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THE ECONOMICS OF TELECOMMUNICATIONS REGULATION

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2.1 INTRODUCTION

This chapter is primarily intended as a work of reference, providing an overview of the economics of telecoms regulation and summarizing the key economic regulatory concepts of the industry. While the focus is mainly on the economic regulatory developments in the UK, the conclusions and discussion should be relevant to all countries that have embarked on telecoms liberalization.

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Before describing the system of economic regulation, it is useful to place it within a basic analytical framework. Increasingly, regulatory agencies and the courts focus on more complete and complex analyses of markets, and on how the behaviour of firms—their actions or conduct—are likely to affect competition. Lawyers need to be familiar with the language of economic theory; economic jargon increasingly shows up in legal briefs, court and regulatory decisions. Therefore, while it is clearly essential for those who work in regulation—whether in companies, government, or regulatory bodies themselves—to be familiar with the content of telecoms law, it is also important that practitioners should understand the concepts of telecoms economic regulation and what it is intended to do.

2.2 RATIONALE FOR REGULATION

Traditionally throughout the world, telecoms services were provided in each country by one monopoly carrier. Such carriers were almost always owned by the government and operated as state agencies, often as part of the postal service.

Beginning in the 1980s and continuing into the 1990s, the telecoms industry in almost all countries experienced privatization or at least some degree of corporatization. The privatization of these previously large state-owned carriers involved, however, serious problems of remaining monopoly power or market failure due to the accreted advantages conferred upon these carriers by their history and position as compared with those of potential competitors. In particular, these newly privatized companies benefited from having:

- 100 per cent share of the market at the time of privatization and thus 100 per cent control of customers;
- The accumulated assets, and economies of scale[2] and experience of the telecoms market; and
- Ownership of vital networks or privileged use of public rights of way to which potential competitors must perforce have access if they were to compete.

If unchecked, these firms would be able to exploit their dominant position and act to the detriment of consumers and society in terms of excessive retail prices, low-quality services, under-investment, and serving only high-value customers. Even as markets have become near fully liberalized, there remain (or have emerged) segments of the market that tend towards monopolistic characteristics. Consequently, policy makers put in place economic regulation of the incumbent to prevent these outcomes.

[2] Economies of scale are the cost advantages that firms obtain due to size, output, or scale of operation, with cost per unit of output generally decreasing with increasing scale as costs are spread out over more units of output—see discussion in Section 2.4.4.

2.3 THE PRINCIPLES OF ECONOMIC REGULATION

Before discussing the alternative forms and implementation of economic regulation in the UK, there are some core principles of economic regulation (see Table 2.1). These will be referred to throughout this chapter.

Table 2.1 Core principles of economic regulation

Aim of economic regulation	What does this mean?
Prevent possible abuse of monopoly power	Economic regulation should be focused on preventing abuse of monopoly power. Such abuse may arise if prices are very high in relation to costs so that super-normal profits[3] are earned. Abuse may also arise if costs are higher than they ought to be, or are likely to be in a competitive situation.
Regulation should not distort business decisions	Only where there is a demonstrable competitive or market failure,[4] is there a need for regulatory intervention as economic regulation will always be inferior to effective competition. For example, if regulation were to cover both competitive and monopoly elements of the industry, there would be strong incentives on the incumbent to focus its efforts against the competition whilst continuing to earn high profits in the monopoly part of the business. Economic regulation should not provide a means for either incumbent or non-incumbent operators to distort the competitive playing field and so due care must be taken in its implementation.
Costs of regulation should be limited to that which is essential	An important part of the rationale for privatization was to reduce detailed control by government departments over essentially business decisions. Therefore, economic regulation should ensure that excessive control under a nationalized industry scenario is not replicated under regulation.
Regulation should try to 'mimic' the likely operation of a competitive market	There is general agreement that competition can lead to choice for customers both between operators and in the range of services that are available to them. If regulation can replicate competition, it means that customers' short- and long-term needs will be met efficiently.

[3] Super-normal profits relate to the concept of monopoly profits. In a competitive situation, it is assumed that any excess profit will be competed away by competition. However, in a monopoly environment, this is not the case and hence super-normal or excess profit is earned.

[4] The rationale for imposing regulatory measures is generally based on the notion of market failure. This situation exists when a market fails to function properly. Market failure can arise under various circumstances. In such cases the introduction of appropriate regulatory measures can provide a way of eliminating, or at least reducing, the market failures thereby providing protection to citizens and consumers, and businesses.

2.4 THE ECONOMICS OF TELECOMS

In addition to highlighting the core principles of regulation, it is also worthwhile briefly setting out some of the salient economic features of the sector. These are important in implementing economic regulation to ensure that business decisions are not distorted.

2.4.1 Strong presence of common costs

Common costs are a strong feature of communications networks. When a communications provider constructs its network underneath the streets (or on telephone poles), its choice of which homes and businesses to pass with such lines determines its target market. However simply laying the copper or fibre does not connect the homes so passed. If a home or business wished to be connected, additional electronic equipment at each end of the connection (ie at the customer's location and the communications firm's location) must be installed to use the copper/fibre for transmission purposes. In essence, the communications firm must make three capacity investment decisions: (i) how much common capacity to install to handle actual usage; (ii) how much access connection capacity to install to handle the number of customers; and (iii) how big a network to build and which households to pass with the network (ie which target markets to serve).

Once a network is built for a particular scope, it can then be used to provide service to everyone within that area. In other words, the network is built not just to deliver a single service within a single market, but to deliver a range of services, spanning multiple markets. In a large multi-service communications network, there are significant costs (such as duct, copper, and fibre) which are common to a variety of services which can be used to provide numerous different wholesale and retail services. These costs—so-called 'common costs'—are incurred regardless of whether any one service is supplied. The effect of this is that up to the available capacity, additional output can be produced at nearly zero marginal or incremental cost.[5] A more detailed discussion of marginal and incremental cost is provided in Section 2.14.2.

However, in the presence of common costs, pricing to just recover incremental costs would not be sustainable as not all costs would be recovered and the firm

[5] Marginal cost is the cost associated with the provision of an additional unit of output while incremental cost is the cost associated with an additional specified increment of output.

would make a loss. In setting charges for services, communications networks need to make some allowance for common cost recovery. In general, in markets with significant common costs, an efficient pricing structure will be one where prices lie between the incremental and standalone costs of those services. Standalone costs refer to the costs of producing a product or service in isolation. They therefore include the incremental cost for that service plus all the common costs that would be incurred regardless of whether only one service is supplied. This means that the standalone costs of a service would be significantly higher than the incremental cost of that same service. This large gap between incremental and standalone costs means however that there are various methods of recovering common costs (see Section 2.14.3).

From an economic point of view, an efficient structure for the recovery of common costs should reflect the demand conditions for different products. More price inelastic products (where the demand for the product does not increase or decrease correspondingly with a fall or rise in its price) should attract a higher proportional mark-up to incremental costs—this is often referred to as 'Ramsey pricing'.[6]

However, the overall sizes of different product markets will also influence how a firm recovers its common costs across its product set. A large product market may make a significant contribution to overall common cost recovery by virtue of high volumes, even if the per unit mark-up for common costs for that product is not particularly high. Given the preponderance of common costs, there is much opportunity for various kinds of price discrimination.[7] The degree to which this is possible is however dependent on the demand conditions in the market.

2.4.2 Pricing when demand exceeds capacity levels

As set out above, once a network is built for a particular scope, up to the available capacity, additional output can be produced at nearly zero marginal or incremental cost. However, when demand exceeds capacity levels, given possible cost constraints, output may need to be rationed but this could give rise to a negative externality.[8] The firm's three capacity investment decisions (discussed earlier) are

[6] Named after Frank P Ramsey, who set out this issue in 1927.

[7] Price discrimination often features in economic theory as a manifestation of monopoly power. However, in communications, the presence of significant economies of scale and scope means that price discrimination between different customer groups (depending on its structure) may provide a means of not only allowing the firm to recover its costs, but it could also lead to an increase in output and to customers who might have otherwise been priced out of the market, being served.

[8] An externality is the cost or benefit which is not internalized by the person that consumes the service.

critical to scale the network but it is likely to make these decisions based only on the direct cost of and profit opportunity from production. The firm is unlikely to consider the indirect costs to those harmed by an incorrect decision. Specifically, if demand exceeds capacity and the network is congested, it would be the consumer (not the firm) who suffers because his/her calls or data packets are not delivered.[9] In this situation, this may mean that some high-valued demands may not be served. This negative externality effect together with the systematic variation of demand over time means peak-load pricing[10] schemes are common.

2.4.3 Network externalities

Although capacity constraints can result in negative externalities, the two-way nature of communications also gives rise to an important positive network externality. A fundamental characteristic of communications is that new customers joining a network not only benefit themselves, but create extra opportunities for existing customers.[11] There is, moreover, some evidence of dynamic benefits for the economy arising from the development of the communications sector.[12]

The presence of these positive externalities has important policy implications for pricing structures in communications. Specifically, it provides a justification for subsidising connection charges or line rentals to encourage new users to join the network. Moreover, it also has important implications for policy on interconnection between rival networks (especially with a calling party pays principle[13]), for without interconnection, a small network could be severely disadvantaged relative to the larger one.[14] This is because under a calling party pays regime,

[9] In this example, the firm would not suffer and in fact could benefit from this incorrect decision because if demand needs to be rationed, a mechanism to do this would be to raise price.

[10] Firms that deal in markets with fluctuating demands such as peak and off-peak periods will incur some costs that are common to both periods and other costs which are separable to whichever is served. In the case of communications, due to the level of common and fixed costs in the network, costs are low in off-peak periods hence resulting in low prices, whilst in peak periods prices are high because of lower available capacity.

[11] If there is only one customer on a telecoms network, there is not much point as one would not want to call oneself. If however other individuals join the network, the calling opportunities increase and so from a social viewpoint, everyone benefits.

[12] See the ITU World Telecommunications Development Report 1994 and Saunders RJ, Warford JJ, and Wellenius B, *Telecommunications and Economic Development* (Baltimore MD: John Hopkins University Press, 1983).

[13] The calling party pays principle is a billing option whereby the person making the call is charged for its full costs. The total cost of each call placed by a subscriber is split in two parts. The first part is the amount that the caller's provider is charging to provide the service to the calling party. However, another part of the charge is the amount that the provider of the call-receiver will charge the caller's network, to terminate the call onto his network.

[14] If there are two networks, one large with many customers and another which is just starting up, then no-one would want to join the smaller network, unless the two networks were interconnected.

customers are attracted to an operators' network based on the cost of call origination, not the cost of termination.[15] There is no incentive for the called party to be connected to more than one network operator and in the unlikely event that this did occur, it could entail wasteful duplication. In essence, the called party network has control over a bottleneck monopoly, in which it can gain monopoly profits by inflating the call termination fees. This means there is a strong case for regulation of this service and its charges not only today, but for some considerable time to come on those operators with significant market power.[16]

2.4.4 Economies of scale and scope

Once a network is built for a particular scope, it can be used to provide service to everyone within that area. Given the ubiquitous nature of most incumbent networks, they are subject to considerable economies of scale and scope. In considering the feasibility and efficiency of competition, the regulator must weigh the pros and cons of the possible benefits of competition versus the lost scale and scope economies from having multiple competitors.

If having multiple firms competing in the market leads only to modest cost increases, competition is likely to be feasible and efficient and any small losses in scale economies will be more than offset by the additional dynamic (or long-term innovation) benefits from competition. However, if the scale and scope losses are significant, then efficiency may be better served by viewing the activity as a natural monopoly. In such circumstances, opening access to the network elements subject to scale and scope economies may allow competition to be introduced in related markets ie service-based competition not infrastructure-based competition. In communications, the naturally monopolistic elements are call termination and origination. Termination is a 'strong' bottleneck in communications because of

[15] In Europe, Australia, and New Zealand, the calling party pays (CPP) principle has generally applied. In contrast, in the US and Canada, the receiving party pays (RPP) principle applies. The choice of RPP or CPP generally reflects historical choice. Other things being equal, a charge for receiving calls under RPP may discourage receipt of calls and in some circumstances, may discourage subscribers from connecting to the network. On the other hand, CPP may discourage the making of calls but may via discounted subscriptions encourage greater subscriber penetration. In the early days of communications in UK and Europe, the view was that encouraging subscriber penetration was important, and so CPP was adopted. CPP means however that call termination is a bottleneck, and so where CPP is in place, every network has market power over call termination.

[16] See further Chapter 4, at Section 4.6. It is possible to have SMP in both origination and termination but it is less likely to be the case that everyone would have SMP in origination. It is more likely that there would be a tight oligopoly. If there were sufficient countervailing buyer power, operators would likely switch to a 'bill & keep' regime, depending on traffic flows and the billing costs. In the fixed market, all operators have SMP on termination but because the regime is based on pure LRIC, which is very low, they have adopted a bill & keep regime because that is less costly than actually billing other operators.

the calling party pays principle, while origination is mainly a bottleneck because of sunk costs[17] and economies of scale.

2.5 SCOPE OF THE REGULATORY CONTROL

As noted in Section 2.3, only where there is a demonstrable competitive or market failure, is there a need for regulatory intervention. To limit regulation to where there is persistent market failure, it is normal to carry out a review of competition. In general, setting the scope of the regulatory control has two parts:

1. definition of the relevant market or markets; and
2. assessment of competition in each market, in particular whether any companies have significant market power (SMP) in a given market

2.5.1 Market definition and the SSNIP test

Market definition is not an end in itself, but a means to assess effective competition for the purposes of focusing *ex ante* regulation on those areas where it is required.[18] There are two dimensions to the definition of a relevant market: the relevant products to be included in the same market and the geographic extent of the market.

Market boundaries are determined by identifying constraints on the price-setting behaviour of firms. There are two main competitive constraints to consider: how far it is possible for customers to substitute other services for those in question (demand-side substitution); and how far suppliers could switch, or increase, production to supply the relevant products or services (supply-side substitution)[19] following a price increase, within a reasonable timeframe and at negligible cost.

The concept of the 'hypothetical monopolist test' is a useful tool to identify close demand side and supply-side substitutes. A product is said to constitute a separate

[17] A sunk cost is a cost that has already been incurred and cannot be recovered if the firm exits the market, eg an optical fibre once laid will not be removed and reused.

[18] Often markets are defined based on competition law principles, specifically upon the principle of the 'hypothetical monopoly'. This concept is already well established in antitrust legislation, both in the European Union and in the US, and provides the standard framework for market definition analysis in competition policy cases.

[19] eg the supply of paper for use in publishing. See Case IV/M166 OJ (1992) C58/20, *Torras/Sarrio* [1992] 4 CMLR 341. For customers, different grades of paper are not viewed as substitutes, but because they are produced using the same plant and raw materials, it is relatively easy for manufacturers to switch production between different grades. If a 'hypothetical monopolist' in one grade of paper tried to set prices above competitive levels, manufacturers producing other grades could easily start supplying that grade; market power is thus constrained by substitution by suppliers.

market if a hypothetical monopoly supplier could impose a small but significant, non-transitory price increase (SSNIP) above the competitive level without losing sales to such a degree as to make this unprofitable. If such a price rise would be unprofitable, because consumers would switch to other products, or because suppliers of other products would begin to compete with the monopolist, then the market definition should be expanded to include the substitute products.[20]

The SSNIP test provides a standard framework for market definition analysis and asks whether a hypothetical monopolist could profitably implement a small but significant non-transitory increase in price above *the competitive level*. In sectors with a very large number of providers, the prevailing price level could be used as a proxy for the competitive price level. In markets that are however served by only either one firm or a few firms, the current price cannot be assumed to be a proxy for a 'competitive' price. The reason is because any profit-maximizing firm will always set prices where a further increase in price would be unprofitable. As such, if there is market power in the sector under investigation and current prices are assumed to be at the 'competitive' price level then at this price level, the 'relevant' market may be defined too widely.[21] In other words, many products may appear to be close substitutes when in fact they would not be if the 'true' competitive price level was used. Therefore, if 'current' prices were used as proxies for 'competitive' prices, the SSNIP test could lead to a situation where the market was erroneously defined. This is known in competition policy analysis as the 'Cellophane Fallacy'.[22] Given this, wherever there is a suspicion that market power exists, the prevailing price level should be treated with care.

[20] eg if we were to consider the market for bottled waters and found that via the SSNIP test, the monopolist could charge a small but significant non-transitory price premium above the competitive level then the relevant market, in this case, would be bottled waters. However, if the SSNIP test showed that the monopolist was prevented from charging a small but significant non-transitory price premium above the competitive level then we would need to repeat the test with the inclusion of the closest substitute such as all non-alcoholic beverages etc.

[21] In the situation where there is market power and current prices are assumed to be at the 'competitive' price level, then if prices are increased, sufficient switching would likely occur for it to become unprofitable. This is what we would however expect in a sector with market power because if the price rise was profitable, the firm would have implemented it already.

[22] See *United States v E.I du Pont de Nemours & Co.* 351 US 377 (1956); 76 S. Ct. 994; L. Ed. 1264. In that case, Du Pont argued that cellophane did not constitute a separate market since it competed directly and closely with other flexible packaging materials such aluminium foil, wax paper, and polyethylene. The problem with this argument was that Du Pont, as the sole supplier of cellophane, is likely to have set the prices for its products at a level where alternative products only provided a constraint on the pricing of cellophane if the prevailing price was used as the 'competitive' price.

2.5.2 Assessment of competition in each market

Once the market is defined using the principles outlined above, the next step is to consider whether any firm in that market has SMP. In general, SMP is equivalent to the competition law concept of dominance, as defined by the Court of Justice of the European Union (CJEU):

> a position of economic strength enjoyed by an undertaking which enables it to prevent effective competition being maintained on the relevant market by affording it the power to behave to an appreciable extent independently of its competitors, customers and ultimately of consumers.[23]

Market power is not, however, an absolute term but a matter of degree; the degree of market power will depend on the circumstances of each case. In assessing whether there is dominance, a case-by-case review is needed of:

- the structure of the market and the nature of competition prevailing in the market;
- barriers to entry into the market; and
- countervailing buyer power.

2.5.2.1 *The importance of market structure*

'Market structure' refers to the number and relative size of firms in the market or sector. The fewer firms in a market, the more likely that competition may be weak and that one or more firms may have a degree of market power; that is, they may be able to behave without proper regard to their competitors or to customers. Nonetheless, if firms within the market all have low market shares (ie each serves a relatively small segment of the market) there is less of a chance that any will have market power. If however one or more firms have a higher market share, there will be a greater risk that these firms have at least some market power and competition may be weaker.[24]

Given this, market shares (of both the undertaking and competitors) are commonly used as a preliminary indicator of dominance. Although, they are not conclusive on their own, the CJEU has stated that dominance can be presumed in the absence of evidence to the contrary if an undertaking has a market share persistently above 50 per cent.[25] Market shares between 40 per cent and 50 per cent could

[23] Case 27/76, *United Brands v Commission* [1978] ECR 207, [1978] 1 CMLR 429.

[24] eg if a firm has 35 per cent of the market, it might still be dominant if it has sixty-five competitors each with 1 per cent. Where two firms have roughly equal market shares, even if they are high then single firm dominance is unlikely to be found but collective dominance, whereby a group of firms jointly occupies a dominant position, may be found under EU law.

[25] Case C62/86, *AKZO Chemie BV v Commission* [1993] 5 CMLR 215.

also be considered consistent with dominance if other factors (ie weak position of competitors) are also indicative of it. In the case of market shares below 40 per cent, the EC considers it unlikely that an undertaking will be individually dominant if its market share is below this threshold, although dominance could be established below that figure if other relevant factors (ie the degree of vertical integration or the firm's control of essential inputs that are required by its competitors—see discussion below) provided strong evidence of dominance.

Market shares can be assessed by volume or value of sales. The appropriate measure can vary between markets. Often volume measures are used for bulk products such as wholesale conveyance minutes, and value measures for differentiated products such as retail products. Whichever measure is used, for the assessment of dominance, it is important that the history of the market shares of all undertakings within the relevant market is considered. This is more informative than considering market shares at a single point in time, partly because such a snapshot might hide the dynamic nature of a market. For example, where markets are growing fast, high market shares are less indicative of market power than in a more mature or slow-growth market. It is important in these types of markets to thus have a proper picture of the structure of the market to ensure that any designation of dominance does not prevent innovative activity from occurring.[26]

2.5.2.2 *Barriers to entry*

As mentioned above, high shares in a relevant market need not necessarily indicate dominance. This is particularly so if there are low barriers to entry into the market. If there were no barriers, attempts to exploit a large market position, e.g. through excessive pricing, would attract new entrants so that prices and services would be restored to their competitive levels.

Barriers to entry are defined as a cost that must be borne by a firm entering a market that does not need to be borne by an incumbent already operating in the market. The presence of entry barriers can reduce the scope for competition, so that incumbents can raise prices above competitive levels.[27] Entry and exit conditions

[26] In many fast-growing industries, it is often the case that a particular firm takes the innovating initiative which involves considerable up-front investment and so becomes the market leader. Other firms then enter the market and adopt the practices of the first-mover firm. Now because of customer inertia (ie customers take time to switch their allegiances), initially, the first-mover firm is likely to have a higher market share. This may not however reflect a dominant position because if it is relatively easy to enter the market then over a short period, market shares could be eroded quickly. If the undertaking with a high market share was designated as dominant, this could be detrimental for competition and the development of the industry in the long run as there would be negative incentives on firms to innovate and become the first-mover in an industry.

[27] An exit barrier is a similar concept: a cost borne by a firm leaving a market that a firm remaining in the market does not have to bear. The existence of exit barriers can be important when considering sunk costs since exit costs reduce the disposal value of an incumbent's assets if it chooses to leave a market and may therefore equally deter new entry.

are thus important in assessing whether a firm possesses market power. To get a better picture of the state of the market, it is important that the regulator has hard evidence of the recent history of the market. Such evidence might include a historical record of entry into and exit from the market (or closely related markets) or, if possible, fully documented evidence of plans to enter. Growth, or prospective growth, in a market could also have a bearing on the likelihood of entry, as entry will usually be more likely in a growing market than in a static or declining one. The reason is because it will be easier in a growing market for an entrant to be accommodated without any significant declines in prices and profits. The rate of innovation may also be important. In markets where high rates of innovation occur, or are expected, innovation may overcome barriers to entry relatively quickly. Indeed, any profits that result from an entry barrier created by successful innovation may be an important incentive to innovate.

All of these issues need to be examined as part of a market review of competition and dominance. The existence of fully informed customers should also be considered. If customers are fully aware of the options open to them then a dominant firm is likely to find it difficult to leverage its market power.

In the UK, three types of entry barrier (see Table 2.2) are often distinguished, although they may overlap at times:

Table 2.2 Barriers to entry

Types of entry barrier	Examples
Absolute advantages—access to important assets which are not available to entrants	• Examples are: o Spectrum licences—unless tradeable, they can act as an entry barrier; o Access to an essential facility—if access is indispensable and duplication is difficult or undesirable then this may represent a significant barrier to entry; and o Intellectual property rights (IPR) may provide an absolute advantage. However, whilst an IPR could be an entry barrier in the short term, a rival could overcome it by its own innovation, so care must be taken when making entry barrier assessments based on IPRs
Strategic advantages—an incumbent's first-mover advantage can allow it to shape the way the market develops to deter the potential for market entry	• Examples are: o If the incumbent develops a reputation for aggressively reducing prices when entry occurs, this can deter potential entrants into the market;

Types of entry barrier	Examples
	o The presence of sunk costs could also affect entry into the market. The incumbent would already have incurred its sunk cost investment. This means that it might not need to earn as high a rate of return as a new entrant who will have to make these investments to enter the market. In addition, if the incumbent excessively invests in sunk assets, then strategically, it could signal to potential entrants that it has spare capacity, which it could use to aggressively respond to market entry; o If the incumbent benefits from economies of scale and scope, it can respond aggressively to any potential entrant, which can act as an inhibitor to entry; and o Access to finance could also be an important entry barrier. An incumbent may be seen as being lower risk as a result of a proven track record. It also may have better information about the market and so may be able to present a more convincing business case.
Exclusionary advantages—behaviour by the incumbent can also act as a barrier to entry	• For example: o Vertical integration can encourage dominance in two ways. First, it can make entry harder because the incumbent firm has control of both upstream and downstream markets. Second, it provides the potential for the incumbent firm to leverage its market power upstream or downstream thereby adversely affecting competition; o Predation might also deter entry if a firm secured a reputation for aggressive behaviour; and o Refusal to supply may also constitute a barrier to entry. If, for example, an upstream firm were the sole supplier of inputs to a downstream industry and if there were barriers to entering the upstream market, the firm's refusal to supply a potential entrant in the downstream market could constitute a barrier to entry in the downstream market, even if no other entry barriers existed at that level

2.5.2.3 *Countervailing buyer power*

Another aspect that should be assessed in a market assessment is countervailing buyer power. Buyer power exists where buyers have a strong negotiating position with their suppliers, which weakens the potential market power of a seller. Even if firms have very high market shares, if they possess countervailing buyer power, they may not be able to significantly impede effective competition, in particular by

acting to an appreciable extent independently of their customers. Countervailing buyer power may be present if the following conditions hold:[28]

(a) the buyer is well informed about alternative sources of supply and could readily, and at little cost to itself, switch substantial purchases from one supplier to another while continuing to meet its needs;
(b) the buyer could commence production of the item itself or 'sponsor' new entry by another supplier (e.g. through a long term contract) relatively quickly and without incurring substantial sunk costs;
(c) the buyer is an important outlet for the seller (i.e. the seller would be willing to cede better terms to the buyer in order to retain the opportunity to sell to that buyer;
(d) the buyer can intensify competition among suppliers through establishing a procurement auction or purchasing through a competitive tender.

It should be noted though that while the conditions mentioned above are important to analyse in a market assessment, buyer power does not always benefit the final consumer. For this reason, a careful analysis of vertical relationships in the market, on a case-by-case basis, is often also required.

2.5.3 Key issues—scope of regulatory control

As noted above, regulation should be limited to markets where there is persistent market failure. Setting the scope of a regulatory control requires considerable analysis of the market involving:

- market definition exercises;
- examining the structure and level of competition prevalent in the market;
- investigating possible entry barriers; and
- investigating whether countervailing buyer power is present in the market.

The SSNIP test provides the standard framework for market definition analysis. Once the market has been defined, the dominance assessment can then begin.[29] As discussed, market shares are not conclusive on their own. The complex nature of competition in the market, potential barriers to entry, and buyer power must also be examined.

2.6 FORMS OF ECONOMIC REGULATORY CONTROL

Once the scope of the regulatory control has been specified, the next step is to determine the appropriate form of economic regulatory control to be imposed where there has been a finding of SMP.

[28] Office of Fair Trading, December 2004, 'Assessment of market power', at <https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/284400/oft415.pdf>.

[29] See Sections 2.9 and 2.15 for a discussion as to how these concepts have been applied in the UK and see Chapter 9.

At the time of privatization, the favoured form of economic regulation outside the UK to prevent excessive pricing was Rate-of-Return (RoR) regulation. The RoR approach takes as its starting point the regulated company's own costs, with profit levels set by applying an allowed weighted average cost of capital (WACC)[30] to an established regulatory asset base. This form of regulatory control essentially places a ceiling on the profits that a company can keep from its regulated business.

Under RoR regulation, the firm is more or less guaranteed to receive its cost of capital provided it operates within the rules. A perverse outcome of RoR is however that companies subject to this sort of regulation generally do not improve their efficiency, since they have no incentive to do so. If they reduce their costs, the consequence under RoR regulation is that their allowed revenues go down, to maintain their returns at the level of the cost of capital. Conversely, if their costs increase, their allowed revenues increase. Firms subject to RoR regulation tend therefore to 'gold plate' their investment to obtain the regulated return on a higher asset base.

To address the failings of RoR, Professor Stephen Littlechild developed the now well-known 'RPI – X' formula. This formula caps a selected basket of the incumbent's prices for a period of four to five years. These prices can then increase annually by a designated measure of retail price inflation[31] minus X (where X is a measure of the presumed movement of productivity and costs within the industry). Within this four to five year period, the regulated company can then keep any extra profits generated by increased efficiency, with new controls imposed at the end of the review period.[32] Economists deemed this rule to be attractive because it was easy to implement, it encouraged cost-reducing activities, and (via the basket of services) it could be used to target those aspects of the business where regulation was most needed. Furthermore, it was viewed as a regulatory tool whose usage would decrease as effective competition developed.

2.7 IMPORTANT CONSIDERATIONS WHEN SETTING REGULATORY CONTROLS

However, designing an appropriate price cap is complex; an inappropriate price cap can have a significant negative impact on the development of competition. Consequently, getting the scope and structure of the price cap right is important

[30] The WACC is the minimum return that a company must earn on an existing asset base to satisfy its creditors, owners, and other providers of capital, or they will invest elsewhere.

[31] In the UK, the measure of retail price inflation used was the Retail Price Index (RPI), which measures the change in the cost of a representative sample of retail goods and services. Since 2013 it has been superseded by the Consumer Price Index (CPI).

[32] The extent to which the RPI – X approach provides incentives to improve productive efficiency is in part a function of how the efficiency gains in one control period are treated in the next period. If the efficiency gains in one charge control period are shared between the firm and consumers in the following charge control period, then the firm has an incentive to find those gains.

if regulatory control is to be effective. It is worth noting though that, even if this is implemented correctly, this alone may not be sufficient to 'mimic' the likely operation of a competitive market. There are several important considerations:

- how the services to be regulated are to be grouped (ie the tariff baskets) and whether further mechanisms are then necessary when controlling the different groups (ie sub-caps etc);
- the duration of the price cap;
- how the firm's movements of costs and productivity change over the life of the price cap;
- how capital costs should be valued;
- the interaction of the price cap with quality; and
- demand-side factors that may hinder consumer choice.

2.7.1 Grouping of services to be regulated

The grouping of services to be regulated largely depends on the nature of the market and entity being regulated, the scope of the control, and the regulatory duties and objectives to be achieved.

In general, it is quite rare for price controls to be set on individual services within a market. As noted in Section 2.4, a key economic feature of communications networks is that there are significant common costs. In setting charges for services, communications networks need therefore to make some allowance for common cost recovery. If price controls were set on individual services, there is a risk that if there were unexpected changes to market demand during the price control period, individual service price controls would limit the firm's ability to respond to such changes. The firm may find therefore that it is unable to recover its common costs.

For this reason, often a basket control approach is taken to price controls. This provides the firm with the flexibility to set a pricing structure over the period of the control that will cover the common costs in a reasonably efficient way, as changes occur. However, the national regulatory authority (NRA) needs to be mindful of how much flexibility is provided to the incumbent firm.

If the structure of the price control is too flexible, this could allow the incumbent firm to act on its incentive for anti-competitive pricing behaviour. For example, under a broad cap, a dominant firm (if it is able to) will likely focus price cuts on those sectors of the market where competition is greatest, whilst attempting to earn monopoly profits in sectors where there is the least amount of competition. Such behaviour could be dangerous to existing and nascent competition and could be predatory. Predatory pricing can occur in both a capped and an uncapped market but under a broad cap, it is less costly for the dominant firm to engage in predation. In these

circumstances, the NRA should consider whether there is a need for additional safeguard controls to provide a regulatory safety net for certain customer groups.

2.7.2 Duration of the control

The duration of the control is the length of time over which the price control will be expected to operate. It is an important consideration for the NRA in setting a price cap. In particular, if it is set for too short a period, it could deliver inappropriate incentives for the incumbent to undertake cost-reducing activities which pay back within the designated timescales. On the other hand, if the control is set for too long a period, the incumbent may benefit from too lax a control and consumers could suffer as a result. As such, when determining the duration of a price control a balance needs to be achieved. The period needs to be sufficiently long to provide the company with a strong incentive to make efficiency savings whilst ensuring it is short enough that efficiency savings achieved by outperforming the price control can be returned to customers relatively promptly.

2.7.3 Firm's movements of costs and productivity change over the life of the price cap

The setting of a price cap requires a large amount of information about the future structure of the market. In particular, the NRA needs to factor into the price cap model the potential output and pricing structure of the company. Additionally, it needs to take account of the company's movements of costs and productivity over the life of the price cap.

However, forecasting growth and efficiency rates in an industry, such as communications, driven so strongly by technological and regulatory developments, is a complex exercise. The complexity of this operation is further magnified when there is nascent competition in the market. In these circumstances, the regulator not only needs to forecast the growth and efficiency rates of the incumbent, it also needs to take into account the impact of competitors' outputs and pricing strategies on the incumbent's output and prices and vice versa.

This difficult exercise is compounded by the asymmetry of information problem that exists between the regulator and the firm. Decision-makers within the firm are far more knowledgeable than regulators can ever be about circumstances facing them, and the regulator can neither observe nor infer all aspects of the firm's behaviour. In this situation, the regulator can only condition its policy on what it knows and try and design an incentive mechanism to induce the firm to act in the public interest.

2.7.4 Valuation basis for capital costs

Capital costs are another factor that needs to be considered. Given the importance of capital costs in setting the price cap, its measurement plays a key role in the modelling exercise. In particular, the manner in which the asset base is valued can have a major impact on the cost structure of the incumbent.

Assets can be measured either historically[33] or using current costs.[34] Generally on a total cost basis, the two measures do not differ significantly. The construction costs of trenches and ducts measured in current terms have increased but the price of electronic equipment such as switches has declined substantially due to technological progress. This may suggest that for the purposes of allowing the incumbent firm to recover its costs, either measure is appropriate.

However, where entry is plausible and efficient, if prospective entrants were considering the costs of entry and incumbent costs (and hence their prices) were based on historical costs, then from a business planning perspective, prospective entrants may not be able to gauge the true resource costs of their entry costs vis-à-vis the incumbent's. As a result, from an economic perspective where entry is considered feasible, there is a preference for the use of current costs because it provides correct, current, and efficient entry signals to all market players.

2.7.5 Price caps and quality

When setting a price control, the NRA also needs to be mindful of the incentives that price caps can have on service quality. Specifically, regulatory schemes that incentivize the incumbent operator to decrease costs can also incentivize the operator to lower service quality. If through the regulatory regime, the regulator solely focuses on the price variable, then this could be at the expense of quality.

The regulator can respond to these incentives by regulating service quality. Such regulations can take the form of minimum standards, rewards for improving quality, and penalties for substandard quality. Regulating service quality involves identifying the preferred level of service quality, designing an incentive system so that the operator offers this service quality, and developing a system for monitoring service quality and enforcing the standards. The preferred level of service quality should reflect the value customers place on quality and the operator's cost of providing service quality. This is however difficult to determine in practice, but

[33] Historic Costs relate to what the assets cost in the first place, minus depreciation.

[34] Replacement or Current Costs—what it costs to replace old assets with modern equivalent assets of equal remaining life. This reflects general inflation, plus specific effects such as technical progress.

customer quality preferences may be gleaned through survey instruments, the complaint process, and benchmarking studies.

2.7.6 Demand-side factors that may hinder consumer choice

The previous discussion has mainly focused on the factors to be considered in placing a price control on a firm to control it so that it cannot act on its incentive to exploit its market power. However, this control (by itself) may not be sufficient to 'mimic' the likely operation of a competitive market. This is because there may be some demand-side factors which prevent consumers exercising effective choice.

For consumers to gain the benefits of competition, they need to be able to exercise informed choice but their ability to do so may be hindered for several reasons—for example because they find it difficult to compare offerings or face artificial barriers to switching. These demand-side factors do not necessarily stem from the presence of market power and can be a general feature of the market rather than specific to one firm. Their presence may mean though that even if price controls are put in place to control the behaviour of the firm with SMP, customers may not benefit sufficiently from competition.

It is inevitably the case that even with price controls; a firm with SMP will make some allowance for common cost recovery. If customers are hindered in their ability to exercise choice and are therefore inactive, then firms will focus their pricing to recover common costs on these customers. In a competitive market, these customers would exercise choice and switch product or provider, but if for whatever reason they do not, they may face price hikes. Therefore, it is important that the NRA does not just rely on supply-side remedies (such as price controls), it also needs to consider whether it needs to intervene on the demand-side to help consumers make informed choices and protect particular customer groups. For example, if there is a lack of information and transparency for consumers leading to them being unable to make the best choices, relevant and targeted informational remedies may be a solution.[35] If consumers find that they cannot switch provider easily, then the NRA may need to work with industry to ensure easy switching between providers so consumers can act on their choice. And if some consumer groups find it particularly difficult to engage effectively with the market regardless of the information available, then more direct action may be needed to protect the most vulnerable.

[35] It is imperative that if informational remedies are implemented that they are tested to be accessible, relevant, and targeted. Just providing more information may not be sufficient because behavioural factors (biases) may mean customers do not engage with it. See OFT, 'What does Behavioural Economics mean for Competition Policy?', March 2010, OFT1224, at <http://webarchive.nationalarchives.gov.uk/20140402142426/http:/www.oft.gov.uk/shared_oft/economic_research/oft1224.pdf>.

2.8 STRUCTURE OF THE REGULATED INDUSTRY

Economic regulation has taken various forms in different industries and countries. This is partly because each industry/country has an individual NRA, allowing personal differences to manifest themselves. More fundamental, however, are the underlying differences in the structure of the regulated industry. For effective regulation to occur, an effective model or industry structure needs to be developed to allow effective competition to emerge.

The main model of competition in communications is one based on access to a vertically integrated incumbent's bottleneck facilities. This is because of the significant scale and scope economies in telecoms networks (see Section 2.4). The incumbent also uses those same facilities to compete downstream against competitors to whom it supplies access to the bottleneck facilities. A key issue is that control of the bottleneck facilities (see Section 2.5) potentially puts the incumbent in a position of advantage with respect to its competitors in the downstream market. This may allow it to have both the incentive and ability to distort competition in the downstream market through the way it exercises its control of the upstream bottleneck input.

There are several ways in which the regulator can constrain the vertically integrated firm's incentives and ability to distort competition in the downstream market. In particular, the regulator can pursue a range of different models of separation (see Table 2.3 below). Broadly, each model provides successively stronger constraints on the ability of the vertically integrated incumbent to act on this incentive to distort competition in the downstream market. However, at the same time, the measures imposed become more intrusive for the firm.

Table 2.3 Models of Separation[36]

1. Accounting separation	Separate financial reporting comprising of profit and loss statements and balance sheets for the upstream and downstream entities
2. Creation of a wholesale division	Model 1 accompanied by the creation of a special wholesale (or otherwise named) unit, with a dedicated management but with no guarantee of non-discrimination between affiliated and competitive access seekers
3. Virtual separation	Model 2 with an obligation to offer services to internal and external customers on equal terms, without any physical separation of the business

[36] Table 2.3 is based on an article by Martin E Cave, 'Six Degrees of Separation—Operational Separation as a Remedy in European Telecommunications Regulation' (2006) 64 Communications & Strategies 89–103, at <https://mpra.ub.uni-muenchen.de/3572/1/MPRA_paper_3572.pdf>.

4. Functional separation	Model 3 accompanied by the physical separation of the business and its processes eg location, staff, branding, management information systems
5. Functional separation with local incentives	Model 4 with different management incentives to those of the wider firm
6. Functional separation with independent governance	Model 5 but with the addition of a separate divisional Board with non-executive members who act independently from the group Board
7. Legal separation	Upstream business is established as a separate legal entity within the wider group, but remains under the same overall ownership
8. Structural separation	Split of the vertically integrated operations into separate legal entities, with no significant common ownership and 'line-of-business' restrictions to prevent them re-entering each other's markets

Models one to seven comprise behavioural remedies. These try to remove the ability of the vertically integrated firm to engage in discriminatory conduct but they do not remove the underlying incentives of the vertically integrated firm to discriminate. They do however allow for flexibility of structures as technology and market developments occur but because the underlying incentive to discriminate still exists, they suffer from the asymmetry of information problem, and so require considerable regulatory scrutiny.

Model eight, in contrast, comprises of a structural remedy, which removes both the ability and the underlying incentive of the regulated firm to discriminate against competitors. However, while this model removes the ability and incentive to discriminate, structural separation may not in itself change the bottleneck division's incentives to operate efficiently, invest, or deliver a good quality of service. Therefore, the NRA would still need to continue to regulate the structurally separate bottleneck division to protect consumers in the absence of strong competition. Structural separation could additionally see the loss of efficiencies made possible by a vertically integrated structure, such as cost synergies and the removal of double mark-ups.[37] It is also a one-off intervention that is difficult to reverse. If technological advances, regulatory changes, and differing trading patterns emerge, model eight can institutionalize a structure that could become obsolete.

[37] One of the oft-cited benefits of vertical integration is that firms can benefit from a number of cost synergies. In non-integrated operations, every step in production may involve mark-ups so the reseller can earn profit. By selling directly to end buyers, vertically integrated firms can 'cut out the middle man' removing one or more steps of mark-ups along the way. This can therefore lead to lower prices for consumers.

Given the pros and cons of the different separation models above, whichever model is adopted is highly dependent on the concerns that have been identified at a point in time and the costs and benefits of intervention.

2.9 PRIVATIZATION AND LIBERALIZATION OF COMMUNICATIONS IN THE UK

We now turn to a discussion as to how some of the concepts above were implemented in the UK. Arguably, the UK experience can be divided into three phases of liberalization and economic regulation (i) privatization and the early development of competition; (ii) the end of the UK duopoly policy; and (iii) increasing convergence between telecoms, broadcasting, and information technology. Below, we take each of these in turn:

2.9.1 Privatization and the early development of competition

The early debate on liberalization in the UK began with customer premises equipment, followed by services, and quickly spread to the beginnings of network competition in response to intense demand for leased circuits in the UK. In response to the government's offer to license network competitors in the leased circuits area, Cable & Wireless and Barclays Bank, with subsequent financial support from British Petroleum formed Mercury Communications. The consortium decided however that leased circuits alone did not provide a viable business and sought a licence extension to provide national and international switched services. The large investment required for this purpose persuaded the group that it needed a period as the single alternative switched network if it was to develop as an effective competitor to BT. This duopoly policy was adopted by the government in the autumn of 1983.

The duopoly policy, to which the government committed itself for seven years from the date of its announcement, set the tone of the subsequent comparatively slow and cautious development of network competition in the UK. The government, right from the start, was however, determined to introduce competition into all segments of the UK market. In particular, to encourage the development of competition in mobile services, it licensed in 1985 competing cellular operators, Vodafone and Cellnet and required them to sell through separated retailers. The market structure was determined by spectrum capacity and other licensing decisions, and given that mobile was viewed as a minority service, retail mobile prices were not controlled. The effect of this was that for the next ten years, both companies charged high and generally parallel prices.

To open up the possibility of additional local network competition, the government also licensed cable operators to provide all forms of communications services in addition to television programme services. However, in deference to the duopoly policy, the cable operators could only provide switched voice telephony in association with BT or Mercury. Since BT was not keen to compete with itself, this meant that in practice competing local switched voice telephony services could only be developed by agreement with Mercury during the duopoly period.

In 1984 BT was privatized. After extensive debate about the structure of the industry and the model of competition and separation that should be adopted (see Section 2.8), the government shunned the structural separation policy adopted in the US and instead privatized BT as a vertically integrated company. BT's dominant position throughout the industry meant, however, that there was a clear need for a framework of regulation to contain BT's market power. In particular, regulatory intervention was necessary to ensure that Mercury— and any other subsequent licensed telecommunications operator— had access to actual and potential customers via BT's local circuits at a non-monopolistic price and that customers on Mercury's network were able to contact customers on BT's network and vice versa.

Herein therefore lies the eternal debate on an effective access and interconnection regime.[38] In addition to the requirement for access and interconnection regulation, there was also a requirement to protect consumers against BT's monopoly power. As such considerable discussion occurred as to the appropriate vehicle for price control in the UK. Given the substantial arguments against rate-of-return regulation, discussed in Section 2.6, Littlechild's proposal of RPI – X was adopted.

2.9.2 The end of the UK duopoly policy

In 1991, the government decided to end the duopoly policy and adopt a policy of licensing fixed networks without formal limit.[39] Whilst the government recognized that fixed telephony networks have significant scale economies, it set out that the loss in scale economies from having multiple firms in the market would be more than offset by the long-term benefits from competition and innovation. In adopting this policy, the government concluded that the cable television companies should be licensed to provide switched voice telephony in their own right allowing them to benefit from the economies of scope between television and telephony. But the constraints on the established networks, particularly BT, from providing television programme services and mobile services under its main licence would continue for the rest of the decade. Further, a decision was also taken in 1991 to license competing

[38] See further Chapter 8.

[39] DTI, *Competition and Choice: Telecommunications Policy for the 1990s* (London: HMSO, 1991 cm1461).

personal communication networks (PCNs) to extend the reach of mobile competition. The effect of this was that mobile prices came down and mobile take-up grew at a remarkable pace, again without any regulatory intervention on retail price. In 2000, five licences for 3G mobile services were auctioned. Four of these went to the existing mobile companies but the fifth was awarded to a new entrant.

Therefore, the end of the duopoly policy put the UK decisively on the path of network diversity and infrastructure competition. However, protection of consumers against BT's monopoly power continued to be debated in regulation and the access and interconnection debate in fixed telecoms became even more heightened alongside the issue of interconnection between mobile operators and fixed operators. In particular, with the proliferation of downstream competitors, it became clear that it was in BT's interests to heap as many of its cost as possible onto wholesale services bought by its retail competitors. These magnified charges gave BT a double competitive advantage: its own costs were more fully recovered while its rivals were raised. Given this, as soon as the duopoly period ended, Oftel started to require BT to account separately for its main activities – retail network and access (essentially model 1 in Table 2.3 above). The granularity of such accounts grew in the 1990s, as did the auditing to which they were subject.[40] In addition, it became clear that BT was putting in place demand-side barriers to prevent consumers switching to alternative providers. Therefore, to address this, Oftel commenced work to implement number portability to enable customers to keep their number when switching provider. BT fought this but eventually by 1996, portability became available for customers moving from BT to another operator. Oftel committed however to ensure that all customers can benefit from number portability such that any operator can request portability from any other operator on a 'like for like' basis. Extending number portability to the whole industry was however a slow and arduous journey. Both competing fixed and mobile operators did not want to provide it. They believed that it should solely be mandatory for BT (as it had market power). Extensive debate and cajoling eventually meant that it was only by 2003 that fixed number portability was in place and it took until 2008 for mobile number portability to be agreed. This demonstrates the difficulty that NRAs face in implementing demand-side remedies.

This phase of competition and regulation laid therefore the conceptual foundation in the UK for the more competitive markets which can now be found. These include more interconnection products available at standard prices and other terms and conditions; regular reviews of the competitiveness of individual markets to see what form of regulation they require; accounting separation to support such price setting, and its extension to mobile termination and intervening on the

[40] It could be argued that by 2003, it had evolved to model 3 in Table 2.3 above.

demand-side to empower consumers. The period also saw a switch in emphasis in price control from retail to wholesale or network products (see Sections 2.10 and 2.15).

2.9.3 Increasing convergence between telecoms, broadcasting, and information technology

In 2003, significant changes took place in UK and European communications regulation. Given the increasing convergence between telecommunications, broadcasting, and information technology, five new EU Communications Directives were introduced which took effect on 25 July 2003.[41] Under the new regulatory framework for electronic communications networks and services, NRAs had to carry out reviews of competition in communications markets, to ensure that regulation remained proportionate in the light of changing market conditions. The European Commission also issued guidelines on market analysis and the assessment of significant market power (the 'SMP Guidelines'[42]). NRAs are required to take the utmost account of these guidelines when identifying a market and when considering whether to make a market power determination. Oftel already carried out market reviews but the new EU Directives did lead to some changes on how it evaluated competition and it also meant that its analysis was now subject to scrutiny from the European Commission.

The transposition of the EU Directives into UK law resulted in the formation of Ofcom and the Communications Act 2003. Shortly after, Ofcom launched the Strategic Review of Telecommunications (oft referred to as the Telcoms Strategic Review or the 'TSR').[43] Its aim was to assess whether the then current regulatory approach governing both fixed and mobile services was still appropriate.

The main conclusion for mobile was that competition looked good. There was competition between five network operators, as well as service providers purchasing capacity in the wholesale market. However, in 2010, Deutsche Telekom and France Télécom agreed to merge their UK mobile operations (Orange and T-Mobile) into Everything Everywhere (now EE), thereby reducing the number of mobile network operators in the UK market from five to four. Ofcom was looking to reduce barriers to entry in the provision of wireless services via its spectrum management activities such that further spectrum could be released for mobile services.[44] This manifested itself in 2013 when five licences for 4G mobile services

[41] See further Chapter 4.

[42] Commission guidelines on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services, OJ C 165/6, 11 July 2002.

[43] Ofcom, 'Strategic review of telecommunications Phase 2 Consultation', 2004, at <http://webarchive.nationalarchives.gov.uk/20160702162827/http:/stakeholders.ofcom.org.uk/consultations/telecoms_p2/>.

[44] See further Chapter 7.

were auctioned. As in the previous auction award, four of these went to existing mobile companies (EE, O2, Vodafone, and H3G) but the fifth was awarded to a new player (in this case BT).[45]

In contrast, for fixed services, the main conclusion from the TSR was that although liberalization had led to a number of downstream retail markets being opened to competition, the strong presence of common costs and economies of scale in fixed networks meant that most competitors still rely on upstream wholesale inputs provided by the incumbent, BT. Ofcom decided therefore that the focus of economic regulation should be on opening access to the network elements subject to scale and scope economies to allow competition to be introduced in related markets. It argued however that BT's market power in the provision of fixed infrastructure and its vertically integrated structure into the downstream markets for which that infrastructure is a critical input meant that BT (given its then current structure) would always have an incentive and the ability to engage in discriminatory behaviour against its competitors. In particular, Ofcom highlighted that while price discrimination may be easier to detect, verify, and enforce, non-price discrimination (such as delaying access to key inputs to competitors etc) is not. Ofcom believed that its then current powers did not suffice to deal with the problem. Consequently, it put forward a proposal to introduce a form of functional separation and to strengthen the then current non-discrimination rules (from model 3 to model 5 in Table 2.3 above). This manifested itself in what is termed Equivalence of Input (EoI) supported by the organizational separation of BT and the creation of Openreach as a functionally separate entity.[46]

In March 2015, ten years after the TSR, Ofcom launched a Strategic Review of Digital Communications (DCR). Whilst Ofcom set out that the UK's telecoms users have enjoyed largely positive outcomes in the last decade, some concerns remain.[47] In particular, Ofcom highlighted that given the increasing dependence on communications, more needs to be done to make sure there is widespread availability of superfast fixed broadband and better mobile coverage. Moreover, more generally Ofcom pointed out that there are continuing concerns about the quality of service delivered by some providers and argued that as future demand for data grows more network investment will be required to deliver it.

[45] Ofcom Press Release, 'Ofcom announces winners of the 4G mobile auction', 2013, at <http://media.ofcom.org.uk/news/2013/winners-of-the-4g-mobile-auction/>.

[46] Ofcom, 'A notice under Section 155(1) of the Enterprise Act 2002', 2005, at <http://webarchive.nationalarchives.gov.uk/20160702162827/http:/stakeholders.ofcom.org.uk/binaries/consultations/sec155/summary/sec155.pdf>.

[47] Ofcom, 'Initial conclusions from the Strategic Review of Digital Communications', 2016, at <https://www.ofcom.org.uk/phones-telecoms-and-internet/information-for-industry/policy/digital-comms-review/conclusions-strategic-review-digital-Communications>.

In response to these concerns and to empower consumers to make informed choices, Ofcom set out that it would publish service quality performance data on all operators, and look to introduce automatic compensation for consumers and small businesses when things go wrong. Alongside this, it said that it would introduce tougher minimum standards for Openreach with rigorous enforcement and fines for underperformance. Ofcom also said that (with universal service as a backstop[48]) it will encourage the roll-out of new 'fibre to the premise' networks to homes and businesses, and will require BT to open up its network, allowing easier access for rivals to lay their own fibre cables along BT's telegraph poles and in its underground cable 'ducts' (see Section 2.15). This marked a shift from the previous strategic review in that Ofcom was now implying that the focus of economic regulation should be more towards fostering network competition rather than just competition based on access regulation.

Ofcom recognized though that where the private sector cannot offer competing infrastructure investment, competitors will still be reliant on Openreach to provide service to retail customers. It said that while functional separation and EoI (essentially model 5 from Table 2.3 above) have achieved good outcomes, they do not remove BT's incentive to discriminate. Therefore, it pointed out that there are still risks to competition. In particular, Ofcom said that while Openreach is required to provide services to all competing providers including BT on an equivalent basis, there still may be scope for BT Group to influence the design and investment of such services in a way that makes them more favourable to BT than to its competitors. In February 2016, Ofcom stated that Openreach needs to change, taking its own decisions on budget, investment, and strategy, in consultation with the wider industry.[49] In March 2017, BT notified Ofcom of voluntary commitments to reform Openreach.[50] These commitments comprise of BT agreeing to legally separate Openreach so that it becomes a distinct company with its own staff, management, purpose, and strategy and a legal purpose to serve all of its customers equally. This is essentially model 7 in Table 2.3 above. Ofcom responded that it considered that BT's March Notification sufficiently addressed its competition concerns. In March 2017, Ofcom published a consultation of the commitments[51] and an explanation of how it will monitor compliance with the new arrangements and ultimately assess whether they deliver positive outcomes for consumers and businesses.

[48] See Section 2.12 for a discussion about universal service.

[49] Ofcom, 'Making communications work for everyone: Initial conclusions from the Strategic Review of Digital Communications', 2016, section 6 at <https://www.ofcom.org.uk/__data/assets/pdf_file/0016/50416/dcr-statement.pdf>.

[50] Ofcom Press Release, 'BT agrees to legal separation of Openreach', 2017, at <https://www.ofcom.org.uk/about-ofcom/latest/media/media-releases/2017/bt-agrees-to-legal-separation-of-openreach>.

[51] Ofcom, 'Delivering a more independent Openreach: Update on BT's voluntary notification under s.89C Communications Act 2003 and consultation on releasing the BT undertakings pursuant to section 154 Enterprise Act 2002', 2017 at <https://www.ofcom.org.uk/__data/assets/pdf_file/0035/98855/Openreach-consultation-2017.pdf>.

The discussion above provides a whistle-stop tour of the broad phases of liberalization and regulation in the UK since the privatization of BT. In the following sections, we now turn to a more detailed discussion of the regulations that were implemented at the retail and wholesale levels drawing on the economic concepts discussed earlier.

2.10 RETAIL PRICE REGULATION IN THE UK

A core principle of regulation is that as effective competition develops regulation should be lessened. However, as set out in Table 2.4, in the early days of UK communications regulation, there was both a tightening of the price cap control and an extension of the coverage of the control.

Table 2.4 Summary of UK retail price controls[52]

Dates	Control	Price control coverage
1984–1989	RPI – 3%	49%
1989–1991	RPI – 4.5%	55%
1991–1993	RPI – 6.25%	67%
1993–1997	RPI – 7.5%	64%
1997–2002	RPI – 4.5%	26%
2002–2006	RPI – 0%	Not applicable

In 1984, the first price cap was set at RPI – 3 per cent and the basket of controlled services covering approximately half of BT's revenues was set for five years. In the subsequent Price Review of 1988, Oftel tightened the price cap to RPI – 4.5 per cent, and added additional services to the basket increasing the coverage of the cap to just over half of BT's revenues. These arrangements were supposed to stand for a duration of four years but the Duopoly Review in 1990 meant that these commitments were jettisoned and new arrangements were put in place. These tightened the price cap further from RPI – 4.5 per cent to RPI – 6.25 per cent. Moreover, because routine monitoring of BT's international calls showed profits were rising sharply, out-going international call charges were added to the price cap basket. Oftel's next review of the BT price cap also tightened the cap further to RPI – 7.5 per cent and as in the previous review, more services were added to the control. By 1997, nearly 70 per cent of BT's revenues were covered by the control.

[52] Source: Cave, M, 'The Evolution of Telecommunications Regulation in the UK' (1997) 41 European Economic Review 691–699.

This ever-tightening regulation however changed considerably in 1997. After Oftel conducted a market study of competition,[53] it reverted to the core principle that retail controls should only be implemented where consumer protection was absolutely required. This led to the coverage of the switched services price cap being targeted on the lowest spending 80 per cent of residential customers and the cap being loosened from RPI – 7.5 per cent to RPI – 4.5 per cent. The effect of this was that 26 per cent of BT's group revenues were now subject to retail price caps compared with nearly 70 per cent previously.

In February 2001, Oftel determined that the 1997 retail price controls on BT should be extended until July 2002. Then in June 2002, Oftel loosened the price controls further with a safeguard cap of RPI – RPI for the lowest 80 per cent of residential customers. As an incentive on BT, Oftel suggested that if BT developed an effective wholesale line rental (WLR) product,[54] the cap would be further reduced to RPI + 0 per cent. In July 2006, Ofcom announced the removal of retail price controls. This followed both the conclusion of Ofcom's TSR and the specific public consultation, launched in March 2006, on removing retail price controls.[55] Ofcom stated that deregulation was because of the rapid growth of competition and continued reductions in the cost of phone services to retail customers. This is therefore a good illustration of the removal of retail regulation as effective competition becomes prevalent, though Ofcom recognized that regulation would continue to be required for some time to come at the wholesale level.

The rolling-back of economic price control regulation as competition became effective did not mean however that the regulator ignored market circumstances at the retail level. It recognized that it still needed to keep an eye on the effectiveness of competition for consumers, otherwise there was a risk that consumers could be harmed. In this regard, in 2010, Ofcom began a review of consumer switching processes prioritizing switches involving fixed voice and broadband services made over the Openreach copper network. It found that switching processes differed substantially amongst operators leading to customer confusion and customers seeing the switching process as a hassle. Working with industry, in 2013 Ofcom put in place agreed consistent switching processes, which means that consumers can

[53] See Section 2.5 for a discussion about how the extent of competition in communications markets is examined for the purposes of deciding whether regulatory controls are required or not.

[54] Wholesale Line Rental (WLR) is intended to stimulate competition by allowing suppliers to provide an integrated service comprising calls and access, renting the exchange line from BT and sending customers a single bill.

[55] Ofcom, 'Retail price controls: explanatory statement and proposals', 2006, at <http://webarchive.nationalarchives.gov.uk/20160702162827/http:/stakeholders.ofcom.org.uk/binaries/consultations/retail/statement/rpcstatement.pdf>.

exercise choice and switch quickly without loss of service.[56] In addition, it has put in place a number of informational remedies targeted at consumers to help consumers through the process of switching.

To further inform consumers of their available options, Ofcom has also prioritized publishing service quality performance data on all operators. This acts as a bit of a 'name and shame' of poor performing operators and so provides a mechanism for consumers to be informed of alternative providers and an incentive for operators to improve their quality of service.[57] The incentive for operators to improve their quality of service is also reinforced by Ofcom's proposal to introduce automatic compensation for consumers and smaller businesses when things go wrong.[58]

Alongside, the demand-side remedies above, Ofcom has also been keeping an eye on operators' behaviour at the retail level. Even though retail regulation had been removed in the UK, in 2016, prompted by concerns over rapidly rising prices for standalone landline telephone services (ie the sale of telephone services to those people who buy such services in a standalone contract and not as part of a bundle with other services such as broadband or pay TV) Ofcom launched a review of the retail market for standalone landline telephone services.[59] In 2017, it provisionally concluded that there is a distinct market for standalone landline telephone services, with BT holding significant market power. To prevent BT from using this market power against standalone landline telephone customers, Ofcom proposed to regulate BT's standalone telephony services through a retail price control, with an initial price cut of between £5 and £7 in monthly line rental, and a basket cap on prices of line rental and calls to limit future price increases to no more than the rate of inflation. In addition, Ofcom also proposed to require BT to work with it to trial—and, if appropriate, deliver—consumer information to encourage its standalone telephony customers to look for better value deals to promote competition. In response to these proposals, in October 2017, BT voluntarily agreed to put these measures in place for a period of three years.[60]

[56] Ofcom, 'Consumer switching: A statement and consultation on the processes for switching fixed voice and broadband providers on the Openreach copper network', 2013, at <http://webarchive.nationalarchives.gov.uk/20160702162827/http://stakeholders.ofcom.org.uk/binaries/consultations/consumer-switching-review/summary/Consumer_Switching.pdf>.

[57] Ofcom, 'Comparing service quality', 2017, at <https://www.ofcom.org.uk/phones-telecoms-and-internet/advice-for-consumers/quality-of-service>.

[58] Ofcom, 'Automatic compensation', 2017, at <https://www.ofcom.org.uk/__data/assets/pdf_file/0030/98706/automatic-compensation-consultation.pdf>.

[59] Ofcom Press Release, 'Landline prices review to protect elderly and vulnerable', 2016, at <https://www.ofcom.org.uk/about-ofcom/latest/features-and-news/landline-prices-review>.

[60] Ofcom, 'Review of the market for standalone landline telephone services: statement', 2017, at <https://www.ofcom.org.uk/__data/assets/pdf_file/0015/107322/standalone-landline-statement.pdf>.

2.10.1 Operation of retail price caps in the UK

As detailed above, excluding developments from 1997, the price cap regime within the UK communications industry tended to intensify over time. Firstly, the coverage of the price cap, in terms of the goods and services that were subject to regulatory control, tended to expand. Secondly the severity of X, the deduction factor, was typically tightened at successive review periods. This led to an enforced decline in real prices, which in the short term was of immediate benefit to consumers.

However with the coverage of the cap so wide, there was less consideration given to the long-term impact of price cap regulation on competition and in particular the effect of price regulation on nascent competition. In a monopoly environment, the setting of a price cap is a relatively simple exercise. The regulator sets X commensurate with an efficient operator level of profit. The regulated firm then sets prices as per the RPI – X formula and the resultant profit level is then greater or less than forecast depending on cost control and volume changes. However, in a potentially competitive environment, designing an appropriate cap is more complex. The reason is because if severe price caps are imposed on the incumbent operator, this has the consequence of also forcing competitors to parallel any incumbent-led price cuts to penetrate the market. If operators have to extend their investments in the development of new services and their deployment of lower cost technologies, then this could have an impact on their market entry. As such a balance needs to be reached between consumer effects and competition effects in setting a price cap.[61]

2.10.2 Key issues—retail price caps

In summary, the asymmetric nature of a price cap, in that it prevents price rises but allows price decreases, while being irrelevant in a monopoly market can become of critical importance when potential competition is prevalent. Regulatory intervention should only be initiated if there is a demonstrable competitive or market failure. When reviewing a price cap regime, the regulator should examine the competitiveness and potential competitiveness of the market and should ensure that if the price cap regime is to continue, that a balance is reached between protecting consumers against high prices and not impeding the development of an effectively competitive market.

[61] Where there is the potential for competition, NRAs need to define markets in a dynamic manner. They should take account of the changing nature of the industry otherwise erroneous regulatory decisions could be made which could distort the workings of the sector.

2.11 TARIFF REBALANCING ISSUES

Governments generally feel it desirable that individuals should have access to communications facilities, to exercise their political rights, and on social grounds, to prevent a gulf emerging between ''information-rich' and 'information-poor' groups. This alongside the positive externalities and dynamic benefits for the economy has meant that dominant operators have historically been encouraged in monopoly environments to set prices for network access as low as possible. Prices for other services, such as long distance and international calls, have been kept high to subsidise low access prices. This has, however, led to tariffs being out of balance with underlying costs, which with the introduction of privatization and liberalization policies has meant that competitive activity has been targeted to wherever these imbalances have occurred.

In terms of economic efficiency, an unbalanced price structure has a number of adverse effects. Firstly, it provides incorrect signals to potential entrants and so could lead to inefficient entry. Secondly, it results in a loss of economic welfare. Where the price of a service is in excess of long run marginal cost,[62] potential customers, whose valuation of the service exceeds the cost, but not the price, are deterred from using it. Where price is below long run marginal cost, there will be consumers whose valuation of the service falls below its cost, but use it because price is below cost. The potential economic welfare benefits from rebalancing can hence be substantial.

Before discussing rebalancing in more depth, it is worthwhile considering exactly what is meant by the concept of rebalancing. Tariffs for two services are said to be balanced if they are set at levels which reflect their costs. A policy of rebalancing in the communications sector seeks therefore to increase access prices, and reduce prices for services that have traditionally subsidised low access prices. The objective is to ensure that the price for each service reflects the underlying cost of providing that service. Increased network access prices under tariff rebalancing generally have a relatively small impact on overall subscriber numbers. This is because demand for network access is usually not very responsive to changes in price. In addition, low prices for usage can stimulate demand for access, helping to mitigate the effects of increased prices for access.

While the economic benefits of tariff rebalancing are clear from a theoretical point of view and empirical evidence supports the existence of these benefits, rebalancing is difficult to implement. Firstly, it is difficult to separately define costs

[62] See Section 2.14 for a discussion about marginal costs.

where two services are closely linked. Secondly and more importantly from a political perspective, rebalancing can be difficult for politicians to sell to the public. This is because rebalancing generally requires that the majority (ie the voters) pay more whilst the better-off pay less.

Rebalancing became a prominent issue in the UK when BT made its first price changes as a private company in the 1980s. It was keen to rebalance quickly as having tariffs out of balance exposed it to competition targeted exclusively at the high margin calling business. It argued that line rentals priced below cost 'distorts the market and encourages inefficient and misplaced investment'.[63] BT managed to carry out some rebalancing actions but these tended to favour large users over smaller users and involved price cuts in areas where competition was prevalent and price increases where it was not. (The incentives on BT for rebalancing were therefore similar to the incentives produced from price regulation as discussed in Section 2.7.)

Rebalancing, if pursued too vigorously, could undermine the liberalization process. Oftel was concerned about this and so concluded in 1986 that no further rebalancing between local and long-distance charges should occur. The view was that the liberalization process needed to be protected and if effective would lead to natural cost reductions and rebalancing over a number of years.

2.12 SOCIAL OBLIGATIONS AND FURTHER CONSTRAINTS ON RETAIL PRICES

In addition to tariff rebalancing issues, social obligations on retail prices are an additional consideration for NRAs. Economics of density[64] in communications means, certain classes of customers are profitable to serve whilst others are unprofitable. In a pure competitive market, if this occurred, firms would not serve unprofitable customers. To prevent certain customer classes from being excluded from service, there is therefore usually a requirement to cross-subsidize between profitable and unprofitable customers. This can take the form of geographically averaged retail tariffs alongside a requirement to provide service to all customers demanding service (otherwise known as the universal service obligation or USO).

Subsidization by profitable customers to unprofitable customers, like the subsidization by long distance and international call charges to line rental and local call charges, has historically been encouraged by governments. The rationale for

[63] BT's response to Oftel's statement 'Effective Competition: Framework for Action', para 7.1.

[64] An industry exhibiting economies of density is one where the more closely packed together the customers are, the lower the unit costs.

imposing a USO is both social and economic. The social policy goal is to provide individuals with access to communications facilities to avoid a gulf emerging between groups in society. The economic rationale, on the other hand, relates to the presence of externalities, not taken into account by individuals in their private decision-making. New customers joining a network not only benefit themselves, but create extra opportunities for existing customers. There is, moreover, evidence of dynamic benefits for the economy arising from the development of the communications sector.

The presence of these externalities and the social and political considerations mentioned above thus create a case for imposing a USO sharing mechanism as long as it can be proven that costs outweigh benefits. It should, however, be recognized that the main aim of the obligations will differ at different periods. At the time of network build-out and mass-market take-up, the objective of universal service obligations is likely to be primarily economic. Once the network is completed, however, the goal of universal service shifts to being primarily a social one. In the former stage, it is desirable to keep installation prices low so as to stimulate demand and to take account of the network externality. In the latter stage, the emphasis is likely to be upon targeting subsidies to ensure that the telephone is affordable to all and adapted to those with special needs.

Traditionally in a monopoly environment the costs of the USO have been covered by a cross-subsidy. When competition has been introduced, however, the incumbent has asserted, as with rebalancing, that having a USO, exposes it to competition targeted exclusively at the profitable business thereby resulting in it having inadequate funds to cover the costs of serving unprofitable customers. As a consequence, it claims that the costs of this should be shared amongst operators to ensure competition on equal terms.

2.12.1 Costing the USO

The costs of meeting the USO comprise the sum of the losses incurred by the USO operator in serving customers whom it is obliged to serve but whom it would not otherwise serve had it not been a USO operator.

To estimate the cost of the USO, a detailed examination of the costs and revenues associated with customers is needed. Given that only a few customers are likely to impose net USO costs, the estimation should focus on the costs of loss-making customers on an avoidable basis. In other words, the calculation should try to elicit how much would be saved (ie costs) and how much would be lost (ie revenues) if loss-making customers were removed from the network.

The calculation of the cost side of the equation comprises detailed economic modelling, the aim of which is to determine the maximum number of customers

that can be served economically. Once this has been identified, it should then be possible to derive and cost the shortfall or the cost of serving loss-making customers. Once the avoidable costs of delivering universal service have been quantified, any commercial benefits such as good public relations, perception of marketplace ubiquity, reduced churn, simplified credit procedures arising from serving remaining customers must be quantified. All incremental revenues emanating from loss-making customers must also be included on the revenue calculation. This should comprise call charges, line rental charges, as well as revenue of incoming calls to loss-making customers. This is of key importance to the calculation as this would be lost to the operator if the customer left the network. The cost of delivering universal service is then the amount by which the cost of serving loss-making customers exceeds the benefits and incremental revenues associated with serving these same customers.

2.12.2 Funding the USO

If costs outweigh the benefits such that it imposes a significant burden on the incumbent, there is then a case for imposing a sharing system so that competition occurs on a 'level playing field'. A number of mechanisms exist for funding and sharing the costs of the USO. If the rationale for the USO is social policy, so that the cost of funding the USO ultimately represents a tax on customers to fund extended services for others, then it may be appropriate for the costs to be met by general taxation. Governments, generally however, find this option unpalatable and so, it is usually the case that the costs of USO are financed from within the communications sector. This can be done in several ways. A fund or virtual fund can be set up where the costs of the universal service are shared out between carriers according to the size of each operator's traffic share, as is the case in Australia. Alternatively, costs could be divided to reflect service revenues minus payments to other operators. Whichever approach is adopted, it is however important that how the USO is allocated and financed does not lead to market distortions.

2.12.3 Operation of the USO in the UK

In the UK, a study of the USO was conducted in 1996[65] and was estimated to be less than £0.05 billion. Oftel argued that the transaction cost of administering and funding the USO would exceed the delivery cost, and so it concluded that

[65] Oftel, Universal Telecommunications Services, Statement, 1997, at <http://webarchive.nationalarchives.gov.uk/20040104233440/http:/www.ofcom.org.uk/static/archive/oftel/publications/1995_98/consumer/univ_2.htm>.

the delivery of the USO should not be funded by the industry as a whole. Ofcom stated however that the costs and burden of universal service would be kept under review.[66]

If an undue burden from the USO is found the funding methods outlined above can be used. The efficacy of using a fund or virtual fund could, however, be improved if alternative service providers are present in the market. For example, permitting the incumbent to contract out the USO to the most efficient service provider or equally, franchising the USO to the most efficient service provider and then making the appropriate transfers could potentially improve the efficiency of USO delivery.

In November 2015, the government set out its intention to introduce a broadband USO.[67] This is intended to give everyone a right to a decent broadband connection, with a download speed of 10Mbit/s, on request. The government proposed introducing this USO in recognition of the increasingly important role broadband plays in people's lives. Ofcom was commissioned by the government to provide technical analysis and advice to support the design of the broadband USO.[68] In December 2016, Ofcom published its advice for government on how it might secure its overarching policy objectives.[69] This comprised of, amongst other things, a high-level consideration of the scope and level of the USO, the costs of delivering the USO, options for USO designation which delivers value for money, views on the extent of any market distortion arising from the implementation of a broadband USO, and mechanisms for funding the USO. In July 2017, BT made an offer to provide the required infrastructure on a voluntary basis, avoiding the need for regulation, and recouping the cost through customer bills. In December 2017, the government rejected this offer and decided to press ahead with adoption of a regulatory USO, to provide everyone with minimum 10 Mbps line speeds by 2020.[70]

[66] *Notification of Proposals for the Designation of Universal Service Providers and Setting of Conditions*, Consultation Document, 12 March 2003. Under the Communications Act 2003, s 65 *et seq*, Ofcom have the right to review such matters for the purpose of making a universal service designation. Document, at <http://webarchive.nationalarchives.gov.uk/20040104233440/http:/www.ofcom.org.uk/static/archive/oftel/publications/eu_directives/2003/uso0303.htm>.

[67] Government press release, 'Government plans to make sure no-one is left behind on broadband access', 2015, at <https://www.gov.uk/government/news/government-plans-to-make-sure-no-one-is-left-behind-on-broadband-access>.

[68] Letter from DCMS to Ofcom, March 2016, at <https://www.ofcom.org.uk/__data/assets/pdf_file/0027/53676/dcms_letter.pdf>.

[69] Ofcom, 'Achieving decent broadband connectivity for everyone: Technical advice to UK Government on broadband universal service', 2016, at <https://www.ofcom.org.uk/__data/assets/pdf_file/0028/95581/final-report.pdf>.

[70] See <https://www.gov.uk/government/news/high-speed-broadband-to-become-a-legal-right>. The obligation will be made through a 'universal service order', issued by the Secretary of State under the Communications Act 2003, s 65 (as amended by the Digital Economy Act 2017, s 1).

2.13 THE NEED FOR AN EFFECTIVE INTERCONNECTION REGIME[71]

As detailed in Section 2.4, the value of belonging or being connected to the network increases with the number of people on the network. This means that competition between separate networks is unlikely to be sustainable, as the larger any one network gets the greater becomes its advantage over the others. The solution to this problem is for networks to interconnect, in effect forming one single network. Therefore, regulators need to impose an obligation to interconnect or to terminate calls to enable members of one network to call members of another.

In addition to 'interconnection' services, regulators usually also demand that incumbent operators provide a number of 'access' services[72] to competitors at a regulated price. As noted above, a number of call origination services are often considered naturally monopolistic because of sunk costs and economies of scale. Opening access to the network elements subject to scale and scope economies may allow competition to be introduced in related markets. However, this requires regulatory intervention because without it, the incumbent would not have an incentive to provide access to these network elements.

Whilst intervention to oblige operators to provide access and interconnection services can be helpful, it provides no guarantee that access and interconnection will be provided on reasonable terms.[73] Interconnection and access charges are key cost components of entrants' tariffs.

If high interconnection and access charges are set, new entrants in evaluating whether they should enter and provide service could conclude that business is not viable and may not enter the market. Existing entrants' investment behaviour could also be affected. If interconnect and access prices are kept at inflated levels, existing entrants in the marketplace are likely to try to minimize costs by bypassing the incumbent's network and building their own network components to compensate. However, if these network components have natural monopoly properties,[74] this duplication of network may be inefficient.

[71] See also Chapter 8. [72] See further Chapter 8.

[73] The effectiveness of an entrant's challenge to an incumbent is dependent on not only price but the non-price terms of access and interconnection services.

[74] A natural monopoly is defined by economists as an activity which exhibits economies of scale throughout the entire stretch of its unit cost curve. Such a condition could make one firm the inevitable winner and only survivor in any competitive contest with others in that line of activity which exhibits natural monopoly features. See Vickers, J and Yarrow, G, *Privatisation: An Economic Analysis* (Cambridge: MIT Press, 1998).

In contrast, if interconnect and access charges are set too low, this could inefficiently encourage prospective competitors to buy access rather than build their own networks. Moreover, if charge levels are too low, the incumbent may be at risk of not being able to efficiently recover its network costs. If this is the case, it could result in investor uncertainty and therefore a corresponding decrease in investment and innovation in the industry. As a result, future network build-out may be less robust because capital funding that might otherwise have been used for network and service construction may not readily be available. In addition, technology choices may be driven by a short-term focus of recovery of network costs rather than a long-term focus of over-all industry growth. This could therefore have potentially irreversible consequences for service provision and the development of competition in the industry.

Striking the appropriate balance of interconnect and access charge levels is crucial to ensure the efficient development of competition and of the industry. The NRA's role in setting these charges is critical to establish a sustainable interconnect and access regime. To prevent the dominant operator from abusing its position, the NRA must have the appropriate powers and penalty mechanisms to control for this, both for creating the conditions for effective competition and also for a system of minimum regulatory intervention.

2.14 INTERCONNECTION COST METHODOLOGIES

Establishing the right arrangements for setting interconnection and access charges is probably the most important element in the communications regulatory framework. Getting an understanding of the underlying costs of the network is important because in general, to ensure efficient use and development of the network, prices should be set in relation to costs.[75]

2.14.1 Fully allocated costs (FAC)

Historically, regulators and communication operators have used FAC, when setting interconnect and access charges. FAC is calculated by attributing to any service whatever costs are directly determined or caused by that service. So for

[75] Determining such costs has been subject to judicial consideration in a number of jurisdictions. See eg *Telecom Corporation of NZ Ltd v Clear Communications Ltd* (1992) 4 NZBLC; *Verizon v FCC* 535 US 467, 122 S Ct 1646, and the CJEU decision in Case C-55/06, *Arcor AG & Co. KG v Bundesrepublik Deutschland*, 24 April 2008.

example, large parts of the local loop costs can be associated with the provision of access to customers or the costs of an international switch can be associated with the provision of international calls. There are, however, costs that could be viewed as 'common' to a number of services that cannot be allocated on a causative basis. For example, the costs associated with running regulatory departments, legal departments, administration, human resources and the Chief Executive's office. To ensure recovery of these common costs, under the FAC method, these are normally allocated to the respective service on the basis of either output, gross revenues, or the direct costs of each service.

Although FAC (for the purposes of interconnect and access charging) ensures that all costs are recovered, the procedures for deriving and agreeing the costs is complex. The process for calculating FAC is heavily reliant on information that the incumbent dominant operator supplies the regulator. 'Strategic' cost allocations, by the incumbent operator, can allow it to raise competitors' costs and so keep them at a permanent cost disadvantage. These 'strategic' cost attribution procedures can be very intricate and complex and so regulatory scrutiny of them can be difficult. Another difficulty of using FAC is that many costs cannot be allocated on a causative basis and so must be attributed using a particular rule ie the output, gross revenues, direct costs of each service etc. However, changing the rule can substantially change the results. Given the criticisms on FAC, many have suggested that the use of FAC for interconnect and access services is inefficient. Consequently, in recent years discussions about the relevant cost standard for setting interconnection and access charges has shifted towards incremental or marginal costs.

2.14.2 Marginal and incremental costs

Marginal costs represent the forward looking costs associated with the provision of an additional unit of output of any particular good or service. Hence the marginal cost of access would be the costs associated with attaching a new subscriber to the local loop and the marginal cost of a long distance call would be the marginal costs of local conveyance at both ends, the marginal cost of switching and the marginal cost of long distance conveyance.

Economic theory generally suggests that prices should reflect marginal cost. When a firm decides whether it should increase or decrease output, the firm looks to the incremental effects on revenues and costs. If it priced below marginal cost, the firm would be better off by ceasing production entirely as it would be incurring losses on every item produced and if price was above marginal cost, it would be better off by producing more until such time that prices and marginal cost were equated.

There are two basic types of marginal cost: Short Run Marginal Cost (SRMC) and Long Run Marginal Costs (LRMC):

- SRMC reflect the costs that occur when a unit of output is changed when only some inputs can be varied. Those that cannot be varied therefore represent fixed costs and are not included in the calculation of SRMC.
- LRMC reflect the costs that occur when a unit of output is changed when all inputs can be varied. Hence product specific costs that can be efficiently varied with marginal changes in output over the long run are included in the calculation of LRMC.

LRMC is often considered a better measure than SRMC for regulatory purposes. The reason is because if a company is producing at capacity, increasing output by one unit could mean significant levels of SRMC, whereas when it is not producing at capacity SRMC can be negligible. SRMC is quite 'lumpy' depending on when the demand change is assumed to occur. In contrast, because LRMC reflects the costs that occur when all inputs can be varied in response to a sustained demand change, this 'lumpiness' can be smoothed out. As such, it can provide better signals to consumers and the market.

LRMC is however rather difficult to calculate in practice. Inputs (such as staff, vehicles, and machines) can only be sensibly varied in larger discrete amounts in response to variations in much larger volumes of outputs (and not just an additional unit of output). Consequently, in practice, the increment of output considered is often much larger and the cost calculated is long run incremental costs (LRIC). This is defined as the cost of adding an increment of output. The size of the increment can either be small (perhaps a 5 per cent change in the volume of a service) or large—consisting of a whole service or a group of services. So for example, the incremental cost of long distance calls is the extra costs of providing all long distance calls given the availability of access expressed on a per unit basis. Thus with the same output increment, marginal and incremental costs may be the same.

Marginal and incremental costs can be calculated in two ways. The first, known as 'bottom-up' cost modelling involves the construction of an engineering/economic model of an optimal telecommunications network. The idea is to design and cost an efficient network which can meet any given set of demands.[76] By changing certain demand parameters for individual services, it is then possible to calculate the marginal or incremental costs of that service. The alternative approach, known as 'top-down' cost modelling, starts from the incumbent's management accounts

[76] The bottom-up model in designing an optimal communications network rather than the actual network in place removes the margin of inefficiency implicit in most incumbent's network thereby allowing only efficient costs to be recovered through interconnect charges.

or fully allocated costs. The first step involves (where necessary) re-valuing the assets on the basis of their replacement (or current) costs (see Section 2.7). The non-incremental costs such as non-attributive 'common' costs are then removed from the accounts and the remaining costs are used to calculate the incremental costs of service on a per unit basis.

It is normal for both methods to be used in determining incremental or marginal costs. The reason is that the two models act as an auditing mechanism for each other. Each has strengths and weaknesses that ensure that the reconciliation between the two models allows for only relevant costs to be recovered. If the NRA relied exclusively on the top-down model derived from the fully allocated costs of the incumbent, the resulting incremental costs could lead to a skewed outcome in favour of the incumbent where inefficiencies in the incumbent's cost structure could be passed on to competitors in interconnection and access charges. The bottom-up model has the important advantage of being derived in an open and transparent way but because it is based on a theoretically efficient network rather than the actual network in place, the assumptions underpinning the model may be unrealistic. As a consequence, the use of both models yields advantages and allows the regulator to scrutinize more closely the cost structure of the incumbent operator.

2.14.3 Mark-ups for common cost recovery

Incremental costs include only the costs that are caused by the provision of a defined increment of output. In other words, any shared costs between the defined increment of output and other services would be excluded. A large proportion of network costs and overheads are shared between products, and so the incremental cost incurred by a single given product using the network is likely to be low. However, where the increment includes a group of aggregated products, the incremental cost of this would include the costs shared between them but would exclude the shared costs between this group of aggregated products and other products.

If a firm bases its pricing decisions on LRIC estimates, which did not include common costs, this may leave the company with inadequate revenues to meet these shared costs. For this reason, where LRIC estimates are used for price setting purposes, it is fairly standard practice to mark-up LRIC by an amount considered appropriate to cover a reasonable proportion of common costs. As set out in Section 2.4, there are various methods of recovering common costs.

From an economic point of view, Ramsey pricing is often considered to be efficient. Ramsey pricing involves marking-up services where demand is not responsive to price. In other words, it involves varying the price to incremental cost ratio in inverse proportion to the elasticity of demand. The principle generally implies,

therefore, the highest mark-up for those services where customers are price insensitive.

The Ramsey pricing formula for calculating the mark-up depends strongly on the type of competition between the incumbent operator and its competitors, the relative sizes of the firms, the differences in the costs of supplying the final output and the cost of interconnection or access. The complexity of the information required to put Ramsey prices into practice means that at a practical level, it is difficult. The problems of estimating the various elasticities which are required in the Ramsey approach are considerable particularly when dynamic effects have to be factored in somehow. Therefore, whatever appeal the approach has at a theoretical level, in practice, pure Ramsey pricing is not often used.

Given the practical difficulties with Ramsey pricing, the alternative is to use an accounting rule to recover common costs. For example, if the common input was used to produce two separate, regulated services, one simple rule would be to split the common cost equally between the two services. An alternative rule is to recover common costs in proportion to the incremental cost of the two services. This method of allocating costs is known as the equal proportionate mark-up (EPMU) and is an approach that is often used in the calculation of fully allocated costs to cover 'common' costs. While these rules allow the firm to recover their common costs, they lack any of the theoretical economic justifications which, despite the practical problems associated with their implementation, Ramsey pricing at least partly possesses. It means therefore that the NRA needs to have a level of scrutiny to ensure that price signals are not distorted.

2.15 INTERCONNECTION AND ACCESS REGULATION IN THE UK

In light of the theoretical discussion above on interconnection and access, it is worth considering how the UK regulatory regime has dealt with this.

2.15.1 Fixed communications interconnection and access regulation in the UK

The history of interconnection and access regulation in the UK has been a long one and has evolved considerably taking account of changing market circumstances, but at the core have been the principles of economic regulation, discussed earlier. In this sub-section, the history of UK interconnection and access regulation is set out starting with a discussion of the approach that was taken when BT was privatized and ending with a discussion of Ofcom proposals from its recent Strategic Review of Digital Communications.

2.15.1.1 *Early days of interconnection and access regulation*

Given the structure of the market and the barriers to entry, a clear case for interconnection and access arose when Mercury was licensed for operation. BT had no incentive to provide interconnect to Mercury, but its licence stated that it had an obligation to interconnect. Nonetheless, the licence did not specify how the interconnect charges should be set. Consequently, from 1982 to 1984, BT played out an effective series of interconnection and access negotiations with Mercury that delayed Mercury's entry into the market. Given these obstacles, in early 1985 Mercury sought determination from Oftel. Over subsequent periods, BT had little interest in reaching agreement over interconnect and access services. It is only when forced to do so by the regulator on an annual basis, following the breakdown in commercial negotiations, that BT reluctantly supplied access to its 'bottleneck' services. It did not, however, ask Mercury for interconnect to enable BT customers to call those directly connected to Mercury's network. This, therefore, added an additional obstacle for Mercury's market entry as it meant that, given BT's dominance in the market, customers directly connected to Mercury had the inconvenience of requiring separate BT incoming lines if they wanted to receive calls from BT customers.

In June 1992, Oftel stipulated that detailed 'Accounting Separation' between BT's different businesses was necessary (as per model 1 in Table 2.3 above) for the continuing development of competition, and for public confidence that BT was not abusing its dominant position.[77] The application of accounting separation to BT's business was in the form of BT's 'retail' and 'network' arms. BT-Network was responsible for the sale of wholesale access and interconnect network services to all retailers including BT-Retail at non-discriminatory regulated prices, determined on an annual basis using the fully allocated costing approach outlined above. BT-Retail, in contrast, was responsible for selling on these services to final customers. Other results of the Accounting Separation process were a set of standard interconnection and access charges and a methodology for determining undue discrimination (in terms of BT's retail prices versus interconnection and access prices). Via this approach to accounting separation, some transparency was introduced into BT's costs. It is of course debatable quite how transparent any system based on BT's own accounts can be given the asymmetry of information that existed between Oftel and BT. This is one of the reasons why there was a strong lobby for a move to incremental costing.

[77] This policy is to be contrasted with the more radical policy in the US of structural separation of the RBOCs from AT&T. See Chapter 5.

2.15.1.2 *A new regime of network charge controls*

In 1996/97, the change in network costing from FAC, based upon historic cost accounts, to LRIC plus an EPMU mark-up, reflecting the replacement (or current) cost of capital assets, got underway. In addition, Oftel proposed a move away from the need of annual interconnection determinations and instead opted for a more flexible approach based on a network price cap.[78] Traditionally, the use of price caps were only used for retail services, Oftel, however, felt that the methodology for setting retail price caps could also be applied to network and wholesale prices.[79] This new approach marked a significant departure from the norm since in other countries NRAs were just starting to get more deeply involved in the direct regulation of interconnection and access.

In setting the network price cap, Oftel allowed BT to recover in its wholesale prices the incremental costs of providing the relevant service which included an appropriate return on capital and a proportion of common costs. The requirement for incremental cost measures provoked Oftel to develop, in conjunction with the industry, incremental cost models, both 'bottom-up' and 'top-down'. A detailed analysis of differences between the models led to a reconciliation which produced 'hybrid' figures as the best measure of the relevant incremental costs.

Given that under the new network charge controls, charges would no longer be determined annually but would be set by BT within the confines of network price caps, Oftel set a new framework of rules. These rules set out that BT's flexibility to set interconnection/access charges would depend upon the competitiveness of the relevant interconnection or access market. This kept regulatory intervention at a minimum and focused on areas where there was risk of abuse. In addition, like the retail price cap equivalent, the network charge control encouraged efficient investment unlike the annual determination process.

On the basis of this new framework of rules, Oftel proposed that from 1 October 1997 and ending in September 2001,[80] BT should be free to set the charges for competitive services, subject only to general competition legislation. For prospectively competitive services, BT would set charges subject to a safeguard cap of RPI + 0 % and for non-competitive services, BT would set charges within three network baskets, each subject to a charge cap formula of RPI – 8 per cent.

To allay fears from competitors that BT would manipulate charges for its own benefit, Oftel put in place guidelines setting out how it would deal with reasoned

[78] Network Charges From 1997, Oftel Consultative Document, December 1996, at <http://webarchive.nationalarchives.gov.uk/20040104233440/http:/www.ofcom.org.uk/static/archive/oftel/publications/1995_98/pricing/ncctitle.htm>.

[79] See Sections 2.6 and 2.7 for a discussion on the methodology for setting price caps.

[80] Oftel Statement, 'Network charges from 1997', May 1997, at <http://webarchive.nationalarchives.gov.uk/20040104233440/http:/www.ofcom.org.uk/static/archive/oftel/publications/1995_98/pricing/ncct797.htm>.

complaints on BT's charges. In particular, it set out that anti-competitive behavioural investigations would normally involve the comparison of the tariff for a particular service with its cost estimates, with the use of price floors and ceilings playing a significant role in the investigation. If prices were below price floors: set at incremental costs, then (subject to there being no objective justifications) prices may be predatory. In contrast, if prices were above price ceilings: set at the standalone cost[81] of providing the particular service in question, then it could indicate excessive prices in the marketplace.

During 2000, Oftel began its review of the future structure of the network charge controls and, in February 2001, concluded that competition had not increased sufficiently to remove the controls introduced in 1997.[82] Oftel determined therefore that new charge controls should be introduced which ran from 1 October 2001 to 30 September 2005. Again, like the previous controls, these were based on the extent of competition in the relevant interconnection and access market. As before, Oftel concluded that controls should not be applied to competitive services. For new interconnection services, however, Oftel proposed to retain the power to 'charge control' new services before they are introduced or after their introduction. For prospectively competitive services, Oftel concluded that the 'safeguard' cap of RPI + 0 per cent should be maintained. However, the expectation was that competition rather than the safeguard cap would be the binding constraint on the charges for these services. In the case of non-competitive services, Oftel concluded that interconnection and access services should continue to be subject to charge controls. Oftel proposed however that they should be grouped into five 'baskets of services' rather than the previous three with each basket having a different value of 'X'. These groupings took account of the prospects for competition and were set in a way to ensure that BT would not have too much flexibility to act on its incentive to price its services in a way to thwart competition.

2.15.1.3 *The early days of local loop unbundling (LLU)*

At the same time as the network charge controls review, Oftel was also considering how to implement an EU Regulation, which made it compulsory, from 2 January

[81] Standalone costs refer to the costs that would be incurred by an efficient entrant if it were to decide to produce only a specified set of commodities, e.g. access lines or call minutes. There are generally significant common costs associated with access lines and minutes. These costs would be incurred regardless of whether only one service is supplied. This means that the standalone costs of a particular service would be significantly higher than the incremental cost of that same service.

[82] For more information see, (1) Price Control Review—Possible Approaches for Future Retail and Network Charge Controls, Consultation March 2000; (2) Price Control Review, Consultation October 2000; (3) Proposals for Network Charge and Retail Price Controls from 2001. (February 2001). These are available at <http://webarchive.nationalarchives.gov.uk/20040104233440/http:/www.ofcom.org.uk/static/archive/oftel/publications/>.

2001, for BT to meet reasonable requests for unbundled access to the local loop.[83] The aim of the Regulation was to address the lack of competition on the local network where incumbent operators continued to dominate the market for voice telephony services and high-speed internet access. By allowing entrants access to the incumbent's local loop (rather than expecting them to build their own local loop), the Commission believed that increased competition in this area would allow higher bandwidth services such as high speed always on internet access and video on demand to develop more rapidly. Further, they believed that increased competitive pressure in this area could lead to a wider range of services for consumers and better value for money.

In May 2000, Oftel published a consultation document proposing prices for operators leasing unbundled loops.[84] The key pricing principles were that the price of the loop would be cost oriented, the starting charges would be geographically averaged, and that BT should be able to recover the costs associated with setting up co-location facilities. On 29 December 2000, Oftel published the final wholesale prices to be applied until 31 March 2002 and suggested that in April 2002, it would introduce an RPI – X cap on the charges.[85] In March 2002, Oftel concluded that the market for the provision of LLU services had not developed as quickly as originally anticipated. However, being aware of the forthcoming European Directives, it decided to roll over the price controls from December 2000 and said that it would review in early 2003.

2.15.1.4 *The increasing importance of leased lines regulation*

In making provision and setting wholesale prices for LLU, Oftel mandated a form of unbundling in which BT made local access lines available as leased circuits to other operators.[86] Wholesale leased lines had previously not been subject to regulation let alone a price control. The effect of the LLU regulations meant however that leased lines became more important in facilitating delivery of higher bandwidth services to consumers and SMEs. The European Commission recognized the increasing importance of competition in leased lines and in July 1999, the

[83] Regulation (EC) No 2887/2000 of the European Parliament and of the Council of 18 December 2000 on unbundled access to the local loop, OJ L 336/4, 30 December 2000.

[84] Oftel, 'Access to Bandwidth: Indicative prices and pricing principles', 2006, at <http://webarchive.nationalarchives.gov.uk/20040104233440/http:/www.ofcom.org.uk/static/archive/oftel/publications/broadband/llu/llu0500.htm>.

[85] Oftel, 'Determination under Condition 83.16 of the Licence of British Telecommunications Plc relating to the charges for the provision of metallic path facilities and associated internal tie circuits', 2000, at <http://webarchive.nationalarchives.gov.uk/20040104233440/http:/www.ofcom.org.uk/static/archive/oftel/publications/broadband/llu/llup1200.htm>.

[86] Leased lines are permanently connected communications links that are used by business and other operators for services such as voice and data traffic and internet access.

Competition DG of the European Commission opened a formal sector inquiry into the price of leased lines across the EU. In November 1999, the Commission expressed its concern in a draft Recommendation that despite the fact that the provision of leased line services had been liberalized in Europe since 1 July 1996, competition was slow to develop. The Commission issued 'recommended price ceilings' for leased line interconnection services.

At the same time, Oftel began its review of national leased lines. In August 2000, Oftel consulted on the state of competition in both the relevant retail and wholesale markets for national leased lines. Oftel found that competition was not effective in the retail market resulting in prices higher than they would be in a competitive market. Its analysis suggested that the reason for the lack of effective competition in retail leased lines was the lack of effective competition in the wholesale market. In 2001, Oftel proposed therefore to require BT to provide wholesale leased lines at all digital bandwidths on non-discriminatory terms and at cost-oriented prices.[87]

Oftel expected BT to negotiate with operators but stated that if prices could not be agreed then it would set prices, taking into account the extent of competition for the service. If the service was effectively competitive or moving towards a competitive market structure, Oftel said it would interpret the requirement for cost orientation as meaning any price between the long run incremental cost (LRIC) floor and standalone cost (SAC) ceiling, subject to any relevant combinatorial and non-discrimination tests also being satisfied. If, by contrast, the relevant economic market was not effectively competitive, Oftel would be inclined to interpret the cost orientation requirement to mean that prices should be set on a LRIC basis with some allowance for common cost recovery.

Following this direction from Oftel, BT began offering wholesale leased circuits in August 2001, although take-up was low because operators had concerns about BT's applicable terms and conditions. To boost the development of broadband in the business market, in 2002 Oftel announced a two-phase review. The first phase directed BT to make a number of improvements to its wholesale leased line products to promote greater take-up of the products by other operators.[88] The second phase review, completed in December 2002[89] considered pricing and service level agreements. The conclusion of this review was that Oftel set prices for

[87] It maintained safeguard caps on analogue retail leased lines since the competitive pressures created by its wholesale policy options were likely to stimulate sufficient retail competition to constrain retail prices for all other services.

[88] Oftel, 'Phase 1 direction to resolve a dispute concerning the provision of partial private circuits', 2002, at <http://webarchive.nationalarchives.gov.uk/20040104233440/http:/www.ofcom.org.uk/static/archive/oftel/publications/broadband/leased_lines/ppcs0602.htm>.

[89] Oftel, 'Partial Private Circuits, Phase Two—a Direction to resolve a dispute concerning the provision of partial private circuits', 23 December 2002, at <http://webarchive.nationalarchives.gov.uk/20040104233440/http:/www.ofcom.org.uk/static/archive/oftel/publications/broadband/leased_lines/ppc1202/direction.htm>.

leased lines that were considerably lower than BT charges (typically 50 per cent lower for connection and 20 per cent lower for rental). Further, it backdated these charges to the launch of the products, which meant that BT had to provide considerable refunds to operators. In addition, Oftel confirmed a number of improvements for BT to make to its service level agreement. These improvements included BT paying compensation to other operators in the event of late delivery.

2.15.1.5 *Implementation of the European Directives*

The EU's New Regulatory Framework[90] in 2002 required NRAs to carry out reviews of competition in communications markets, which Oftel carried out in accordance with the guidelines set out by the Commission.[91] In most of the market reviews, where SMP was found, Oftel put in place charge controls based on RPI – X to constrain BT's ability to exploit its market power. These controls were often set on multiple baskets with sometimes a number of sub-caps being imposed. This was to prevent BT from rebalancing its charges in a way which undermined competition. Oftel did not however solely rely on using RPI – X. In the case of LLU services, Oftel concluded that LLU services should be charged on a LRIC plus EPMU basis. In addition, it imposed charge ceilings for a number of LLU services to prevent BT from increasing charges in a way that undermined competition. It deferred however setting the charge ceiling for the fully unbundled rental charge because a high proportion of the total cost of this charge is determined by the cost of laying and maintaining the copper loop, the costs for which Ofcom was in the process of reviewing.

In the wholesale broadband market review, (unlike in other markets) Oftel/Ofcom was reluctant to impose cost-based pricing because it feared that doing so could deter investment in broadband technologies. Broadband was still an emerging technology so there was a high degree of uncertainty on costs, and the timing of cost recovery and the appropriate rate of return. As such, Oftel/Ofcom proposed that access should be priced on a 'retail minus' basis. This pricing approach does not set the absolute level of the charges, but requires that a margin exists between the relevant wholesale charges and the relevant downstream prices (ie the prices of retail and intermediate products) which covers the necessary additional costs of providing the downstream products. This allows other providers to purchase access services and compete effectively against the regulated firm's downstream arm by ensuring that no margin squeeze takes place. Retail minus should in principle guarantee that no discrimination takes place

[90] See Chapter 4.

[91] Oftel EU directive implementation, at <http://webarchive.nationalarchives.gov.uk/20040104233440/http:/www.ofcom.org.uk/static/archive/oftel/publications/eu_directives/index.htm>.

between independent service providers and the service providers of the operators with market power, while allowing for the regulated firms to set charges according to their commercial judgment.

2.15.1.6 *The evolution of economic regulation since the Telecoms Strategic Review*

As noted earlier, the TSR was designed to set the strategic direction for Ofcom's activities in relation to telecoms. The TSR was launched in response to a number of perceived problems:

- There were enduring economic bottlenecks (as a result of economies of scale and scope) in fixed telecoms preventing effective and sustainable end-to-end competition;
- The competition that had delivered benefits to consumers to date might not have been sustainable going forward; there were limited scale competitors in both residential and business markets and LLU had been ineffective as a means of promoting competition in broadband;
- Companies who wished to compete had to rely on BT for access to parts of the network where competition was not sustainable and there were on-going concerns about non-price discrimination;
- There was a need to promote timely and efficient investment in emerging technologies and platforms as existing copper switched networks became due for replacement.

The TSR led to the implementation of two main interventions. The first involved a renewed focus on and increased use of LLU. Given the scale and scope economies in networks, there was a recognition that it would be difficult to get multiple competing networks so the aim was to encourage the number of competitors to BT in residential telecoms services via access regulation. By using charge controls, this promoted market entry by scale competitors to BT who invested in installing equipment and backhaul in local telephone exchanges, while maintaining the opportunity for BT to make a fair return. The second addressed the concerns about non-price discrimination. To ensure that competitors were granted access to infrastructure on an equal basis, two parallel interventions—equivalence of inputs and the organizational separation of BT—were imposed.

More generally, the TSR laid out seven principles for regulation to address the issues in the market at the time:[92]

[92] See para 1.25 of Ofcom, 'Strategic Review of Telecommunications Phase 2 Consultation', 2004 (link at n 43).

- Promote competition at deepest level where effective and sustainable;
- Focus regulation to deliver equality of access ie competitors should be treated the same as BT's downstream retail operations;
- Withdraw from regulation when competitive conditions allow;
- Promote investment and stimulate innovation;
- Different regulation for different products and different geographies;
- Create scope for market entry that can remove bottlenecks over time; and
- In the wider value chain, adopt a light-touch approach, and rely on competition law where possible.

Following the TSR and the removal of regulatory controls in retail services, Ofcom undertook market reviews following the economic principles outlined above. These reviews essentially covered the following:

- *Wholesale narrowband*—ie the services in the network charge controls, such as wholesale call termination, wholesale call origination, wholesale fixed analogue exchange lines, and wholesale ISDN30 and ISDN2 lines;
- *Wholesale local access*—ie fixed telecommunications infrastructure; the physical connection between a home or business and the local telephone exchange/street cabinet. This connection is needed to support fixed line services such as voice calls and broadband internet access;
- *Wholesale broadband access*—ie wholesale broadband products that communications providers provide for themselves and sell to each other and are one of the building blocks of the retail broadband offers that consumers buy. The wholesale broadband access market sits between the retail broadband market, which relates to the products that consumers buy, and the wholesale local access market, which relates to the access connection between the consumer and the network;
- *Business connectivity*—this concerns the retail provision of leased lines and wholesale provision of terminating segments and trunk segments in the UK.

Below we consider each of them in turn and set out how economic regulation has evolved in these markets since the TSR.[93]

Wholesale narrowband market reviews Following the TSR, in 2005[94] Ofcom completely deregulated inter-tandem conveyance and inter-tandem transit—by removing charge controls and all other regulations. This followed Ofcom's finding that BT no longer had SMP in these markets. Furthermore, it loosened regulation

[93] See also Chapter 8, at Section 8.5.

[94] Ofcom, 'Explanatory Statement and Notification of decisions on BT's SMP status and charge controls in narrowband wholesale markets', 2005, at <http://webarchive.nationalarchives.gov.uk/20160702162827/http:/stakeholders.ofcom.org.uk/consultations/charge/statement/>.

by moving BT's charge control on local-tandem conveyance to a 'safeguard cap' that limited charge increases for that service to below inflation. This was to take account of the prospects of competition in this segment. On the non-competitive baskets, Ofcom disaggregated the baskets into eight non-competitive baskets—each with a different value of 'X'. Further, for most of the non-competitive baskets, the value of 'X' was reduced in comparison with the previous controls. This approach ensured that controls were focused on areas that required regulation. In addition, the disaggregation of baskets meant that while BT had some flexibility within the baskets to recover its costs, it was not too flexible to allow it to act on its incentive for anti-competitive pricing.

In 2009,[95] the value of 'X' set for call termination and call origination by Ofcom was reduced even further in comparison with the previous controls. However, as part of the 2009 review,[96] given the increasing usage of LLU and the conclusion from the TSR, Ofcom set a specific obligation on BT to supply analogue wholesale line rental (WLR)[97] and subsequently set a charge control until 2014 for this product.[98] In 2014, Ofcom conducted a market review of the fixed access market[99] and put in place new controls.[100] In addition, to address concerns of a continued decline in Openreach's performance in provisioning and repairs, Ofcom imposed mandatory minimum quality of service (QoS) obligations on BT. In particular, it applied minimum standards to the provisioning and repair of some of the wholesale products that communications providers (CPs) purchase from Openreach to offer broadband and telephony products to consumers and small businesses.

In 2013, Ofcom concluded that wholesale call termination rates should be based on pure LRIC and that wholesale call origination rates should be based on LRIC+[101]

[95] Ofcom, 'Review of BT's network charge controls, statement', 2009, at <http://webarchive.nationalarchives.gov.uk/20160702162827/http:/stakeholders.ofcom.org.uk/consultations/review_bt_ncc/statement/>.

[96] Ofcom, 'Review of the fixed narrowband services wholesale markets: Consultation on the proposed markets, market power determinations and remedies', 2009, at <http://webarchive.nationalarchives.gov.uk/20160702162827/http:/stakeholders.ofcom.org.uk/binaries/consultations/review_wholesale/summary/fnwm.pdf>.

[97] WLR stands for Wholesale Line Rental. It is a facility which allows alternative providers to rent access lines on wholesale terms from BT, and resell the lines to customers, providing a single bill that covers both your line rental and calls.

[98] This charge control comprised of three baskets: WLR Rental with a cap of RPI – 7.3%; WLR transfer with a cap of RPI and WLR new connection with a cap of RPI – 10.2%. This control applied from on 1 April 2012 until 1 April 2014.

[99] Ofcom, 'Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30: Consultation on the proposed markets, market power determinations and remedies', 2013, at <https://www.ofcom.org.uk/__data/assets/pdf_file/0033/76497/fixed-access-markets.pdf>.

[100] Ofcom, 'Fixed access market reviews: Approach to setting LLU and WLR Charge Controls', 2013, at <https://www.ofcom.org.uk/consultations-and-statements/category-1/llu-wlr-cc-13>.

[101] As set out in Section 2.14, pure LRIC is the cost of adding an increment of output. LRIC+, in contrast includes an EPMU mark-up for common cost recovery.

with effect from 1 January 2014. This meant that common costs should no longer be required from wholesale call termination and instead operators would need to recover common costs from other services (ie origination services). This followed an EU Recommendation in 2009[102] that termination charges should be based on pure LRIC and also the fact that mobile call termination was based on pure LRIC.

Wholesale local access (WLA) market reviews Ahead of the publication of Ofcom's review of the cost of laying and maintaining the copper loop,[103] BT voluntarily reduced the fully unbundled rental charge on 1 August 2005 from £105.09 to £80.00. However, despite BT's charge reduction, Ofcom still considered it appropriate to set a ceiling for this charge to ensure that BT would not be able to subsequently increase it to an excessive level. As such, using an agreed costing approach, Ofcom set the fully unbundled rental charge ceiling at £81.69, which took effect from 1 January 2006.[104]

In 2010, Ofcom conducted another review of the wholesale local access market.[105] A number of developments had occurred since the previous market review. In particular, commercial investments in next generation access (NGA) networks had resulted in super-fast broadband being made available to nearly half of all UK households. However, competition in the provision of super-fast broadband services remained in its infancy. Ofcom found that BT continued to have SMP in the UK market for WLA services, and concluded that access to BT's local access network remains critical for those companies seeking to compete in the delivery of downstream services such as broadband and traditional voice services. Ofcom recognized though that to support the future development of the market, the regulatory framework needed both to promote competition at the access level and to support continued investment and innovation. Accordingly, it imposed a number of regulatory obligations on BT, designed to support investment and competition in super-fast broadband, as well as in current generation services. The new regulatory model relied on the following core elements:

[102] Commission Recommendation (2009/396/EC) on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU, OJ L 124/67, 25 May 2009.

[103] Ofcom, 'Valuing copper access: Final statement', 2005, at <http://webarchive.nationalarchives.gov.uk/20160702162827/http:/stakeholders.ofcom.org.uk/binaries/consultations/copper/statement/statement.pdf>.

[104] Ofcom, 'Local loop unbundling: setting the fully unbundled rental charge ceiling and minor amendment to SMP conditions FA6 and FB6', 2005, at <http://webarchive.nationalarchives.gov.uk/20160702162827/http:/stakeholders.ofcom.org.uk/binaries/consultations/llu/statement/llu_statement.pdf>.

[105] Ofcom, 'Review of the wholesale local access market: Statement on market definition, market power determinations and remedies', 2010, at <http://webarchive.nationalarchives.gov.uk/20160702162827/http:/stakeholders.ofcom.org.uk/binaries/consultations/wla/statement/WLA_statement.pdf>.

- Virtual Unbundled Local Access (VULA): This allows competitors to deliver services over BT's new NGA network, with a degree of control that is similar to that achieved when taking over the physical line to the customer;
- Physical Infrastructure Access (PIA): This allows competitors to deploy their own NGA infrastructure between the customer and the local exchange, using BT's duct and pole infrastructure, to provide broadband and telephony; and
- LLU which continued to provide a basis for competition in current generation services, allowing competitors to physically take over (or share) BT's copper lines between the customer and the local exchange.

This regulatory framework set out that VULA would likely be attractive for communications providers where BT had already upgraded its local access network; PIA would be attractive to companies wishing to address market opportunities in advance of BT and may also be of interest to companies wishing to provide service in locations which may be in receipt of public funding support. The remedies were complemented by other measures such as Sub-loop Unbundling (SLU),[106] charge controls for LLU[107] but greater freedom for BT in the pricing of VULA services.[108] This greater freedom for BT was to account for the risk in investment and the initial small scale of adoption of NGA services. These remedies were therefore designed to promote access competition, protect customers, and balance the incentives for companies facing what remained risky investments.

In 2014, Ofcom carried out a further review of the WLA market and concluded that the core elements (set out above) continued to be important.[109] However, VULA was increasingly becoming an important input for CPs to provide NGA services in competition with BT and so Ofcom placed a requirement on BT to supply a VULA product to competitors who wanted it. Ofcom considered that, in the absence of such a requirement, BT would have an incentive and ability to refuse access at the wholesale level and so favour its own retail operations with the effect of hindering sustainable competition in the downstream market, ultimately against the interests of end-users. Ofcom did not however implement

[106] SLU allows originating communications providers (OCPs) to physically take over (or share) the part of BT's existing copper lines between a street cabinet and the customer premises. This remedy will allow OCPs to deploy fibre to the cabinet technology where they consider this to be economic.

[107] Ofcom, 'Charge control review for LLU and WLR services', 2012, at <http://webarchive.nationalarchives.gov.uk/20160702162827/http:/stakeholders.ofcom.org.uk/binaries/consultations/wlr-cc-2011/statement/statementMarch12.pdf>.

[108] Ofcom believed that by just controlling the prices of the copper remedies, this would act as a constraint on BT's pricing of VULA.

[109] Ofcom, 'Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30 Volume 1: Statement on the markets, market power determinations and remedies', 2014, at <https://www.ofcom.org.uk/__data/assets/pdf_file/0032/78863/volume1.pdf>.

cost-based charges because controls on current generation broadband continued to exert a constraint on VULA prices. This meant that consumers were protected but additionally pricing flexibility on VULA also provided BT with incentives to invest in NGA capacity. Ofcom noted however that there was a risk that with pricing flexibility, BT could manipulate the VULA price relative to its own retail offering in a way that allowed it to distort competition to the detriment of consumers.

Therefore, in March 2015, Ofcom required BT to maintain a minimum VULA margin to enable an operator that has slightly higher costs than BT (or some other slight commercial drawback relative to BT) to profitably match BT's retail superfast broadband offers.[110] While Ofcom recognized that setting a minimum margin of this nature may mean that there is a short-term negative impact on efficiency (by allowing CPs with slightly higher costs than BT to compete) and with some risk that retail prices could be slightly higher than they ought to be, they considered that these potential impacts, even if they did arise, would likely be outweighed by the long term dynamic benefits of future competition.

Wholesale broadband access market reviews Competition in retail broadband services depends on service providers having access to wholesale broadband services or LLU to build their own services. Whilst Ofcom's approach to LLU was a key enabler of competition amongst LLU networks and meant that many consumers had a choice of provider, LLU is not economically viable on a national basis.[111] This meant that in some geographic areas there was no direct competition between broadband networks. In these areas Ofcom put in place regulation at the wholesale level to ensure that consumers can choose between differing retail offers. Conversely, in areas which benefitted from competition between networks, Ofcom sought to remove unnecessary regulation.

Geographically varied LLU competition meant that for wholesale broadband access, there were four distinct geographic markets in which competitive conditions within each were broadly similar:

- those geographic areas covered by exchanges where KCOM is the only operator ('the Hull area');
- those geographic areas covered by exchanges where BT is the only operator ('Market 1');

[110] Ofcom, 'Fixed access market reviews: Approach to the VULA margin', 2015, at <https://www.ofcom.org.uk/__data/assets/pdf_file/0015/72420/vula_margin_final_statement.pdf>.

[111] Ofcom, 'Review of the wholesale broadband access markets 2006/07', 2007, at <http://stakeholders.ofcom.org.uk/consultations/wbamr07/summary>.

- those geographic areas covered by exchanges where there are two or three principal operators AND exchanges where there are four or more principal operators but where the exchange serves fewer than 10,000 premises ('Market 2'); and
- those geographic areas covered by exchanges where there are four or more principal operators and where the exchange serves 10,000 or more premises ('Market 3').

Ofcom found KCOM had SMP in the Hull area[112] and that BT had SMP in Market 1 and, separately, in Market 2. However, because of the rapidly changing competitive conditions Ofcom found that no operator had SMP in Market 3 on a forward-looking basis. In light of its SMP assessment, Ofcom directed BT to provide access on non-discriminatory terms and to publish a reference offer. Separate to this review, BT also made certain pricing commitments to the industry and Ofcom. In particular, it committed to reducing the price of its wholesale broadband services, in all parts of the UK, year-on-year until the end of 2010. BT also committed to supply wholesale broadband services and to not unduly discriminate, in all parts of the UK, until the end of 2008 and it committed to provide a period of stability for LLU by not introducing geographically targeted reductions, below a certain level, to its wholesale broadband prices.

In 2010, Ofcom completed another review of the wholesale broadband access market.[113] Ofcom found that there was effective competition in almost 80 per cent of the UK. However, in just over one-fifth of the UK—covered by what it called Market 1 and Market 2—it concluded that there was not sufficient competition. Market 1 was made up of exchange areas in which BT was the only provider of wholesale broadband services, whereas Market 2 comprised of exchange areas with two significant providers or with three significant providers where BT's market share was 50 per cent or more. For Market 1, Ofcom decided that BT should be subject to a charge control.[114] The charge control was imposed on the main product used by competitors and so Ofcom believed that charge controlling this product directly protected most consumers in Market 1 and constrained BT from excessive charging on the other products available in Market 1. The charge control took the form of RPI – 12.00 per cent with a duration until 31 March 2014. In addition, Ofcom set a number of RPI – 0 per cent sub-caps for a number of services within the basket, to

[112] Hull is an area in the UK, which is not served by BT but instead is served by KCOM Group (formerly known as Kingston Communications).

[113] Ofcom, 'Review of the wholesale broadband access markets: Statement on market definition, market power determinations and remedies', 2010, at <https://www.ofcom.org.uk/__data/assets/pdf_file/0028/37666/wbastatement.pdf>.

[114] Ofcom, 'WBA charge control: Charge control framework for WBA Market 1 services', 2011, at <http://stakeholders.ofcom.org.uk/binaries/consultations/823069/statement/statement.pdf>.

ensure that charges for these services did not increase in real terms over the charge control period.

In 2014, Ofcom completed the next review of the wholesale broadband access market.[115] Taking account of market and competitive developments, it defined three distinct markets: Market A—where no more than two operators are present or forecast to be present, which accounts for 9.5 per cent of UK premises; Market B—in which there is effective competition, accounting for 89.8 per cent of premises; and the Hull Area—0.7 per cent of UK premises, where KCOM is the only significant provider. According to Ofcom, Market A tends to be in the most rural and remote parts of the country. As Ofcom found effective competition in Market B, it did not impose regulation in that market and removed regulation in those parts of Market B where there was currently regulation—approximately 12 per cent of UK premises. In Market A, where it found BT to have SMP, it implemented a charge control at a level of CPI-10.7 per cent until 31 March 2017.[116]

Business connectivity market reviews (BCMR) In 2008, Ofcom conducted a review of the leased lines markets. It concluded that additional bandwidth categories should be defined for very high bandwidth traditional interface (TI) and high bandwidth alternative interface (AI) circuits, over and above those identified in 2004. On a geographic basis, it concluded that separate geographic markets for wholesale leased lines exist in the Hull area. In the rest of the UK, it found the markets to be national in scope, with two exceptions. The exceptions related to the markets for high bandwidth and very high bandwidth traditional interface symmetric broadband origination[117] (TISBO). In these cases, it found that separate geographic markets existed in a newly defined Central and East London Area (CELA), and the rest of the UK (excluding Hull). Having defined the relevant product and geographic markets, it then found that in the UK (excluding Hull), BT had SMP in all markets except in the markets in CELA. Accordingly, it decided that the previous charge controls should be extended to cover low bandwidth alternative interface symmetric broadband origination (AISBO) and TI trunk services, in addition to low and high bandwidth TISBOs.[118] Ofcom was intending to set the new charge controls to start when the old

[115] Ofcom, 'Review of the wholesale broadband access markets: Statement on market definition, market power determinations and remedies', 2014, at <http://stakeholders.ofcom.org.uk/binaries/consultations/review-wba-markets/statement/WBA-Statement.pdf>.

[116] In January 2013, the Office of National Statistics (ONS) announced the outcome of its October 2012 consultation on RPI. The ONS concluded that the RPI 'does not meet international standards …'. In light of this, Ofcom has decided to use CPI as the standard measure of inflation in its charge controls.

[117] Transmission of voice and of data and data transmission is symmetrical when upload speeds are the same as download speeds.

[118] Ofcom, 'Leased lines charge control—Statement', 2009, at <http://webarchive.nationalarchives.gov.uk/20160702162827/http://stakeholders.ofcom.org.uk/consultations/llcc/statement/>.

ones expired. However, due to some accounting amendments that BT made to its regulatory accounts, which required detailed independent scrutiny ahead of setting the new charge controls, it had to delay the start of the charge controls. As such, whilst the review of BT's accounts was taking place, it sought a commitment from BT that it would not increase prices in nominal terms and that the charge control would be backdated to 1 October 2008. In 2009, Ofcom set a charge control comprising of six baskets with a number of sub-caps and other safeguards to reduce the likelihood of undue price discrimination. These charge controls ran until 2012 at which point, Ofcom conducted another BCMR.[119] The main difference between the 2013 review and that carried out in 2008 was:

- There were separate markets identified for regional and national TI trunk connectivity. In the previous review of the market Ofcom defined a single TI trunk market;
- Ofcom defined a wholesale multiple interface (MI) market which included any service faster than 1Gbit/s and any service delivered with wavelength-division multiplex (WDM)[120] equipment at the customers' premises, irrespective of bandwidth and interface; and
- Ofcom determined that separate geographic markets existed (i) in the Hull area for all wholesale leased lines, and (ii) in a defined area of London and including Slough (the Western, Eastern, and Central London Area, or WECLA) for all the defined wholesale symmetric broadband origination product markets other than the low bandwidth (up to and including 8Mbit/s) and very high bandwidth (622Mbit/s) TISBO markets.

Based on these revised market definitions, Ofcom found that BT had SMP in the AI, TI, and MI markets. It found though that the WECLA and very high bandwidth TISBOs were competitive. Ofcom also found BT to have SMP in regional trunk TI segments. In response to these SMP findings, Ofcom put in place a charge control with a duration of three years until 2016 with several sub-caps and safeguard caps comprising of two separate service baskets for wholesale services:

- TI at RPI + 2.25 per cent—covering low, medium, and high bandwidth services outside the WECLA, low bandwidth services within the WECLA, and regional trunk services at all bandwidths; and

[119] Ofcom, 'Business Connectivity Market Review', 2013, at <http://stakeholders.ofcom.org.uk/consultations/business-connectivity-mr/final-statement/>.

[120] This technology can multiply by several times the bandwidth transmissible in an optical fibre. WDM equipment allows providers to aggregate traffic from different services and to use optical fibres efficiently in the core of their networks as demand for bandwidth continues to increase.

- Ethernet at RPI – 11.50 per cent—covering and including Ethernet services up to and including 1Gbit/s outside the WECLA and Ethernet services above 1Gbit/s outside the WECLA;
- AISBO at RPI – RPI on each relevant service—covering AISBO services up to and including 1Gbit/s in the WECLA.

2.15.1.7 *Strategic review of digital communications and the future of economic regulation*
As set out above, ten years after the TSR, Ofcom launched a Strategic Review of Digital Communications (DCR). A key strand pertinent to fixed access regulation was however that given the increasing importance of digital communications services, there needed to be a strategic shift in the UK to large-scale investment in more fibre, a step change in quality of service, and a continued focus on removing unnecessary regulation.

To achieve this strategic shift to fibre, Ofcom set out that while competition (since the TSR) had focused on the provision of active[121] access products designed to give other communications providers the ability to compete effectively downstream with BT, it would now consciously consider the appetite for investment in fibre via either pole or duct access.[122] And to achieve the step change in quality, Ofcom said that it would set tough minimum quality requirements on Openreach with penalties when it fails to meet these standards. The normal market review process would be the vehicle to deliver these proposals.

Below we consider the market reviews since the DCR and how the conclusions from it have filtered into the different market reviews.

Wholesale narrowband market review Following the DCR, in 2016, Ofcom carried out a review of the markets comprising of wholesale fixed telephone lines, call origination, ISDN30, ISDN2, and call termination.[123] This review suggested that competition has delivered new services and increased choice to retail consumers. Therefore, Ofcom put forward proposals to significantly reduce the wholesale regulation that it applies to BT in these wholesale markets. These

[121] Active products include the physical elements of the network (ie duct, access to poles, copper, fibre) and the electronic equipment to provide service.

[122] ie Ofcom would now consider whether regulation should be based on passive products (just the physical elements of the network: duct, poles, copper, fibre) because in doing so, it may encourage competitors to invest in building competing networks to BT.

[123] Ofcom, 'Narrowband Market Review: Consultation on the proposed markets, market power determinations and remedies for wholesale call termination, wholesale call origination and wholesale narrowband access markets', 2016, at <https://www.ofcom.org.uk/__data/assets/pdf_file/0016/95011/Narrowband-Market-Review.pdf>.

proposals were the subject of a consultation with a final statement published in November 2017.[124]

The review did however find that there was a need for protection for fixed voice-only consumers (those who do not take broadband or other bundled services). As such, Ofcom commenced a separate review of retail fixed voice-only services (see Section 2.10).

Wholesale local access (WLA) market review Ofcom carried out a market review of WLA between March 2017 and March 2018. As in the previous review, Ofcom found BT to have SMP and so required BT to continue to provide access to LLU and VULA (amongst other services).[125] It additionally decided to include a direction-making power enabling Ofcom to set appropriate quality of service standards on BT. It imposed a cost-based charge control on the main form of LLU[126] (MPF) and the supporting services used by BT's competitors (referred to as ancillary services) but it removed the specific network access obligation and charge control on SMPF. In setting a cost-based control, it said that it would seek to allow BT the opportunity to recover the costs of network deployment, to the extent such costs are efficiently incurred. In other words, if there were costs incurred in network expansion that provide customers with an improved quality of broadband service, then these should be considered in setting those controls.

Ofcom recognized in the review that the PIA remedy it had imposed in 2010 suffered from some limitations. This meant that there had been limited take-up of PIA to date in the UK. To make it easier and more cost effective for telecoms providers to invest in advanced, competing infrastructure (in line with the conclusion of the DCR), in December 2016 and April 2017 Ofcom published proposals to develop an effective remedy for access to BT's ducts and telegraph poles, which were finalized in February 2018.[127, 128, 129] These proposals are aimed to address concerns from BT's

[124] Ofcom, 'Narrowband Market Review', 30 November 2017, at <https://www.ofcom.org.uk/__data/assets/pdf_file/0020/108353/final-statement-narrowband-market-review.pdf>.

[125] Ofcom, 'Wholesale Local Access Market Review—Statement—Volume 1—Markets, market power determinations and remedies', 2018, at <https://www.ofcom.org.uk/__data/assets/pdf_file/0020/112475/wla-statement-vol-1.pdf>.

[126] There are two forms of LLU—Metallic Path Facility (MPF) and Shared Metallic Path Facility (SMPF). MPF allows providers to offer both voice and broadband services. SMPF allows providers to offer only broadband services over the copper network. This means that one provider can provide broadband services to the customer while another provider supplies voice services on the same line.

[127] Ofcom, 'Wholesale Local Access Market Review: Initial proposals to develop an effective PIA remedy', 2016, at <https://www.ofcom.org.uk/__data/assets/pdf_file/0024/95109/Wholesale-Local-Access-Market-Review.pdf>.

[128] Ofcom, 'Wholesale Local Access Market Review: Consultation on duct and pole access remedies', 2017, at <https://www.ofcom.org.uk/__data/assets/pdf_file/0008/101051/duct-pole-access-remedies-consultation.pdf>.

[129] Ofcom, 'Wholesale Local Access Market Review: Statement—Volume 3: Physical infrastructure access remedy', 2018, at < https://www.ofcom.org.uk/__data/assets/pdf_file/0023/112469/wla-statement-vol-3.pdf>.

competitors about the absolute costs and time required to build ultrafast broadband networks at scale. Following consultation of the proposals, a final decision was published in March 2018.

As regards VULA, while in previous reviews, there had been no explicit pricing controls (to encourage investment), this time around, Ofcom said that the controls of standard broadband services were unlikely to sufficiently constrain BT's superfast broadband prices over the period of this market review.[130] Consequently, it said that there was a significant risk that retail competition would be weaker and consumers would face considerably higher prices if there was no control on VULA pricing. In striking a balance between protecting consumers and competition in the short term while encouraging network investment, it concluded therefore that for the lower bandwidth VULA product, BT's prices should be subject to a charge control rather than the VULA margin test (it set in 2015—see WLA discussion in Section 2.15.1.6). However, it stated that BT would continue to have pricing flexibility on other higher bandwidth variants of VULA but because there are controls on the lower bandwidth service, it should provide sufficient protection to superfast broadband customers from the risk of higher prices, while allowing other telecoms providers to compete with BT for those customers as well as preserving BT's incentives to invest.

Wholesale broadband access market review As set out above, the wholesale broadband access market sits between the retail broadband market and the WLA market. Given that remedies in the WLA market are still under consultation, it became clear that given the linkages between the two markets, there would be delays in implementing new controls in WBA from April 2017 (when the controls expire). As such, Ofcom asked BT to make a voluntary price commitment to cover the period between the expiry of the current controls and the commencement of the new controls. In August 2016, BT committed to keep prices in Market A to a level of CPI-CPI to 31 December 2017. In June 2017, Ofcom issued provisional conclusions.[131] As in the previous review, it identified two markets: Market A where no more than two operators are present and Market B in which there is effective competition. Ofcom said that the size of Market A, where BT has SMP should reduce to 2 per cent of UK premises from the previous 9.5 per cent. Given these findings, Ofcom proposed not to put a charge control in place on any WBA services as it

[130] Ofcom, 'Wholesale Local Access Market Review: Statement—Volume 3: Physical infrastructure access remedy', 2018, at <https://www.ofcom.org.uk/__data/assets/pdf_file/0023/112487/wla-statement-vol-2.pdf>.

[131] Ofcom, 'Wholesale Broadband Access Market Review: Consultation on market definition, market power determinations and remedies', 2017, at <https://www.ofcom.org.uk/__data/assets/pdf_file/0013/103180/wba-consultation.pdf>.

considers that BT's retail national pricing and the level of competition in the rest of the country acts as a constraint to prevent consumers facing excessive retail prices in Market A.

Business connectivity market review (BCMR) In 2016, Ofcom again reviewed the BCMR.[132] Ofcom concluded that there were two relevant product markets:

- A single product market for Ethernet and wavelength-division multiplex (WDM)[133] services because there was evidence that a chain of substitution links all such services and they could all be provided using the same physical access infrastructure. They referred to this product market as contemporary interface (or CI) services. They found however that there were differences in competitive conditions between geographic areas and so defined distinct geographic markets in wholesale CI services in each of the Central London Area (CLA), London Periphery (LP), Hull, and the rest of the UK. Based on differences in competitive conditions, Ofcom concluded that BT has SMP in the LP and the rest of the UK and KCOM has SMP in Hull. In relation to the CLA, Ofcom determined that there would be a sufficient choice of alternative infrastructure to ensure that end-to-end users will be protected by effective and sustainable competition and that BT did not have SMP in the region; and
- a separate product market for TI services below 8 Mbits, because there is little prospect of competitive entry in the provision of these legacy products, whose volume is declining. Two geographic markets for TI services were found: one in the whole of UK except Hull where BT has SMP, and the other in Hull where KCOM has SMP.

Based on these SMP findings, unlike in previous reviews, Ofcom decided that they would put in place two remedies to operate concurrently to promote competition in the provision of leased lines:

- **An active remedy**: A requirement for the SMP operator to offer functioning electronic services (based on the product definitions above) on regulated terms, including both the physical elements of the network and the electronic equipment; and
- **A passive remedy**: A requirement for the SMP operator to offer its competitors access to unlit strands of its optical fibre, allowing CPs to provide the electronic equipment needed to light the fibre—('dark fibre').

[132] Ofcom, 'Business Connectivity Market Review: Final Statement', 2016, at <https://www.ofcom.org.uk/consultations-and-statements/category-1/business-connectivity-market-review-2015>.

[133] WDM allows a single fibre to carry several leased line services simultaneously.

In previous reviews and following the conclusion from the TSR, reliance was predominantly based on active remedies but the view was taken in the 2016 BCMR that there should be a transition to passive remedies to provide incentives for efficient investment for BT and for rival infrastructure operators (in line with the conclusion from the DCR). In implementing these two remedies, Ofcom recognized that a dark fibre remedy would carry some risks relative to an actives-only remedies package. These include the potential for inefficient entry incentivized by regulatory arbitrage opportunities, which could result from any inconsistencies between the pricing of active and dark fibre products. Given this, Ofcom determined that BT should provide dark fibre at a price consistent with its 1Gbit/s wholesale Ethernet leased line services. More specifically, Ofcom specified that BT, from 1 October 2017, will be required to provide dark fibre at the same price as the 1Gbit/s active service, minus the long run incremental costs of the active elements of that 1Gbit/s service—called the 'active-minus' pricing approach.

Ofcom considered that this approach results in a charge consistent with the design of the active controls which it was imposing on BT (described below) and so would provide incentives for efficient investment for BT and for rival infrastructure operators. They argued that it should incentivize use of dark fibre where it provides benefits relative to active remedies and it should ensure that BT will continue to have a fair opportunity to recover its efficiently incurred costs.

For the active remedy, as in previous reviews, Ofcom put in place a charge control with a duration of three years until 2019 with several sub-caps and safeguard caps comprising of two separate service baskets for wholesale services comprising of a TI service basket (based on the product definition above) at CPI-3.50 per cent and an Ethernet service basket (based on the product definition above) at CPI-13.50 per cent. In addition, Ofcom proposed significant one-off charge reductions to both BT's Ethernet and TI charges to reflect that BT's returns in these markets were significantly more than its cost of capital.

In response, BT appealed Ofcom's decision and alleged errors concerning market definition and alleged errors concerning the remedies imposed. In July 2017, the Competition Appeals Tribunal (CAT) issued a short statement quashing Ofcom's decision in relation to its definition of the market.[134] It has since provided its reasoning and has remitted matters back to Ofcom for reconsideration.[135]

2.15.1.8 *Key considerations for fixed telephony access and interconnection*

As can be observed from the discussion above, the approach to fixed communications interconnection and access regulation has gone through a number of stages.

[134] *British Telecommunications plc v Office of Communications (Market definition Ruling)* [2017] CAT 17.
[135] *British Telecommunications plc v Office of Communications (Judgment Market Definition)* [2017] CAT 25.

Prominent features have however been the pattern of 'rolling back' regulation as competition takes hold and targeting regulatory controls where competition is ineffective.

Since the TSR, many operators and in particular BT (in 2009) have started to adopt and invest in communications networks with the capability to provide superfast broadband. This has been driven by consumer demand for bandwidth. Investment in superfast broadband technologies is risky because of cost and demand uncertainty. Given the riskiness of this investment, regulators have had to strike an appropriate balance in ensuring investment incentives, promoting competition, and protecting consumers where competition is not effective or sustainable.

The approach taken in the UK to ensuring investment incentives has involved what is termed 'a fair bet' approach. Under this approach, if, at the time of investment, the expected return is equal to the cost of capital, the firm should be allowed to enjoy some of the upside risk when demand turns out to be higher than expected (ie it allows returns higher than the cost of capital) to balance the fact that the firm will earn returns below the cost of capital if demand turns out to be low. In theory, the 'fair bet' approach should not undermine investment incentives and should provide the firm with a fair opportunity to recover its investment. Essentially this provides regulatory certainty to firms and means that investors can commit funds for investment with confidence that the regulator will not act in a way which would lead to the investor not having the opportunity to recover its costs.

To encourage competition, the UK (since the TSR) has placed considerable focus on the provision of active access products[136] designed to give other communications providers the ability to compete effectively downstream with BT. Further, Ofcom has continued to focus on ensuring equivalence of input and functional separation to ensure that competitors are treated in a non-discriminatory manner. To further encourage investment, Ofcom has also given BT some pricing freedom in setting the wholesale price for VULA to account for the risk in investment and the initial small scale of adoption. However, it has done so because there is an ongoing constraint from current generation copper-based broadband services (which are price regulated). By continuing to have price controls on current generation copper-based broadband services, it reduces the risk of consumer detriment by constraining BT's ability to charge excessive prices on superfast broadband. It also protects consumers during the change to superfast broadband and means that consumers of existing

[136] The focus on 'active' wholesale products reflects Ofcom's assessment in the TSR that investment in infrastructure by other network providers was unlikely. However, to safeguard the opportunity for further competition based on physical infrastructure access it implemented passive remedies (poles and duct access) and mandated sub-loop unbundling (a type of unbundled access whereby a sub-section of the local loop is unbundled. In practice this often means the competitor placing a small street cabinet with a DSLAM, next to a telco local copper aggregation cabinet using a 'tie cable' to connect to the last part of the local loop into customers' homes).

services are not made worse off by the adoption of new technology, and the price of these basic services provides a competitive constraint to the pricing of new services which are not price controlled.

Whilst Ofcom's overarching strategy has focused on active access products to promote competition in superfast broadband, following the DCR, it is now consciously testing the market to see if there is further appetite for investment in fibre through passive infrastructure access (PIA). In residential markets, Ofcom already requires BT Openreach to allow operators to deploy NGA networks in the physical infrastructure of its access network (ie via ducts and poles). This allows other operators to deploy their own fibre to serve customers on their own networks—an alternative to VULA to deliver superfast broadband. However, to date there has been no interest in using PIA by other communications providers unless PIA is also extended to the business market.

The 2016 BCMR did consider whether the PIA remedy should be extended to the business market but the conclusion was to impose dark fibre and not duct access. The main reason was because most of the benefits of passive remedies could be achieved via dark fibre and a dark fibre remedy would allow Ofcom to manage the implementation risks during a transitional period whilst active remedies and passive remedies coexist. In contrast, with a PIA remedy, it would be more difficult to manage prices at different levels in the value chain to avoid creating incentives for inefficient entry while active remedies are an important part of the remedy package. Ofcom did however say that once competition based on dark fibre proves effective and, active remedies can be removed, the pricing of dark fibre and duct access could be made more compatible. It appears therefore that the intention following the DCR is that much more emphasis will be placed in the future on passive remedies (comprising of dark fibre and duct access) but the UK will need to go through a transition phase to get there, which involves running active and passive remedies concurrently.

2.15.2 Mobile interconnection regulation in the UK

As mentioned above in Section 2.9, the government historically sought to encourage the development of competition by licensing a number of mobile operators. As with fixed services, interconnection has been a key issue. In particular, the charges offered to fixed operators to enable their customers to call mobile networks has often been the subject of much debate.

In the 1990s, residential and business consumer organizations expressed concern to Oftel about the prices for calling mobile phones. Oftel recognized that due to the Calling Party Pays arrangement in the UK, all network operators have a monopoly position over the 'termination' of calls on their own networks. When someone wants to make a call to a mobile, or any other phone then the calling party

has no choice but to call the network to which the called party has subscribed. This means that mobile operators, in common with other network operators, are able to set charges for call termination, without reference to significant competitive pressures. Given this, Oftel initiated an investigation. The main preliminary finding from this work was that BT's prices for calls to Vodafone and Cellnet customers were too high which was mainly caused by Vodafone's and Cellnet's high termination charges. Oftel had the option to impose price controls but it recognized that such action would have a significant impact on the whole of the mobile market. This is especially so, given that the commercial strategy of most UK mobile operators was to subsidize handsets to encourage take-up of service. Any potential price control on termination rates would have had a knock-on impact on the pricing structure for handsets and calls from mobile networks. Given this, in March 1998, Oftel referred the issue of prices of calls to Vodafone and Cellnet to the then Monopolies and Mergers Commission (MMC).[137]

In December 1998, the MMC completed its investigation and concluded that there was insufficient competitive constraint on termination charges.[138] It considered that the only effective means of remedying or preventing any adverse effects would be to impose a price control on termination. It thus proposed that Cellnet and Vodafone should reduce their weighted average termination charges by RPI – 9 per cent until 2001/02.

In February 2001, Oftel carried out a review of the price controls, noting that although the market had grown rapidly and at a rate much greater than that predicted, there was still an incentive for each of the mobile network operators (MNOs) to charge termination rates above the competitive price.[139] In light of this, Oftel concluded that controls on termination charges on the four main mobile networks were needed to protect consumers and proposed a charge control of RPI – 12 per cent each year for the four years until March 2006.[140] The MNOs objected to this proposal, stating that it was inappropriate to view call termination as a separate

[137] Prices of Calls to Mobiles Statement, March 1998, at <http://webarchive.nationalarchives.gov.uk/20040104233440/http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/pricing/ctm0398.htm>. The MMC was first replaced by the Competition Commission (CC), which has since been replaced by the Competition and Markets Authority (CMA).

[138] Reports on references under section 13 of the Telecommunications Act 1984 on the charges made by Cellnet and Vodafone for terminating calls from fixed-line networks, at <http://webarchive.nationalarchives.gov.uk/20040104233440/http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/pricing/cmmc1298.htm>.

[139] Review of the Price Control on Calls to Mobiles, February 2001, at <http://webarchive.nationalarchives.gov.uk/20040104233440/http://www.ofcom.org.uk/static/archive/oftel/publications/mobile/ctom0201.htm>.

[140] Review of the Charge Control on Calls to Mobiles, 26 September 2001, at <http://webarchive.nationalarchives.gov.uk/20040104233440/http://www.ofcom.org.uk/static/archive/oftel/publications/mobile/ctm0901.htm>.

market, as it was just one of a bundle of interconnected services purchased by customers; that there was a single market for the provision of all mobile services in the UK; that the market was competitive; and that none of the MNOs had the ability to earn excessive profits from call termination because the competitive pressures they all faced in respect of the totality of the services they offered competed away any such profits. Oftel referred the matter to the CC who published its findings in December 2002.[141]

The CC agreed with Oftel on the matter of call termination being a separate market and concluded that competitive pressures at the retail level did not constrain termination charges. Reviewing the termination charges offered by the MNOs, the CC submitted that they operated against the public interest and accordingly recommended that for each MNO there should be a price cap for fixed to mobile calls and a cap for mobile to mobile calls to prevent the MNOs loading charges disproportionately on to one or other call type. It determined that each of the MNOs should be required to reduce the level of its average termination charge by 15 per cent in real terms before 25 July 2003. And it also determined that O2 and Vodafone should be subject to further reductions in their average termination charges of RPI – 15 per cent and that Orange and T-Mobile should also be subject to further reductions in their average termination charges of RPI – 14 per cent until March 2006. Therefore, the reference to the CC resulted in tighter charge controls on the MNOs in comparison with what Oftel had proposed.

The New Regulatory Framework for Telecommunications regulation in 2003 meant however that Ofcom had to carry out an early review of the situation.[142] In June 2004, it published its market review of wholesale voice calls terminated on individual mobile networks.[143] This covered not only the four MNOs discussed above but also calls terminated on Hutchison 3G UK (H3G) - a 3G MNO. Ofcom's view was that each MNO in the UK had significant market power in a separate market for voice call termination on its network. As such it proposed that in respect of Vodafone, O2, T-Mobile, and Orange for their 2G call termination

[141] Reports on references under section 13 of the Telecommunications Act 1984 on the charges made by Vodafone, O2, Orange, and T-Mobile for terminating calls from fixed and mobile networks, at <http://webarchive.nationalarchives.gov.uk/20040104233440/http://www.ofcom.org.uk/static/archive/oftel/publications/mobile/ctm_2003/index.htm>.

[142] See further Section 2.15 and Chapter 4.

[143] Review of mobile wholesale voice call termination markets—EU Market Review, at <http://webarchive.nationalarchives.gov.uk/20040104233440/http://www.ofcom.org.uk/static/archive/oftel/publications/eu_directives/2003/ctm/ctm0503.pdf> and Wholesale Mobile Voice Call Termination: Proposals for the identification and analysis of markets, determination of market power and setting of SMP Explanatory Statement and Notification, 19 December 2003, conditions available at <http://webarchive.nationalarchives.gov.uk/20160702162827/http://stakeholders.ofcom.org.uk/consultations/mobile_call_termination/>.

services, that they should (a) provide network access for the purposes of 2G call termination; (b) not unduly discriminate in the provision of such access; (c) publish a Reference Offer; (d) give prior notification of price changes; and (e) reduce termination charges in line with the proposed charge controls by the CC. In respect of 3G voice call termination services, it recommended that there should be no *ex-ante* regulation although H3G was required to give advance notification of price changes and provide Ofcom with details of call volumes.

Given that Ofcom effectively designated all five MNOs as having significant market power, H3G subsequently appealed its SMP designation to the Competition Appeals Tribunal (CAT) on the grounds, among others, that Ofcom did not carry out sufficient analysis of prices to entitle it to come to a decision that H3G had significant market power and, failed to take account or sufficient account, of the ability of BT to restrain pricing, in reaching its conclusions.[144] The CAT, in November 2005, found that Ofcom erred in its SMP determination since it did not conduct a full assessment of the extent to which BT had countervailing buyer power. As such the CAT remitted the decision back to Ofcom to reconsider.

In March 2007, Ofcom published its assessment and concluded that there are separate markets for the provision of wholesale mobile voice call termination in the UK to other communications providers and that each of the five MNOs has SMP in the market for termination of voice calls on its network.[145] On this basis, Ofcom determined that charge controls (applying for four years from 1 April 2007[146]) should be imposed on the supply of mobile call termination by each of the five MNOs, and those controls should apply without distinction to voice call termination whether on 2G or 3G networks.

Both BT and H3G appealed Ofcom's MCT Statement. H3G appealed Ofcom's determination that H3G has SMP and the price control; while BT appealed the level of the price control only. In May 2008, the CAT upheld Ofcom's finding of SMP for H3G, dismissing the non-price control matters arising in H3G's appeal.[147] That judgment was appealed to the Court of Appeal, which found in favour of Ofcom

[144] See *Hutchison 3G (UK) Limited v Ofcom* [2005] CAT 39, at para 35.

[145] Mobile Call Termination Statement (MCT), March 2007, at <http://webarchive.nationalarchives.gov.uk/20160702162827/http://stakeholders.ofcom.org.uk/binaries/consultations/mobile_call_term/statement/statement.pdf> and Assessment of whether 3G holds a position of SMP in the market for wholesale mobile voice call termination on its network, March 2007, at <http://webarchive.nationalarchives.gov.uk/20160702162827/http://stakeholders.ofcom.org.uk/binaries/consultations/h3gsmp/statement/statement.pdf>.

[146] Given that the then existing charge controls were due to expire less than one week after publication of the Ofcom statement, Ofcom decided to impose new controls from 1 April 2007 but to adjust the level of the year-one (1 April 2007 to 31 March 2008) controls by weighting them as though they applied for only 10 of the 12 months of the year one control and as though for two of the 12 months the present average charges applied.

[147] See *Hutchison 3G (UK) Limited v Office of Communications (Mobile Call Termination)* [2008] CAT 11.

and the interveners, BT and T-Mobile, and upheld the CAT's decision rejecting H3G's challenge.[148]

On 18 March 2008, the CAT referred various 'price control matters' to the CC. In January 2009, the CC issued its determination on mobile call termination charges. This resulted in the charges being reduced even further than Ofcom's original 2007 statement. Table 2.5 shows the CC's determination of charges in real 2006/07 prices (with the original charges set in the 2007 MCT Statement shown in brackets).

Table 2.5 CC Determination of charges (pence per minute charges)

Operator	2007/08	2008/09	2009/10	2010/11
Vodafone & O2	5.2 (5.5)	4.7 (5.4)	4.4 (5.2)	4.0 (5.1)
T-Mobile & Orange	5.7 (6.0)	5.0 (5.7)	4.5 (5.4)	4.0 (5.1)
H3G	8.9 (8.9)	6.8 (7.5)	5.5 (6.7)	4.3 (5.9)

The European Commission also began a public consultation on the regulatory treatment of fixed and mobile termination rates in the EU. The responses of the 2G/3G MNOs had a number of factors in common. In particular they argued for symmetric MTRs in the same national market, although they argued that there is not a 'one size fits all' approach across the EU. They argued that MTRs and fixed termination rates (FTRs) should be separate, as there are legitimate cost differences between the two sectors. They suggested that MTRs should include some provision for the recovery of fixed and common costs because not doing so would lead to fixed or common costs being recovered in other less efficient ways, potentially to the detriment of consumers.

In contrast, H3G proposed that symmetric zero termination rates (Bill and Keep) were the best option for the future termination regime. It argued though that until this is introduced, small or later market entrants should be allowed a higher termination rate. This is because H3G believed that incumbent networks had an incentive to engineer an on-net/off-net retail price differential at the retail level, to deter calls to competing networks.[149] To compete and attract mobile subscribers, it argued that smaller networks need to set their off-net prices at the same level as the larger networks on-net price. However this can be unprofitable if the on-net prices are below the level of the regulated MTR. It further argued that because smaller operators are 'forced' to offer low off-net call prices this leads to a

[148] See *Hutchison 3G (UK) Limited v Office of Communications* [2009] EWCA Civ 683.

[149] 'On-net' refers to traffic within the same mobile network ie between customers on the H3G network. 'Off-net' is when traffic crosses to another network eg a call from the H3G network to a Vodafone customer.

large amount of off-net traffic and therefore a net outflow of traffic from the smaller network. Thus if MTRs are symmetric, this disadvantages the smaller operator. H3G therefore argued that a move to Bill and Keep would level the playing field, but suggested that in the transition to Bill and Keep smaller operators should receive higher MTRs to counter the impact of the outflows.

The final Commission Recommendation on termination suggested a pure LRIC cost methodology.[150] In essence, the Commission suggested recovering elements of common costs not from termination, but from the competitive retail side of the mobile market. This approach would reduce the headline rate of termination charges, particularly MTRs, then currently in place across the EU, potentially by a significant amount. It was recognized however that such a shift could affect mobile retail prices, as MNOs would seek to recover costs from their retail customers that were no longer recoverable from call termination charges.

In the context of all this debate and in anticipation of the mobile call termination charges expiring in March 2011, Ofcom published a consultation document in May 2009,[151] which considered the different approaches that may be taken towards setting MTRs. It acknowledged that in arriving at a decision on the best approach, it required to take utmost account of the EC Recommendation but it must do so in the context of considering the effects on all market participants. For this reason, it considered a much broader set of options than that set out by the Commission.

Based on the responses to the May 2009 consultation and a second consultation in April 2010,[152] Ofcom, in April 2011[153] proposed the use of the pure LRIC method to set regulated rates. It proposed that after a single-year transitional period, a symmetric rate would apply across the four mobile networks.

In 2014, Ofcom launched its consultation for MTRs for 2015/18.[154] Based on responses to this consultation, in March 2015[155] Ofcom concluded that it would set

[150] Commission Recommendation on regulatory treatment of fixed and mobile termination rates in the EU C(2009) 3359 final, at <http://ec.europa.eu/smart-regulation/impact/ia_carried_out/docs/ia_2009/c_2009_3359_en.pdf>.

[151] Ofcom, 'Wholesale mobile voice call termination: Preliminary consultation on future regulation', 2009, at <http://webarchive.nationalarchives.gov.uk/20160702162827/http://stakeholders.ofcom.org.uk/binaries/consultations/mobilecallterm/summary/mobile_call_term.pdf>.

[152] Ofcom, 'Wholesale mobile call termination review (second consultation)', 2010, at <http://webarchive.nationalarchives.gov.uk/20160702162827/http://stakeholders.ofcom.org.uk/consultations/wmctr/>.

[153] Ofcom, 'Mobile termination review statement', 2011, at <http://webarchive.nationalarchives.gov.uk/20160702162827/http://stakeholders.ofcom.org.uk/consultations/mtr/statement>.

[154] Ofcom, 'Mobile call termination market review 2015–18', 2014, at <http://stakeholders.ofcom.org.uk/binaries/consultations/mobile-call-termination-14/summary/MCT_Consultation.pdf>.

[155] Ofcom, 'Mobile call termination market review 2015–18: Statement on the markets, market power determinations and remedies', 2015, at <https://www.ofcom.org.uk/__data/assets/pdf_file/0029/76385/mct_final_statement.pdf>.

a single MTR cap for all mobile networks with SMP and to set the MTRs with reference to the LRIC in each and every year of the cap. This represented a change from the previous market review where the charge control only applied to the four largest mobile networks and smaller mobile networks were subject to an obligation to provide network access on fair and reasonable (F&R) terms and conditions, including charges. Ofcom's reasoning for this change was that imposing a charge control on all mobile networks with SMP will be more effective than the F&R approach in remedying the harm caused by MTRs set above the efficient cost benchmark. In March 2018, Ofcom set out its decision on the regulation of the wholesale MCT market for the period 2018 to 2021.[156] As in the previous review, Ofcom imposed a single maximum cap on MTRs based on LRIC for all mobile providers with SMP.

2.15.3 Key issues—interconnect and access charges

The effectiveness in the development of a competitive telecommunications environment is heavily reliant on the agreed terms of interconnection and access. Establishing a sustainable interconnect and access regime is hence probably one of the most important tasks in developing a regulatory framework for telecommunications.

The role of the NRA in setting these charges, is critical in ensuring that the industry has confidence in the interconnect and access charge levels. To prevent the dominant operator from abusing its position, the NRA must have the appropriate powers and penalty mechanisms to control for this.

Economic theory states that prices should be set in relation to costs. The traditional use of fully allocated costs, although simple to implement means however that interconnecting operators could receive the wrong price signals. The general shift towards the use of incremental costs represents an improvement on the status quo although it can be argued that it is difficult to implement and to monitor.

The UK access and interconnection regime has gone through several stages of development and the liberalization and technological developments of the market have necessitated the need for fresh approaches. These could be considered to better serve the industry as they maximize the degree to which markets decide charges and so reduce as far as possible the inevitable distortionary intervention by the regulator.

[156] Ofcom, 'Mobile call termination market review 2018–21: Final Statement', March 2018, at <https://www.ofcom.org.uk/__data/assets/pdf_file/0021/112458/Final-Statement-Mobile-Call-Termination-Market-Review-2018-2021.pdf>.

However, in relation to termination charges on mobile networks, there has been considerable debate and resistance from the mobile operators to accept charge controls on termination. In the past few years, they have been more willing to accept controls but developments in this sector (such as the 2016 merger between BT and EE, the debate on 5G, and the increasing usage of Over-the-top services[157]) means that the debate will likely continue for some time to come and could be further complicated by the emergence of fixed-mobile convergence.

2.16 CONCLUDING REMARKS

This chapter has provided an overview of the economics of telecoms regulation encompassing the economic theory of regulation as well as the application of this theory to the UK communications industry.

The 1980s and 1990s were a landmark era in the history of communications. This is not just because of the important technological changes that occurred or the growing number of services and applications available to consumers, noteworthy though these are, but because of the steps taken along the road to liberalization. Where once communications was seen as the monopoly preserve of state-owned enterprises, it is now recognized as an industry where competition can and should be allowed.

The communications sector as a whole is fast-moving in terms of both technological and strategic development. As the market develops and convergence takes hold there will be a multitude of pricing packages on the market offering consumers more choice than ever before. Competitors will enter and exit and the fight for market share will continue. This will inevitably raise a number of challenges for regulatory policy. In particular, the emergence of fixed mobile convergence and quad play offerings may mean that new innovative economic regulatory policies will be required to protect consumers and encourage competition and investment. As more and more consumers take up multi-play bundles that include voice-over-broadband, the costs per customer of the public switched telephone network (PSTN) will increase rapidly. One of the options for dealing with this is to switch the network off, which would alter the cost basis for the delivery of fixed line services and could fundamentally change the competitive landscape.[158] The migration of consumers from LLU to NGA (and potentially to fibre-to-the-home (FTTH) products) may require a different approach to promoting competition. For

[157] Such as WhatsApp, Viber, Skype.

[158] BT has announced its intention to do this by 2025.

example, passive remedies such as access to ducts or dark fibre may become more important. In addition, as the UK Government prepares to leave the European Union, a key consideration will be whether the European legal frameworks governing communications in the UK will need replicated or replaced in UK legislation. All these issues will play out over the next few years. The forces of competition and technological developments, alongside the emergence of new innovative economic regulatory policies mean that the future of communications continues to be very exciting!