a similar regulatory problem, when introduced in the **United States.** US legislation and market structure are quite different from the European ones, and it is therefore necessary to analyze different aspects before providing an answer to that question:

Technology. A product like Duet requires that the fixed as well as the mobile network used is digital. Large parts of these networks are still analogue in the US. However, the networks

[14] The **relevant market** is *not* the entire market for telephony. If the operator holds a strong market position in *either* the market for mobile telephony *or* the market for fixed telephony market that provider is though to have a strong market position.

are gradually being digitized and it is only a matter of time before similar product will be introduced over here[15].

Market structure. When mobile licenses were distributed, the regulators pursued a duopoly policy. One license was given to an affiliate of the incumbent fixed network operator and one was assigned to a new mobile network operator. Because of this structure one would therefore a priori need to worry when it becomes possible to integrate the two networks, since one might suspect the fixed network operator to have incentives to favor its affiliate.

Principle of non-discrimination. Sec 252 (i) of the American Telecommunication Act of 1996 requires that a local exchange carrier "make available any interconnection, service, or network element provided under an agreement under this section to which it is party to any other requesting telecommunications carrier upon the same terms and conditions as those provided in the agreement". Like in Denmark, it is not clear whether this would help the competitor if it were the fixed operator that marketed the integrated product. This is because it is the mobile network operator that sells minutes to the fixed network operator. Thus the fixed network is not providing any service that a requesting carrier can demand on similar conditions.

Number-portability is required by the Telecommunication Act of 1996. When switching to a competing local access provider, however, this is currently only possible if the competitor resell the incumbents service. With facility based entry (own switches) this is not possible. Furthermore (unlike Europe) there is no requirement of future number-portability to the mobile network (in Europe from 2001). Thus even at the same prices a pure mobile based product would be an imperfect substitute for a product combining the fixed and the mobile network.

Called party pays. Maybe the largest barrier to entry into the home telephone market for mobile phone providers is the fact that US (unlike European) mobile phone users have to pay for incoming calls, which largely discourage them from giving out their phone number. When/if this changes, the mobile phone will be a much better alternative (ignoring altruism) and we will see a dramatic flow of traffic from the fixed network over on the mobile network, and a much larger potential for Duet-products as well as pure mobile based products.

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[15] **MCI** currently offers a product called "follow me". This is nothing but a simple forwarding system, however. The customer is assigned one personal number and can then have calls forwarded to where ever he wants (home phone, mobile phone, office phone, pager, answering machine etc.) To change the number the user has to dial around 20 digits. The consumer can not use his original number, the service can not depend on whether the cellular phone is turned on or not (but is manual), and the consumer still has to subscribe to different phone companies. It is a substitute for Duet - but a poor one. A much more interesting product has been marketed by **GTE** (the CLEC part), who has specialized in bundling telecommunications services. They market a phone that when used at home is connected to the fixed network but also serves as a mobile phone. The consumer only has one number and does not need to worry about redirection. Opposite to Duet this service has not been a success. One disadvantage is that the consumers can not use his existing mobile and fixed phone. We imagine that another problem is the fact that the customer have to pay for all incoming calls when the phone is off the fixed network – some of which he might have preferred to receive on the fixed network, free of charge.

Unbundling and resale. Two particular features of the Telecommunication Act of 1996 might make a crucial difference from the EU in favor of the competitors. First of all, the Incumbent Local Exchange Carrier (ILEC) has the "duty to provide, to any requesting telecommunications carrier for the provision of a telecommunications service nondiscriminatory access to network elements on an unbundled basis at any technically feasible point on rates, terms and conditions that are just, reasonable, and nondiscriminatory." (Sec 251 (3)). This unbundling has in practice been pretty slow and difficult. Buy at least in principle it opens up a possibility for competitors to buy the elements of the fixed network that they need to provide a similar integrated product.
If the competitive provider wants to buy a whole service as a package, the ILEC has the "duty to offer for resale at wholesale rates any telecommunication service that the carrier provides at retail to subscribers who are not telecommunication carriers". Applied to the Danish case this would imply that TD would not be allowed to charge the competitors the same price for redirection, as it charges to end consumers, but would have to include a wholesale discount. If the resale price of the redirection service is much above the price charged, when integrated in a Duet-subscription, it is not obvious that such a discount on that high price would make any difference, since it would still be to expensive for enabling competitors to compete.

Summing up, a similar problem might well arise in the US, and the regulatory authorities therefore ought to take the issue into consideration. The one important difference is that American service providers, at least on paper, might be able to use the needed elements of the fixed network to provide a similar product and at reasonable prices, a lot closer to cost than in Denmark under the current legislation. The largest problem in the US seems to be the determination of a proper price for leasing the local loop.

12. Conclusion

It has been explained how products like the Danish Duet system, combining fixed and mobile telephony, offers its users many advantages over traditional fixed and mobile telephony. It has been shown that TD might have an incentive to extent its monopoly power over the local loop into the market for mobile telephony, and it has been discussed how this potentially could lead to inefficiencies due to price distortions and/or inefficient production of mobile minutes. Pure mobile-based products will be a viable future alternative, but not until per minute prices fall even more and number portability (to the mobile network operators) is introduced. The prices that TD currently charge its competitors for the services needed to provide a Duet product, appear to be much higher than costs and do not seem to allow the competitors to offer a competitive product. Facility based entry in the local loop is probably not economically feasible and at this time probably not socially optimal either.

If politicians and regulators in Denmark and in the rest of the EU want to safeguard competition, they will either have to give competitors access to TD's local loop – at reasonable or maybe even cost-based prices - or they will have to require consumers to be allowed to choose their own mobile provider in a Duet subscription. Alternatively (at least

in theory) it could be required that these products be marketed by the mobile companies, who then bought the fixed line part of the product at non-discriminatory prices of the local fixed network access provider (TD). Access to the local loop seems to be the most obvious solution and is more or less what Danish legislators have just proposed.

The main reason for leveling the playing field and stimulate competition is to enable the market to choose the most efficient provider and prevent TD from keeping mobile per minutes prices in Duet above the competitive mobile prices. Forcing TD to offer to its competitors the local loop on favorable terms may on the other hand have the negative effect of discouraging future investments by firms with market power, due to the created regulatory uncertainty. It may also reduce the incentive for facility based entry that in some cases might have been beneficial to society.

Problems similar to the Danish case will certainly arise in the rest of the EU and probably to some extent also in the United States. Regulators therefore ought to look into whether for instance the unbundling requirements of the Telecommunications Act of 1996 are sufficient to safeguard competition or whether this potential problem should be dealt with specifically. Regulators around the world can gain valuable insight from studying the Duet case and following closely the future development of this converging Danish market for mobile and fixed telephony and the future consequences of unbundling the local loop. Future effort should be invested in developing procedures for estimating costs and establishing “optimal” prices of the local loop.

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14. Legislation:

Denmark, Parliament:

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Bill no. L 242 proposed on 16 April 1996 on act on competition and interconnection in telecommunications, including comments on the Bill. (Lovforslag til Lov om konkurrenceforhold og samtrafik i telesektoren).

Act no. 391 of 10 June 1997 to amend the Act on competition and interconnection in telecommunications, calculation of interconnection prices etc. (Lov om ændring af lov om konkurrenceforhold og samtrafik i telesektoren, beregning af samtrafikpriser m.v.)

Bill no. L 260 proposed on 7 May 1997 on act to amend the Act on competition and interconnection in telecommunications, calculation of interconnection prices etc. (Lovforslag om ændring af lov om konkurrenceforhold og samtrafik i telesektoren, beregning af samtrafikpriser m.v.).

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Bill no. L 243 proposed on 16 April 1996 on act on public mobile communication, including comments on bill. (forslag til lov om offentlig mobilkommunikation).

Bill proposed on 23 April 1998 on act to amend the act of universal service and certain consumer issues in the telecommunications sector, act on assignment and use of number resources etc., act on certain aspects within telecommunications, and act on competition and interconnection in telecommunications ect. (lov om aendring af lov om forsyningspligt og visse forbrugerforhold inden for telesektoren, lov om tildeling og anvendelse af nummerressourcer m.v., lov om visse forhold på telekommunikationsområdet og lov om konkurrenceforhold og samtrafik i telesektoren m.v.)

Denmark, The National Telecom Agency: (http:/www.tst.dk)
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EU

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The relevant sections are 251 (Interconnection), 252 (Procedures for negotiation, arbitration and approval of agreements), 253 (Removal of barriers to entry), 254 (Universal service), 256 (Coordination of interconnectivity) and 259 (Infrastructure Sharing).

The act can be found on: http:/www.ith.ch/sites/wwwfiles/tel_us96-fr.html
(Compiled and posted courtesy of Blumenfeld & Cohen – Technology Law Group)

15. Web-sites:

Tele Danmark: www.teledk.dk

The National Telecom Agency: www.tst.dk

EU, telecommunications policy web-site: www.espo.cec.bel/infosoc/telecompolicy