Part B – Annexes

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Part B - Annex 16

Thresholds

Introduction

A16.1 As set out in Section 13 we have estimated a range for the costs of the unbundled tariff the price of non-geographic calls ('NGCs'). In order to place these costs in context we have estimated the threshold at which the quantified benefits for residential callers from the improvement in demand would outweigh the costs. This informs our decision as to whether the benefits of the unbundled tariff are likely to outweigh the costs. The reasoning and evidence supporting our view of the benefits of the unbundled tariff relative to the costs is set out in Section 13.

A16.2 This Annex explains how we have calculated the thresholds at which the benefits of the unbundled tariff (just) outweigh the costs. As explained below, these thresholds are not intended to be precise. Their purpose is to help our assessment of the order of magnitude of the costs and benefits in question (e.g. are the benefits likely to be significantly greater or smaller than the costs or are they likely to be more evenly balanced).

A16.3 This Annex is structured as follows:

- we discuss the relationship with the estimates of consumer detriment set out in the December 2010 Consultation;
- we provide a recap on the sources of consumer detriment and how the unbundled tariff addresses them;
- we explain our analytical approach;
- we set out the results of that modelling; and
- finally, we set out our conclusions.

Relationship with the estimates of consumer detriment in the December 2010 Consultation

A16.4 In paragraphs A2.221-A2.239 of the December 2010 Consultation we calculated the potential magnitude of consumer detriment. We estimated that the consumer detriment resulting from consumers' over-estimation of NGC prices was of the order of £563m per annum. This calculation omitted certain sources of consumer detriment. Crucially this calculation was relative to a benchmark where all misperceptions of NGC prices were eliminated.

A16.5 In paragraph A2.233 of the December 2010 Consultation we explicitly acknowledged the difference between the maximum potential benefit and the likely benefit of intervention. The maximum potential benefit is the full extent of the consumer detriment. It is unlikely that any type of intervention will completely remove the detriment in its entirety, even if it substantially reduces it.

A16.6 In their responses to the December 2010 Consultation both Vodafone and EE agreed that intervention was unlikely to eliminate all consumer detriment.

- Vodafone doubted whether it was realistic to assume that call price misperception could be eliminated, regardless of what transparency measures were introduced.[1]

- EE made a number of adjustments to our calculations that have the effect of reducing the estimate of consumer detriment. Having made those adjustments, EE suggested that the benefits of any intervention might be smaller because any remedy might not be 100% effective.[2]

A16.7 In this current consultation we do not set out an estimate of total consumer detriment relative to a benchmark where all misperceptions of NGC prices are eliminated. This is because the key question is somewhat different, namely whether the benefits of the detailed interventions on which we are consulting are likely to outweigh the costs. Moreover we have gathered further information on the costs of the unbundled tariff so we are now better placed to compare the costs against the benefits that we were in the December 2010 Consultation.

A16.8 Accordingly, as explained above, we now calculate thresholds at which the benefits are likely to outweigh the costs, rather than the total level of consumer detriment. Note, however, that the model we have used to carry out these thresholds is similar to that used to calculate total detriment in the December 2010 Consultation. This means that stakeholders' comments on the 2010 calculations are relevant to our latest calculations. We thus set out and address those comments below.

Recap on sources of consumer detriment and how the unbundled tariff addresses them

A16.9 Before we set out the details of our calculations, it is useful to set out a brief recap on the sources of consumer detriment and how these are addressed by the unbundled tariff. This helps explain which of the benefits of the unbundled tariff would be most susceptible to reasonable quantification and which benefits we have omitted from our calculations.

The nature of current consumer detriment

A16.10 In Annex 8 we set out our concerns about the operation of the retail level. Table A16.1 below summarises the resulting sources of consumer detriment and how they are interrelated.[3] We refer to these as "Concerns 1 to 7" below.

[1] Vodafone, December 2010 consultation response, paragraph 153.
[2] EE, December 2010 consultation response, annex 1, paragraph 27(b).
[3] Table A2.20 in the December 2010 Consultation was a more condensed version of this table i.e. it did not explicitly unpack the effects shown here as Concerns 3 and 4.

Table A16.1: Sources of consumer detriment at the retail level

	Concern	Cause	Implication	Assessment criterion
1	**Consumer price misperceptions** (tendency to over-estimate NGC prices; under-estimation is less common)	Poor price awareness, horizontal externality	Reduced consumer demand for NGCs	Price awareness
2	**Lack of consumer confidence in NGC prices or making NGCs**	Poor price awareness, horizontal externality	Reduced consumer demand for NGCs	Price awareness
3	**Competition between OCPs is reduced**	Flows from concerns 1-2	Higher prices for NGCs	Pattern of prices
4	**Competition between SPs is reduced**	Poor price awareness, horizontal externality, vertical externality	Higher prices for NGCs. Uncertain effect on quality and variety of services offered via non-geographic numbers	Pattern of prices. Service quality, variety and innovation
5	**Distorted pattern of retail prices** (unduly high NGC prices[4])	Flows from concerns 1-4	Reduced consumer demand for NGCs (also higher demand for other services)	Pattern of prices
6	**Reduced investment and innovation by SPs**	Flows from concerns 1-5	Reduced quality and variety of services offered via non-geographic numbers	Service quality, variety and innovation
7	**Reduced access to socially important services by vulnerable consumers**	Flows from concerns 1-5	Higher actual and expected prices discourage vulnerable consumers from accessing socially important services	Distributional concerns

[4] The pattern of retail prices is distorted via the tariff package effect (TPE). Via this effect, the price of other telecoms services may also be affected, both by high margins on NGCs and by any suppression of demand for NGCs. We discuss the possible direction of this effect, as well as the TPE more generally, in further detail in Annex 8.

A16.11 In Table A16.1 we have drawn a distinction between two aspects of poor consumer price awareness:

- Concern 1 captures the situation where consumers are fairly confident that they know the price but where their expectation is wrong; and
- Concern 2 captures the situation where the consumer does not know what the price is and is deterred as a result of that uncertainty (e.g. because of risk aversion – fear of a large bill).

A16.12 This distinction is useful when we come to discuss our modelling below. In particular, we have separately modelled the cases where:

- the price consumers expect to pay for a NGC moves closer to the actual price. This can be thought of as addressing Concern 1; and
- the demand curve shifts. One interpretation is that this is a consequence of addressing Concern 2,[5] so that risk averse consumers are less concerned that they could incur a high bill and are thus more willing to make NGCs.

Benefits of the unbundled tariff

A16.13 We discuss the benefits of the unbundled tariff in Section 9. In summary, the unbundled tariff helps address Concerns 1-7 in a number of ways.[6]

A16.14 Firstly, the unbundled tariff is likely to improve price awareness. SPs and OCPs can communicate their portion of the price more clearly. The change in the presentation of prices may also make prices more intuitive and easier to remember. The horizontal externality may be reduced since consumers can learn the actual price of a call, rather than inferring it from the price of calling similar numbers or calling on a different device. As a result, Concerns 1 and 2 are likely to be mitigated.

A16.15 Secondly, competition between OCPs and SPs is likely to increase, addressing Concerns 3 and 4 in Table A16.1 above. This is for a number of reasons:

- improved price awareness;
- the unbundled tariff changes the presentation of prices in a way that facilitates comparisons between SPs and between OCPs; and
- retail prices now reflect differences in the SC i.e. calls to a high SC service cost more than to a low SC service. This tackles one aspect of the vertical externality. As a result, SPs are more able to compete on price.

[5] An alternative explanation for this shift in the demand is that the quality and variety of services available via non-geographic numbers has improved i.e. Concern 6 has been addressed.

[6] In addition to the retail benefits discussed here, unbundling may also have positive effects at the wholesale level e.g. reducing the need for ongoing regulatory intervention via disputes, improved incentives for efficiently routing calls.

A16.16 Thirdly, increases in price awareness and competition are likely to mitigate our concern about prices (Concern 5):

- Increased competition between OCPs creates pressure to lower OCPs' margins on NGCs. Lower OCP margins on NGCs are likely to lead to a rebalancing of OCPs' retail prices which helps to address Concern 5. Lower OCP margins also mitigate the vertical externality, which may create further effects on SPs' behaviour (see below).

- Increased competition between SPs increases the pressure on them to select a cheaper price point (lower SC). Moreover, even where there are no direct competitors to a SP, the change to the presentation of prices exposes how much that SP is earning from the call. This may encourage some SPs to select cheaper price points, in order to avoid bad publicity. Lower SP margins on NGCs would also help address Concern 5.

A16.17 Fourthly, the unbundled tariff may encourage SPs to improve service quality and variety, and to innovate.[7] This addresses Concern 6. This is driven by four main factors:

- lower OCP margins mitigate the vertical externality meaning that using non-geographic numbers to deliver services is less likely to be frustrated by high OCP mark-ups;

- competition between SPs is likely to prompt them to improve the quality of their services;

- increased volume of NGCs may make investment and innovation more attractive; and

- since the SC directly feeds into the retail price, SPs can adopt new business models that rely on a particular approach to call prices (e.g. a low price DQ service funded by advertising).

A16.18 Fifth, the unbundled tariff may mitigate our distributional concern (Concern 7) for two main reasons:

- lower prices, due to OCPs and SPs earning lower margins, help reduce the amount that vulnerable consumers pay for calls to socially important services. As a result, they are less likely to be deterred or unable to call these services; and

- improved price awareness will reduce the extent to which vulnerable consumers are deterred from calling socially important services because they overestimate the price.

A16.19 Overall it is likely that demand for NGCs will increase for a number of reasons:

- the extent to which consumers misperceive prices (Concern 1) is likely to be reduced;

[7] There may be an offsetting effect. Insofar as increased competition reduces SPs' margins this may reduce incentives to innovate and offer a variety of services.

- the extent to which consumers are deterred from making NGCs because they are unsure about the price (Concern 2) is likely to be reduced;
- the actual price of non-geographic calls is likely to fall (Concern 5); and
- increased investment and innovation by SPs may improve the quality and variety of services available via non-geographic numbers (Concern 6).

Analytical approach

A16.20 We now discuss the analytical approach that we have adopted to calculate the threshold at which the benefits of the unbundled tariff are likely to exceed the costs. This discussion is structured as follows:

- the counterfactual;
- the effects that we have modelled;
- detailed modelling assumptions;
- the effects that we have not modelled; and
- an alternative approach to modelling proposed by EE.

The counterfactual

A16.21 The conceptual baseline for our analysis is the status quo. In Section 13 we have quantified the key additional costs if we were to introduce the unbundled tariff i.e. the extra costs relative to the status quo. The calculations in this Annex assess how large the improvement in demand would need to be, again relative to the status quo, in order for the benefits to outweigh those extra quantified costs.[8]

The effects that we have modelled

A16.22 At a high level, the calculations below relate to the quantified benefits to residential callers of bundling relative to the quantified resource costs. Those resource costs fall on callers, OCPs, TCPs and SPs. We have only modelled the benefits incurred by residential consumers because, as set out in Annex 8, the concerns we have identified in the retail market primarily affect residential callers. However, later in this Annex we explain in further detail the effects we have not modelled and, using qualitative analysis, discuss the direction of the impacts on OCPs, SPs, TCPs and business callers.

A16.23 We have assessed the benefits of the unbundled tariff for residential callers in two separate ways:

- Currently residential consumers tend to overestimate the price of non-geographic calls (Concern 1 in Table A16.1 above). The unbundled tariff may reduce the

[8] We have not attempted to put monetary values on the welfare effects of unbundling relative to a a system of maximum prices. As explained in Section 9 the key differences between these forms of intervention are their flexibility and the risk of regulatory failure. These differences are not amenable to being ascribed a monetary value.

extent of this overestimation which will, in turn, increase demand for non-geographic calls. We have calculated what proportion of the gap between actual and expected prices would need to be eliminated in order for the benefits of these extra calls to (just) outweigh the costs of the unbundled tariff.

- The unbundled tariff may also prompt a shift in demand i.e. a general increase in demand, separate from the impact on price overestimation. This might occur because fewer residential consumers are deterred from making NGCs by price uncertainty (i.e. Concern 2 is mitigated) and/or because the quality and variety of services available via non-geographic numbers improves (i.e. Concern 6 is mitigated). We have calculated what percentage shift in overall demand would result in sufficient benefits to (just) outweigh the costs of the unbundled tariff.

A16.24 We explain these two broad effects (the reduction in price overestimation and the shift in demand) in further detail below. In both cases, they will lead to residential consumers making more non-geographic calls, which will tend to increase their consumer surplus. In addition, those increased call volumes will tend to increase OCPs' incremental profits from non-geographic calls, some of which are likely to be passed on to consumers through lower prices for telecoms services (the tariff package effect).

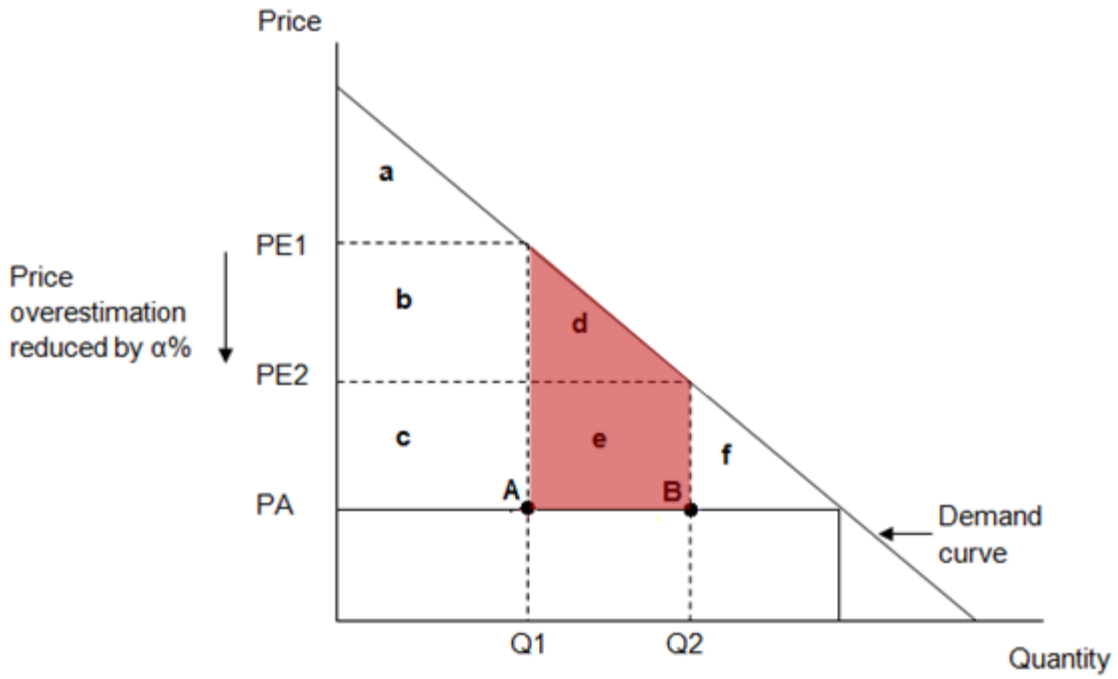
A16.25 The discussion below is structured as follows:

- we describe the reduction in price overestimation that we have modelled;
- we describe the shift in demand that we have modelled; and
- we describe how we have modelled the benefits for residential consumers from the tariff package effect.

Reduction in price overestimation

A16.26 Under the status quo, consumers on average over-estimate the price of making NGCs. The unbundled tariff is likely to lead to less price over-estimation. The benefits of this are illustrated using the simplified diagram in Figure A16.2 below.

Figure A16.2: Reduction in price overestimation



A16.27 Figure A16.2 shows the demand for non-geographic calls. Under the status quo, the expected price of NGCs is PE1 and so consumers demand quantity Q1. However, the actual price of NGCs is PA. Therefore consumers are at point A in Figure A16.2 and under-consume NGCs. Consumer surplus is equal to the area a+b+c. The deadweight loss to society (relative to the benchmark where consumers are aware of the actual price) is the area d+e+f.

A16.28 Under the unbundled tariff, consumer price perceptions are likely to become more accurate. The average expected price of NGCs moves to PE2 i.e. closer to the actual price (which is assumed to be unchanged). At this level, consumers demand Q2 of NGCs and are at point B in the diagram in Figure A16.2. They continue to under-consume NGCs but the consumer surplus is larger (area a+b+c+d+e) and the deadweight loss is smaller (area f). The gain in welfare from the unbundled tariff as a result of the reduction in price overestimation is represented by area d+e (the highlighted area).

A16.29 In order to calculate the threshold at which the benefits of the unbundled tariff for residential consumers outweigh the costs we have done the following:

- We have modelled a demand curve, using data on actual and expected prices and call volumes.
- Given an estimate of the costs of the unbundled tariff, we have calculated how large the reduction in price overestimation needs to be in order for the benefits for residential consumers to equal the costs.[9] The benefits we have taken into account are the welfare for residential consumers from extra calls (area d+e in

[9] As explained below, OCPs are likely to pass some of the additional profits earned on extra NGCs onto consumers via lower telecoms prices.

Figure A16.2) plus the portion of the benefits for OCPs that are passed onto residential callers (discussed below).

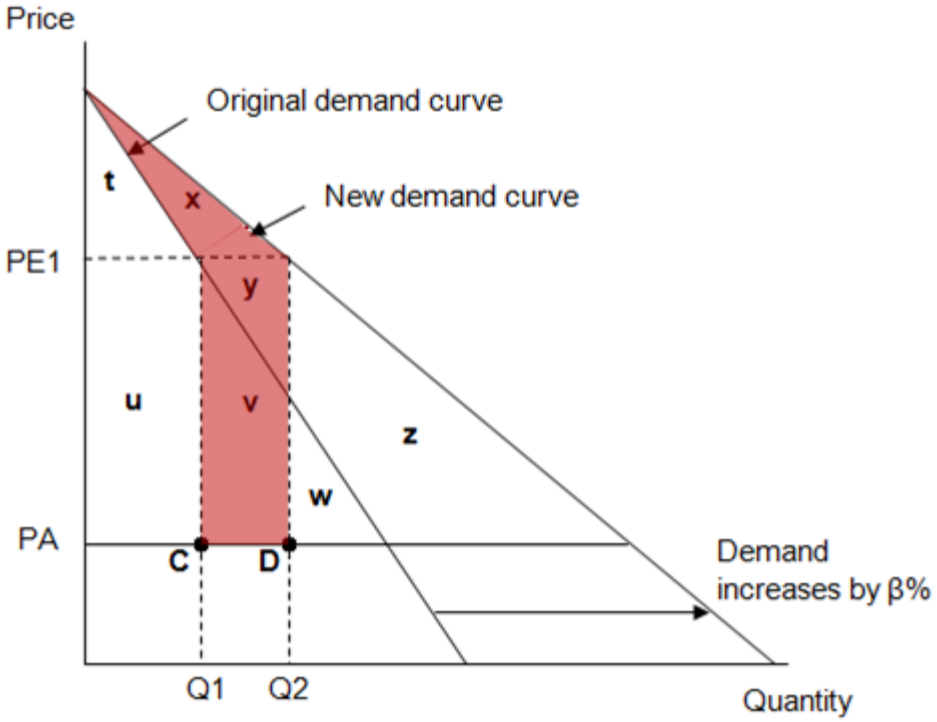
A16.30 This is similar to our calculation in the December 2010 Consultation. The main difference is that, in that consultation, we calculated the welfare gains from reducing the expected price all the way down to PA.[10]

A16.31 Further details of our calculations are set out below.

Shift in demand

A16.32 The unbundled tariff may lead to a shift in demand because fewer consumers are deterred from making NGCs by price uncertainty and/or because the quality and variety of services available via non-geographic numbers improves. The benefits of this are illustrated using the simplified diagram in Figure A16.3 below.[11]

Figure A16.3: Shift in demand for NGCs



A16.33 Figure A16.3 shows the demand for non-geographic calls. Under the status quo, consumers' expected price is PE1 and thus demand for NGCs is Q1. However, the

[10] Other significant differences are that the calculations in the December 2010 Consultation looked at the benefits for all consumers (residential and business) and did not take into account the portion of the benefits for OCPs that are passed onto callers.

[11] The starting point for both Figure A16.2 and Figure A16.3 is the status quo. The status quo market equilibrium in Figure A16.2 is signified by point A whilst the status quo market equilibrium in Figure A16.3 is signified by point C. In addition, many of the areas in both Figures are the same but are labelled differently. For example, area a in Figure A16.2 is the same as area t in Figure A16.3. The reason for making these distinctions is to emphasise that we have modelled the two effects – i.e. a reduction in price overestimation and a shift in demand – separately.

price that consumers actually pay is PA and so consumers are at point C on the diagram in Figure A16.3. At this point, consumer surplus is equal to the area t+u.[12]

A16.34 Introducing the unbundled tariff leads to a shift in the demand curve, i.e. consumers wish to make more NGCs, even if the actual or expected price does not change. Consumers' expected price remains at PE1 but the number of NGCs demanded is now at Q2. Consumers are at point D in the diagram in Figure A16.3 with consumer surplus of area t+u+v+x+y. The gain in welfare of the unbundled tariff is equal to the area x+y+v (the highlighted area).

A16.35 In order to calculate the threshold at which the benefits of the unbundled tariff outweigh the costs we have done the following:

- We have modelled a demand curve, using data on actual and expected prices and call volumes.

- Given an estimate of the costs of the unbundled tariff, we have calculated how large the increase in demand needs to be in order for the benefits for residential consumers) to equal the costs. The benefits we have taken into account are the welfare for residential consumers from extra calls (area x+y+v in Figure A16.3) plus the portion of the benefits for OCPs that are passed onto residential callers (discussed below).

A16.36 Note that the way in which we have estimated a shift in demand is conservative i.e. it will tend to calculate a higher threshold for the point at which the benefits of the unbundled tariff outweigh the costs. In particular we assume that demand at all price levels increases by the same percentage amount. In terms of the linear demand curve shown in Figure A16.3, this results in a pivot in the demand curve rather than a parallel shift to the right. This means that the consumer benefits of an increase in demand are smaller:[13]

- Our approach seems plausible where the shift in the demand curve arises because fewer consumers are deterred from making NGCs by price uncertainty (i.e. Concern 2 is mitigated). It seems likely that the increase in demand for NGCs will be larger for those consumers whose valuation of NGCs is lower. Under the status quo, these low-valuation consumers are likely to be more reluctant to make a NGC because uncertainty around the price outweighs the benefit derived from that call. In contrast, for consumers with a higher valuation of NGCs, the benefit of making the call is more likely to outweigh the uncertainty.

- However, our approach is likely to be conservative where the shift in the demand curve arises because the quality and variety of services available via non-geographic numbers improves (i.e. Concern 6 is mitigated). This improvement in quality is likely to increase the welfare that all consumers receive from making NGCs by a similar amount. As a result, a parallel shift in the demand curve may be more appropriate.

A16.37 In our calculations we have looked at a reduction in price overestimation and a shift in demand separately i.e. we have not combined these effects. In fact, there are

[12] There is also a deadweight loss as a result of price overestimation equal to the area v+w.

[13] A pivot in the demand curve leads to a smaller increase in NGCs made by consumers that highly value them compared to a parallel shift in the demand curve.

synergies between the two effects i.e. a shift in demand combined with a reduction in the expected price will produce extra gains. Intuitively this is because the increase in demand from the reduction in price overestimation is scaled up in the same way that the demand curve is.[14] This is another way in which our calculations are conservative. In practice, we would expect both effects to occur as a result of the unbundled tariff.[15]

The tariff package effect

A16.38 As explained above, our modelling calculates the quantified benefits for residential consumers. However, an increase in demand is likely to increase the incremental profits that OCPs make on non-geographic calls. A proportion of those profits is likely to be passed on to residential consumers via lower prices for telecoms services (the tariff package effect).[16]

A16.39 To carry out this calculation requires information on the incremental profitability of non-geographic calls from residential consumers for OCPs. See Table A16.4 below.

- As part of our analysis of 080 calls, we have an estimate of the average incremental cost of NGCs for fixed and mobile OCPs (see Annex 22 for further details). In that Annex we use a figure of 0.1ppm for the incremental cost of fixed 080 calls and a range of 0.7-0.8ppm for the incremental cost of mobile 080 calls. For simplicity, and since it does not have a material impact on the output of the modelling carried out in this current Annex, we have used the midpoint of that range (0.75ppm) in the calculations below.

- The 2010 Flow of Funds study estimated OCPs' average retention on non-geographic calls.[17] This allows us to estimate OCPs' average mark-up on non-geographic calls. As discussed later in this Annex, the 2010 Flow of Funds study included both business and residential calls. Since the retail price of non-geographic calls is likely to be higher for residential consumers, we have thus

[14] The deadweight loss from price overestimation in Figure A16.3 is equal to the area v+w prior to the demand shift and equal to area w+z after the demand shift. Area v becomes consumer surplus as a result of the shift in the demand curve. That means the area of unaddressed deadweight losses increases from w to w+z. This means that the scope for gains from a reduction in price overestimation is larger (a proportion of w+z rather than a proportion of w).

[15] This reflects the interrelationships between our retail concerns. For example, reducing the extent to which consumers overestimate non-geographic call prices (Concern 1) may increase the attractiveness of operating a non-geographic number for SPs. This, in turn, may lead to increases in the quality and variety of services provided by non-geographic numbers (Concern 6) which might lead to a shift in consumers' demand for NGCs.

[16] We discussed the potential negative impact of the status quo on OCPs in paragraph 5.44 of the December 2010 Consultation. However we did not include this effect in the estimate of consumer detriment calculated in paragraphs A2.221-A2.239 of that document.

[17] Specifically our average retention figure relates to the 08 and 09 number ranges but excludes 080 (which we are not proposing to unbundle). In line with our assumption that actual prices do not change (see below), we have assumed that average retention is the same before and after unbundling.

uplifted fixed OCPs average retention by 14% and mobile OCPs' average retention by 23%.[18]

Table A16.4: OCPs' costs, charges and mark-up

	Average incremental cost of call (£pm)	Average retention (exc. VAT, £pm)	Average OCP mark-up (£pm)
Fixed	0.001	0.027	0.026
Mobile	0.0075	0.165	0.157

Note: average retention and average mark up figures rounded to three decimal places

A16.40 To calculate the change in OCPs' profits we have simply calculated the change in demand and multiplied it by the average OCP mark-up given in Table A16.4 above. However OCPs may not pass all of the increase in their profits onto consumers. We have thus multiplied this by 0.8 to account for the likelihood that the tariff package effect is incomplete.[19] This is then added to the direct benefit for consumers (as described above) to give an estimate of the total consumer benefit from the reduction in price overestimation or shift in demand.

A16.41 Obviously OCPs will benefit from increased demand to the extent that they do not pass all of the increase in profits onto callers. Increased demand for NGCs will also benefit TCPs and SPs. Our calculations do not include the benefits for parties other than residential callers. Rather we discuss the (unmodelled) impact on other stakeholders qualitatively below.

Detailed modelling assumptions

A16.42 This sub-section sets out further detail on the assumptions that we make in the model and is structured as follows:

- basic model framework;
- treatment of costs;
- actual and expected prices;

[18] We explain below how these 14% and 23% figures were determined. Strictly speaking, they are uplifts to the average retail price reported in the 2010 Flow of Funds study that are used to produce an estimate of the price paid by residential callers. Applying these uplifts to estimates of OCPs' average retention on NGCs from the 2010 Flow of Funds study (as we have done), will tend to underestimate OCPs' retention on residential calls (and thus underestimate the increase in OCPs' profits from extra residential calls). Payments from OCPs to TCPs in 2009 were unlikely to materially differ between business and residential calls. This means that if the retail price of residential calls is X% higher than the price of business calls then OCPs' retention on residential calls is more than X% higher than on business calls.

[19] At paragraph 5.52 of the 2012 CC Determination, the CC preferred a figure of 80% over a figure of 50% for the strength of the waterbed effect, given Ofcom's view that the effect is strong. We have adopted the same assumption for the purposes of our calculations in this Annex.

- quantities;
- the own price elasticity of making NGCs;
- the demand function; and
- treatment of price under-estimation.

A16.43 We then discuss some key simplifications:

- absence of fixed and mobile substitution;
- absence of substitution between number ranges; and
- the treatment of price dispersion.

Basic model framework

A16.44 Our modelling approach is similar to the approach adopted in the December 2010 Consultation, the 0870 Statement and the 2005 NTS Consultation. We have separately modelled demand curves for fixed and mobile calls to each of the following number ranges: 0843/4, 0845, 0870, 0871/2/3 and 09.[20] These are the number ranges that we propose the unbundled tariff (excluding the 118 range).[21] Given a specific estimate for the costs of the unbundled tariff we have separately calculated the thresholds at which the benefits to residential consumers from the following two effects of the unbundled tariff would outweigh the costs, relative to the status quo:

- the proportion of the gap between actual and expected prices that would need to be eliminated; or
- the percentage by which overall demand would need to increase.

A16.45 The gain in welfare equals the increase in residential consumers' surplus from making extra non-geographic calls plus the tariff package effect passing on

[20] As explained in Table A2.21 of the December 2010 Consultation we omitted 0843/4 because we did not have data on the expected price. As explained below, we have addressed this data gap by assuming that consumers expect the price to be the same as for 0845 calls. We also omitted 0871/2/3 and erroneously stated that we do not have data on expected prices for these calls. We have corrected this omission. Finally in the December 2010 Consultation we omitted 09 since we did not include other ranges with a significant revenue share (i.e. 0871), there were other (un-modelled) sources of detriment and due to difficulties with data interpretation. We do not think that the first two of these reasons justify the exclusion of 09 from the current modelling exercise. We discuss how we have handled 09 data below.

[21] We have omitted 118 since we do not have data on expected prices and are thus unable to calibrate the demand curve. As a result, we will tend to underestimate the benefits of unbundling. This effect is likely to be fairly small given that total retail revenues and volumes on 118 are relatively small. In 2009, according to the 2010 Flow of Funds study, 118 calls accounted for 17% of revenues and 2% of call minutes on the number ranges that we are proposing to unbundle.

increased OCP profits.[22] This gain in welfare is calculated differently according to the particular benefit of the unbundled tariff we are considering:

- for improved price expectations, the gain in welfare is calculated for each number range on each device (i.e. fixed and mobile) and is then aggregated; and
- for an increase in overall demand, we estimate the weighted average benefit per additional NGC.[23] Based on this, we then estimate how many additional NGCs would be required for the benefits of the unbundled tariff to outweigh the costs.

A16.46 The unbundled tariff will produce a stream of annual benefits for consumers and some annual costs. We have modelled costs and benefits over a ten year period. This is because the unbundled tariff is intended to be an enduring change to the non-geographic numbering system. We anticipate that the unbundled tariff, and the benefits associated with it, will be in place into the long term.[24] Below we have tested the sensitivity of our results to a shorter time horizon.

A16.47 We have used the social time preference rate of 3.5% to calculate the net present value of the benefits.[25] The treatment of future costs is discussed below.

A16.48 We also account for the fact that the overall volume of NGCs is steadily declining. We asked OCPs to provide us with internal documents that forecast non-geographic call volumes, although most were unable to provide this information:

- [✂][26]
- [✂][27]

A16.49 It is difficult for us to be confident that these forecasts are representative, rather than reflecting the particular circumstances of the OCPs in question. Moreover a snapshot forecast for a single year (as provided by [✂]) may not be representative of trends over the 10 year horizon that we model.

A16.50 We also asked OCPs to provide us with internal documents that set out historic trends in non-geographic call volumes. We need to be cautious about how we interpret the data provided since historic volumes may have been affected by the decline in dial-up internet access using the 0845 number range and may not be a reliable guide to future changes in call volumes. In summary, the annual decline in

[22] Effectively we are assuming that the increase in OCPs' surplus is passed on to consumers via lower prices (the tariff package effect).
[23] The consumer surplus per additional call is weighted according to the share of total consumer surplus accounted for by each call type (call type in this case indicating both the device used to make the call and the number range that is called).
[24] Moreover the resource costs of unbundling are either one off costs or an ongoing increase in operating costs, rather than an increase in the costs of replacing assets. For example, while unbundling will result in one-off costs for changing billing systems, it is unlikely to materially increase the cost of a major future upgrade to an OCPs' billing systems (although unbundling creates a tighter relationship between wholesale charges and retail charges, it does not fundamentally change the billing process flow and architecture).
[25] *The Green Book – Appraisal and Evaluation in Central Government*, HM Treasury Guidance.
[26] [✂].
[27] [✂].

the volume of NGCs varied between OCPs and between years but overall the declines were of the same order of magnitude to those forecasted by the OCPs discussed above.

A16.51 In conclusion, our central assumption is that overall volumes decline by 10% per year (if the status quo were to continue, i.e. before we model the effects on the unbundled tariff).[28] However, given the uncertainties we test the sensitivity of our results to an overall decline in volumes of 15% (see below). We believe that these assumptions are reasonable.

A16.52 We have chosen a 10% annual decline in volumes as our base case since faster rates of decline imply NGC volumes will fall to implausibly low levels over the long term. Due to compounding, a 10% annual decline means NGC volumes in year 10 (in terms of our model) are 39% of volumes in year 1, whilst a 15% annual decline means NGC volumes in year 10 are only 23% of volumes in year 1. A fast rate of decline thus implies the disappearance of the vast majority of NGCs which does not fit with arguments made by several stakeholders that there are few alternatives to making calls to non-geographic numbers. Unless a large proportion of NGCs are discretionary, it does not seem realistic that they can continue to decrease at such a fast rate.

A16.53 Finally we account for the fact that the full benefits of the unbundled tariff may not be realised immediately. It is unclear whether the impact of the unbundled tariff on consumers' tendency to overestimate prices and the overall volume of NGCs made will be immediate or whether the effect will be more gradual.

- On the one hand, the example of DWP making its helplines free to caller suggests that consumers' reaction to price changes is relatively quick.[29] On the other hand, the unbundled tariff is not as simple a price message for consumers as making all calls free so consumers' reaction may be slower than in the DWP example.

- The unbundled tariff allows SPs to communicate the SC accurately at the point of call. The 2011 Consumer survey suggests that for up to two-thirds of calls to non-geographic numbers, consumers obtain the number from a source that could also set out the SC.[30] This suggests that the unbundled tariff will immediately improve price transparency for a significant number of callers.

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[28] Assuming a faster rate of decline will reduce the future benefits of unbundling. In contrast, most of the costs of moving to an unbundled system are one-off upfront costs. Accordingly assuming a faster rate of decline will tend to increase the threshold by which demand needs to increase. We include a faster rate of decline in our sensitivity analysis.

[29] When mobile calls to the DWP's helpline were zero-rated in January 2010, the proportion of call minutes to these numbers accounted for by mobiles increased immediately from 7% –prior to the change to 26% in mid-February 2010. In addition, it took less than a year for the proportion of call minutes to these numbers accounted for by mobiles to exceed 40%. This is approaching the proportion of all call minutes that are made from mobiles, namely 49% in 2010 (see Ofcom, CMR 2011, Figure 5.1 on page 245).

[30] 2011 Consumer survey, question GL14: "Thinking about the last time you made a call to a company, shop or public organisation which of the following did you use to get the telephone number?" 65% of callers obtained the telephone number for the last company or public organisation

- However, it may take longer for consumers to learn their AC and so the full impact of the unbundled tariff on consumer price awareness may not be realised immediately.

- In addition, where callers do not have the SC in front of them at the point of call then it may take a while for consumer confidence in making NGCs to be restored.

A16.54 Consequently, we have assumed that the full benefits of the unbundled tariff are not realised until year 3. In year 1, we assume that only 50% of the benefits are realised and in year 2 we assume that only 75% are realised (below this is referred to as "Delayed Scenario 1" and forms part of our base case).[31] We consider that by year 3 the effect of the unbundled tariff will have stabilised, so the full level of any benefits that it yields are realised. However, given the uncertainty around the rate at which the benefits are realised we have tested the sensitivity of our results to two further scenarios. These are "Delayed Scenario 2", which assumes a greater delay in the benefits of the unbundled tariff taking effect, and the "Immediate Scenario" which assumes that the full benefits of the unbundled tariff are realised immediately. Table A16.5 below summarises these scenarios.

Table A16.5: Rate at which the benefits of the unbundled tariff are realised

	Proportion of year 1 benefits realised	Proportion of year 2 benefits realised	Proportion of year 3+ benefits realised
Delayed Scenario 1 (base case)	50%	75%	100%
Delayed Scenario 2	33%	66%	100%
Immediate Scenario	100%	100%	100%

Treatment of costs

A16.55 We use a range of cost scenarios to reflect the current uncertainty behind the potential costs. The range of estimates for the costs of the unbundled tariff, as calculated in Section 13, is summarised in Table A16.6 below. Some of the costs are one-off and upfront while others are incurred annually. As explained above we have modelled costs and benefits over a 10 year period.

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they called from at least one of the following sources: the internet; a letter, bill or leaflet from the company being called; a written advert; or an advert on the TV or radio.

[31] To illustrate, suppose that a reduction in consumer price overestimation of 10% generated benefits of £40m per year prior to any adjustment. In Delayed Scenario 1 the benefits of unbundling are £20m in year 1, £30m in year 2 and then £40m in years 3-10. Note that for the purposes of this illustrative example we have ignored discounting and our assumption that future benefits are diminished as a result of the declining trend in the volume of NGCs.

Table A16.6: Costs of the unbundled tariff

Cost scenario	One-off, upfront costs	Annual costs
Low	£68.8m	£1.8m
Medium	£78.8m	£3.8m
High	£86.7m	£5.8m

A16.56 We have considered two different ways of treating costs.

A16.57 The first approach involves discounting the annual costs of the unbundled tariff using the social time preference rate (3.5%). We then sum the one-off costs with the net present value ('NPV') of the annual costs to estimate the total cost of implementing the unbundled tariff. This approach reflects the method employed in past Ofcom assessments and, for ease, we refer to it as the "Simple" discounting method.

A16.58 However this approach to discounting does not account for the cost to stakeholders of financing investments which are required as a consequence of regulation where the benefits mainly accrue to consumers and/or the wider public. The Joint Regulators' Group ('JRG') has recently consulted on a revised approach to discounting which would explicitly take account of the financing costs incurred by stakeholders for this type of intervention (the "Spackman approach").[32] In summary, under the Spackman approach, financing costs are factored in using a two-step process:

- Convert capital costs (one-off costs) into annual costs using the company's cost of capital. This gives a stream of financing costs, which should be included as part of the cost side of the cost benefit analysis.
- Use the social time preference rate in discounting all costs and benefits, as recommended by the HM Treasury Green Book.[33]

A16.59 Therefore in our base case, we have calculated the NPV's of both one-off and annual costs using the Spackman approach. Specifically to convert the one-off costs into annual costs, we have first assumed that the relative share of the unbundled tariff costs incurred by fixed and mobile OCPs is 50% and 50% respectively.[34] To convert the one-off costs for fixed OCPs, we have used the 'rest

[32] *Discounting for CBAs involving private investment, but public benefit*, JRG consultation, 4 October 2011. This consultation closed on 5 December 2011.The final statement has not yet been published. Further details available at:
http://stakeholders.ofcom.org.uk/binaries/consultations/cba/summary/JRG-condoc.pdf

[33] http://www.hm-treasury.gov.uk/data_greenbook_index.htm

[34] The bulk of the costs that we have quantified are the costs for a small number of OCPs that need to update complex billing systems. We have not attempted to split these cost estimates between fixed and mobile OCPs and have instead adopted a 50:50 split as a simplification (and the results are not sensitive to varing this figure, given the similarities in the fixed and mobile WACCs). Adopting a simplified approach seems reasonable given the other uncertainties. In particular, one of the costs

of BT' (i.e. BT excluding Openreach) pre tax real weighted average cost of capital ('WACC') of 6.5%.[35] We recognise that BT is the largest CP and may not represent the average fixed CP. However, we consider that this is a reasonable proxy in the absence of better information. For mobile OCPs, we have used the pre tax real WACC used in Ofcom's MCT model of 6.2%.[36] Finally, we have assumed that the capital/one-off costs are repaid over 10 years, and the ongoing costs are financed out of operating cash flows (and do not incur financing costs).

A16.60 Below we also test the sensitivity of our results to the "Simple" discounting method. As it has the effect of reducing the threshold levels (compared to the Spackman approach), we use this assumption in our optimistic scenario. For our base case and pessimistic scenarios, we use the Spackman approach.

Actual and expected prices

A16.61 In order to calibrate the demand curves we have used data on actual and expected call prices for residential consumers. Below we first explain how we derived the assumptions used in our base case. We then explain the sensitivities that we have explored, before summarising the figures that we have used.

Base case modelling assumptions

A16.62 As discussed above, residential consumers generally over-estimate prices meaning that their expected prices are above the level of actual prices. In the December 2010 Consultation, we used figures from the 2009 Consumer survey to obtain average (mean) expected prices for each number range.[37] We obtained estimates of actual prices by dividing OCP revenues by the volume of calls for each number range.[38]

A16.63 We continue to use this data. Since the 2009 Consumer survey did not ask about expected 0843/4 prices we have assumed that consumers think these calls cost the same as 0845 calls. This is consistent with the evidence in Section 11 showing that the majority of consumers struggle to distinguish between these number ranges.

A16.64 As in the December 2010 Consultation, we have estimated actual prices using data from the 2010 Flow of Funds study. Specifically, we have taken the total retail revenue for fixed or mobile calls of a particular number range and divided by the corresponding volume of calls. Note that the revenue figures in the 2010 Flow of Funds study exclude VAT. Thus, in order to estimate the average retail price that consumers actually pay, we have added VAT at 15%.[39] This was the prevailing VAT rate in 2009 and is consistent with our use of expected prices from 2009.

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that we have quantified, namely migration costs, are incurred by SPs. We do not have an estimate of the WACC for SPs (indeed, the cost of capital is likely to vary substantially given the diversity of SPs).

[35] *WBA Charge Control*, Ofcom Statement, 20 July 2011, Table 6.3 on page 97. Available at: http://stakeholders.ofcom.org.uk/binaries/consultations/823069/statement/statement.pdf

[36] 2011 MCT Statement, paragraph 9.61.

[37] Responses to questions 43 and 44. These asked "How much do you think it costs to call the following types of telephone numbers from your landline phone/your mobile phone at home during the daytime on a weekday?"

[38] Data on revenues and volumes were obtained from the 2010 Flow of Funds study.

[39] In the December 2010 Consultation we erroneously failed to include an adjustment for VAT.

A16.65 The revenue figures in the 2010 Flow of Funds study include revenues for both residential and business calls. On average, business calls to non-geographic numbers are likely to be cheaper than residential calls to these numbers. As we are modelling the impact of the unbundled tariff on residential callers in this Annex, we need to make an adjustment to the average (business and residential) figures in from the 2010 Flow of Funds study, to avoid underestimating the price of residential calls. Therefore we have produced our estimates of the actual price of non-geographic calls by applying separate uplifts to the figures from the 2010 Flow of Funds study:

- For fixed calls, we have assumed that the average price of business calls to non-geographic numbers is equal to [✂].[40] The major fixed OCPs (BT, Talk Talk and Virgin Media) told us the proportion of their non-total geographic call volumes that were originated by customers on business tariffs.[41] We have used these proportions and the [✂] figure to estimate the revenue that these fixed OCPs earn from business calls to 084, 087 and 09 numbers. We have then subtracted this from their total revenues for 084, 087 and 09 calls to obtain an estimate of residential call revenues. To obtain the fixed uplift, we have estimated by how much the average revenue from residential calls to these numbers exceeds the average revenue from all calls to these numbers. This suggests that we should increase the average revenue figures for fixed calls from the Flow of Funds study by 14% in order to produce an estimate of fixed residential call prices.

- For mobile calls, we have calculated the average revenue for calls from O2, EE, Three and Vodafone to 084, 087 and 09 numbers from the 2010 Flow of Funds study. [✂].[42] This suggests that we should increase the average revenue figures for fixed calls from the Flow of Funds study by 23% in order to produce an estimate of mobile residential call prices.

Sensitivity tests

A16.66 We have also tested the sensitivity of the results to our assumptions about actual and expected prices.

A16.67 First, we have explored the impact of using an uplift of 5% and 25% for fixed call prices (rather than 13%) and an uplift of 10% and 40% for mobile call prices (rather than 23%).

A16.68 Second, we have used alternative estimates for the average expected price taken from the 2011 Consumer survey.[43] Note that the set of questions in the 2011 Consumer survey about expected prices were worded differently to those in the

[40] C&W told us that it does not have a residential consumer base (source: C&W response dated 11 November 2011 to formal information request dated 21 October 2011, question 4). We thus calculated this [✂] figure using data from the 2010 Flow of Funds study for C&W's average retail price for calls to 084, 087 and 09 numbers.

[41] Responses dated 11 November 2011 to our information request dated 21 October 2011 from BT (question 4), Talk Talk (question 5) and Virgin Media (question 4).

[42] [✂]

[43] When using the 2011 Consumer survey data for expected prices we did not make any further adjustment to the actual prices, even though these are taken from 2009 data. As explained in Section 3, as a consequence of the 08x CAT Judgment the current retail prices of mobile 0845 and 0870 calls are in a state of flux.

2009 Consumer survey. Specifically, we showed respondents a number of statements and asked which best described what they know about the cost of calling a particular number range from their mobile and from their landline.[44] For those that responded "I know how much it costs per minute" we then asked them how much they thought it cost to call that number range, during peak hours, in the daytime on a weekday, from their landline/their mobile.[45] We have used the responses to this latter question as an alternative estimate for expected prices. Note that we did not ask about 0843/4 and 0871/2/3 calls in these questions and have thus assumed that consumers expect calls to these number ranges to cost the same as 0845 and 0870 calls respectively. We also did not ask about 09 calls in the 2011 Consumer survey. However, average (mean) expected prices in the 2011 Consumer survey were approximately two thirds of those in the 2009 Consumer survey. We applied this rule of thumb to create an alternative estimate for expected 09 call prices.

A16.69 Note that the ppm expected prices taken from the 2011 Consumer survey are likely to understate residential consumers' beliefs about prices.

- Only 14% and 7% of respondents stated that they know the costs of 0845 and 0870 calls from landlines. For mobile calls the corresponding percentages were 10% and 7% (see Table A16.7 below). As a result, only a minority of respondents to the 2011 Consumer survey were directed to the subsequent question asking for a ppm estimate of the price.

- Moreover, the question routeing means that we only asked for a ppm estimate of the price from those respondents who consider themselves to be particularly aware of prices. It is unsurprising that this subset of consumers tends to make more accurate predictions of actual prices i.e. that they tend to overestimate prices less. In other words consumers as a whole would tend to have less accurate expectations about call prices than the (small minority) of respondents that provided a ppm estimation in the 2011 Consumer survey.

- This is reinforced by the much higher proportion of respondents saying "I do not know how much it costs per minute but think it is expensive" compared to those saying they "…do not think it is expensive" (see Table A16.7 below). In other words, those respondents that were not routed to the second ppm question generally tend to think these calls are expensive. It thus seems plausible that, had we pushed them to provide a ppm figure then this would increase our estimates of the mean expected price.

[44] The options were "I have never heard of [those] numbers", "I know how much it costs per minute", "I do not know how much it costs per minute but think it is expensive", "I do not know how much it costs per minute but do not think it is expensive" and "I do not know how much it costs per minute and don't know whether it's expensive". 2011 Consumer survey, question GL01.
[45] 2011 Consumer survey, question GL02.

Table A16.7: Consumers beliefs about fixed and mobile 0845/0870 calls

	Fixed 0845	Fixed 0870	Mobile 0845	Mobile 0870
I have never heard of [those] numbers	7%	17%	4%	11%
I know how much it costs per minute	14%	7%	10%	7%
I do not know how much it cost per minute but think it's expensive	39%	37%	51%	46%
I do not know how much it cost per minute but do not think it's expensive	15%	7%	8%	5%
I do not know how much it cost per minute and don't know whether it's expensive	24%	32%	27%	30%

Source: 2011 Consumer survey, question GL01

Summary of our assumptions in relation to actual and expected prices

A16.70 Table A16.8 below summarises the actual and expected prices that we used to calibrate the demand curves. For the purposes of this Table, these figures are rounded to two decimal places.

Table A16.8: Actual and expected prices (residential calls)

	Fixed			Mobile		
	Mean expected price (2009, £pm)	**Mean expected price (2011, £pm)**	**Average actual price inc. VAT (2009, £pm)**	**Mean expected price (2009, £pm)**	**Mean expected price (2011, £pm)**	**Average actual price inc. VAT (2009, £pm)**
0843/44	0.30	0.15	0.06	0.46	0.32	0.21
0845	0.30	0.15	0.05	0.46	0.32	0.22
0870	0.39	0.24	0.08	0.51	0.34	0.20
0871	0.39	0.24	0.13	0.51	0.34	0.34
09	0.70	0.46	0.85	0.70	0.47	1.13

Quantities

A16.71 We are modelling residential consumers' demand. In order to calibrate the demand curves, we used data on fixed and mobile call volumes taken from the 2010 Flow of Funds study and reduced them by 31%[46]. As with prices above, this is to reflect the fact that the 2010 Flow of Funds study data includes both residential and business volumes. Our figure of 31% was estimated by calculating a weighted average of the proportion of calls originated by business consumers across the largest fixed and mobile OCPs.[47] This data is summarised in Table A16.9 below.

Table A16.9: Residential call volumes

	Fixed volumes (millions of minutes)	Mobile volumes (millions of minutes)
0843/44	3,386	413
0845	5,376	840
0870	1,442	267
0871	911	199
09	184	52

The own-price elasticity of making NGCs

A16.72 The final piece of evidence we used to model the demand curves was the own-price elasticity demand for fixed calls to each number range and for mobile calls to each number range.

A16.73 In the December 2010 Consultation, our estimate of the own-price elasticity was -0.3. This was the central estimate used in a similar exercise carried out for the 2005 NTS Consultation.[48]

A16.74 We received a number of responses regarding our use of this elasticity figure:

- Vodafone stated that Ofcom's demand assumptions were based on "pure assumption".[49] Vodafone observed that the impact on welfare depends on how sensitive consumers are to changes in the perceived price.[50] Vodafone stated

[46] This adjustment is not applied to 09 however, as the majority of these calls are likely to be made by residential callers. Thus in this case, we believe the data from the 2010 Flow of Funds Study accurately represents residential call revenues and volumes.
[47] Specifically BT, C&W, Talk talk, Virgin Media's fixed business, O2, EE, Vodafone and Three. The proportion of business calls from each of these OCPs was taken from their responses to question 4 of our 21 October 2011 information request (question 5 in the case of Talk Talk). They were weighted using volume data for 084, 087 and 09 calls from the 2010 Flow of Funds study.
[48] December 2010 Consultation, paragraph A2.227.
[49] Vodafone, December 2010 Consultation response, paragraph 154.
[50] Vodafone, December 2010 Consultation response, paragraph 157.

that qualitative evidence suggested that consumers' calling decisions were influenced by other factors and might be relatively price insensitive. Vodafone stated that, to the extent that price played a role, price perceptions might segment consumers according to their price sensitivity.[51]

- Three stated that Ofcom's calculations were dependent on Ofcom's elasticity assumptions. Three considered it would be helpful if Ofcom could provide further evidence to support these assumptions.[52]

- O2 stated that demand for non-geographic calls was relatively price inelastic.[53] As discussed in Annex 8, O2 argued that Ofcom overestimated the extent to which demand would increase.[54]

- Virgin Media did not specifically comment on our consumer detriment calculations. However it stated that provision of additional price information is unlikely to stimulate additional demand and cited our survey results in support of its position. [✂].[55] We discuss this material further in Annex 8.

A16.75 An own-price elasticity estimate of -0.3 has been used in a number of contexts:

- In the 2005 NTS Consultation we carried out a similar exercise in which we estimated the amount of consumer detriment associated with overestimating the price of 0845 and 0870 calls.[56] The -0.3 elasticity figure was described as a "market" elasticity and as a "conservative estimate (i.e. one that will tend to understate the detriment associated with price misperceptions)". We considered that this view was supported by a 1997 US academic paper.[57] That paper stated that "The conventional view in the literature is that the price elasticity is of the order of -0.3 to -0.4 for intralata calls and -0.7 for long-haul interstate calls".[58] We conducted some sensitivity testing of our elasticity estimate using values of -0.2 and -0.4.[59]

- In the 0870 Statement, we carried out a similar exercise in relation to 0870 calls. We again described the -0.3 elasticity as "conservative".[60] We also further discussed the interpretation of the 1997 US paper cited above. We stated that the distinction between intralata and interstate calls in the US is somewhat analogous to that between local and national calls in the UK. We considered that the assumption that the elasticity of demand for 0870 calls is similar to that for local calls was likely to be conservative, since in terms of price and probably purpose of the call, 0870 is likely to be more similar to national calls. However, UK data suggests that national call price elasticities tend to be lower than those of long-distance calls in the US. Therefore, we proposed that an elasticity of -0.4 was

[51] Vodafone, December 2010 Consultation response, paragraph 158.
[52] Three, December 2010 Consultation response, paragraphs 21-22.
[53] O2, December 2010 Consultation response, paragraph 93.
[54] O2, December 2010 Consultation response, paragraphs 13-14. Also paragraphs 38-43
[55] Virgin Media, December 2010 Consultation response, Q4.2 on pages 9-10.
[56] 2005 NTS Consultation, paragraphs 5.57-5.63.
[57] *Toll Price Elasticities Estimated from a Sample of U.S. Residential Telephone Bills*, Information Economics and Policy, Vol. 9, No. 1, pp. 51-70, Rappoport, P. N. and Taylor, L. D. (1997).
[58] 2005 NTS Consultation, paragraph 5.59 and associated footnote 27.
[59] 2005 NTS Consultation, paragraph 5.63.
[60] 0870 Statement, paragraph A3.49.

likely to be reasonable for the UK and considered it could still be seen as conservative, relative to the estimate of -0.7 for interstate calls.[61] We presented results in the 0870 Statement for a range of elasticities between -0.2 and -0.6.[62] We stated that we placed more weight on the welfare estimates associated with elasticities of -0.4 or above (in magnitude) compared to those assuming elasticities of -0.3 or less (in magnitude).[63]

- In the 2011 MCT statement, Ofcom considered the relative price elasticity of demand for mobile subscriptions and calls. However, we concluded that we did not have reliable estimates for these figures and estimated an industry-wide average for both (-0.3).[64]

- In the April 2010 MCT consultation, Ofcom cited a number of papers which found that the (industry-wide) elasticity of demand for subscriptions was less than 1 (around 0.5 or less). When these papers were submitted to the CC in the course of appeals to our 2007 MCT decisions, the CC had a number of concerns with them and instead decided to use a lower industry-wide elasticity of -0.3 in its calculations.[65] With respect to calls, a number of studies also indicated that the demand elasticity was likely to be higher than -0.3 (in absolute terms).[66]

A16.76 As explained above, the thresholds calculated in this Annex are not intended to be precise – rather their purpose is to help indicate the order of magnitude. We consider that our own price elasticity assumption of -0.3 is suitable for this purpose. In particular:

- We respond to stakeholders' arguments about the extent to which demand is currently suppressed in Annex 8. In particular, the evidence in that Annex suggests that demand is inelastic (i.e. magnitude of elasticity less than 1) but is not completely unresponsive to price expectations (i.e. not zero elasticity).

- We consider that calls to many non-geographic numbers are likely to be fairly price insensitive. This is consistent with the comments from Vodafone, O2 and Virgin Media cited above. A low own-price elasticity such as -0.3 fits with this view.

- The -0.3 figure is consistent with our approach in the 2005 NTS Consultation and the 0870 Statement, where it was described as conservative.

A16.77 In addition, we have explored the impact of changing our elasticity assumption by using elasticities of -0.2 and -0.4.[67] As explained below, a change in the elasticity assumption has opposite effects on the two different thresholds. Since in practice we would expect the unbundled tariff to lead to both a reduction in price

[61] 0870 Statement, paragraph A5.22.
[62] See for example 0870 Statement, Figures 2 and 3.
[63] 0870 Statement, paragraph A3.49.
[64] 2011 MCT Statement, footnote 443 to paragraph 7.139.
[65] 2011 MCT Statement, footnote 443 to paragraph 7.136.
[66] Wernick et al. (2010) used data from 16 Member States between 2003 and 2008, and estimated the long-run price elasticity for mobile voice minutes to be in the range of 0.52-0.61. In addition, Credit Suisse suggested an industry-wide call demand elasticity of 0.75 in June 2010.
[67] This is the same range for elasticity assumptions that we used in the 2005 NTS Consultation. In the 0870 Statement we used a slightly wider range, namely -0.2 to -0.6.

overestimation and a shift in demand, this suggests that our overall conclusions are less sensitive to our assumptions about own price elasticity.

The demand function

A16.78 In the detriment calculations for the December 2010 Consultation, we assumed a log-linear demand function.[68] We also used this functional form in the 2005 NTS Consultation and the 0870 Statement.

A16.79 In its response to this consultation, Vodafone stated that Ofcom's demand function was based on "pure assumption".[69]

A16.80 We are not aware of evidence that shows empirically what functional form best reflects the demand for non-geographic calls in the UK. However, as explained above, the thresholds calculated in this Annex are not intended to be precise – rather their purpose is to help indicate the order of magnitude. We consider that our assumed functional form is adequate for this purpose.

A16.81 In addition, as set out below, we have tested the sensitivity of the results to alternative assumptions about the shape of the demand function. Compared to our base case, using a linear demand function increases the threshold at which the shift in the demand outweighs the costs of the unbundled tariff by a factor of approximately 0.5. Compared to our base, a linear demand function does not have a material effect on the threshold for the improvement in the accuracy of price expectations. Using a constant elasticity formulation reduces both thresholds[70]. Our log-linear specification produces results that are between these two alternatives.

Treatment of price under-estimation

A16.82 As shown in Table A16.8 above, the average expected price for non-geographic calls is higher than the average actual price for all of the number ranges that we have modelled, except 09. In the case of 09 calls, the average expected price is lower than the average actual price. This has implications for the mechanics of the model in terms of how the benefits of the unbundled tariff are estimated for the 09 number range.

A16.83 In terms of improved price perceptions, the model captures the positive effect of reduced under-estimation of prices and thus reduced over-consumption.

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[68] Specifically, $Q=Ae^{-\lambda p}$. December 2010 Consultation, footnote 305 to paragraph A2.227.

[69] Vodafone, December 2010 Consultation response, paragraph 154.

[70] When calculating the results using a demand function with constant elasticity, we assume a choke price of £1pm for all non-geographic calls. In other words, we assume that the maximum price any individual is willing to pay for any non-geographic call is £1/minute. We have made this assumption because of the properties of a demand function with constant elasticity – given our elasticity assumptions, consumer surplus will be infinite without assuming a choke price. We consider £1/minute is a suitable choke price as it is substantially above the current price of 084 and 087 calls. In addition, the thresholds calculated by the model are not materially sensitive to changes in the choke price. In the case of 09 calls, the choke price is clearly higher than £1/minute (the current price of 09 calls are often higher than this figure). However, as discussed below, 09 calls are excluded from our calculations.

A16.84 However, we have assumed that there is no change in consumer surplus for 09 calls as a result of a shift in the demand curve.[71] Without this adjustment a shift in the demand curve potentially reduces consumer surplus (depending on the particular parameters chosen). Since consumers are assumed to under-estimate the price, they make too many 09 calls, leading to consumer harm. This over-consumption, and thus the level of consumer harm, can be exacerbated if the demand curve shifts to the right.

A16.85 We consider that this simplification is reasonable:

- Intuitively, it seems unlikely that improving consumer price awareness (i.e. the unbundled tariff) leads to consumers making more errors.

- The reduction in consumer surplus that we sometimes observe in our model may simply be an artefact of the modelling assumptions that we have made. First, when we model a shift in demand we assume there is no improvement in the accuracy of price expectations. In practice, the unbundled tariff is likely to improve both the accuracy of price estimations and lead to a shift in demand. Second, in practice the 09 number range contains a far wider range of price points than any other number range (e.g. from 10ppm to £1.53ppm on BT). Our approach of using a single average expected price and a single average actual price is less likely to reflect the position of an individual caller to this number range.

- The 09 number range is fairly small in terms of call volumes and revenues. According to the 2010 Flow of Funds Study, 09 accounted for 15% of revenues and 2% of call minutes on the 084, 087 and 09 number ranges. The impact on our overall results is thus limited.

Fixed and mobile substitution

A16.86 The -0.3 own price elasticity figure discussed above relates to the responsiveness of the demand for NGCs (in aggregate) to an across the board change in the price of those calls ("NGC-level elasticity"). We do not model substitution between fixed and mobile calls to non-geographic numbers.

A16.87 In reality there is clearly substitution between different devices. For example, if the expected price of mobile calls to non-geographic numbers were to fall relative to the expected price of fixed calls, we would expect some consumers to react by making fewer fixed calls and more mobile calls.

A16.88 The existence of substitution between fixed and mobile calls to non-geographic numbers means there is an additional source of consumer detriment that is not captured in our modelling, namely using the 'wrong' device to make a call. Incorrect expectations about the relative price of NGCs from landlines and mobiles can lead to two sorts of error:

- consumers may use the more expensive device and pay a higher actual price, e.g. if consumers incorrectly overestimate the price of fixed calls relative to

[71] We have also applied this modification in the case of mobile 0871 calls when using the 2011 Consumer survey. As explained below, the mean expected mobile 0871 price from this particular survey appears to be lower than the actual price.

mobile calls, they will erroneously make more calls from mobiles and incur higher costs than they would if they were aware of the correct prices; and

- consumers may use the less convenient device, e.g. if consumers incorrectly overestimate mobile call prices relative to fixed call prices, they may make calls from their landlines even when a call from their mobile phone would be more convenient due to benefits of mobility.

A16.89 In order to capture the effects discussed above, we would need to model fixed and mobile substitution as interrelated systems of demand equations. For this, the following would be required:

- assumptions about cross-price elasticities i.e. assumptions about the responsiveness of mobile demand to changes in fixed prices and vice versa; and

- the -0.3 NGC-level elasticity discussed above would need to be adjusted to reflect the scope for substitution between landlines and mobiles (consistent with assumptions about cross-price elasticities). We would expect the absolute elasticity to be higher since, for example, a change in the price of mobile calls would lead to a greater change in mobile volumes as some consumers would substitute to fixed calls.

A16.90 In light of the above, we have adopted a simplified approach and not modelled fixed to mobile substitution. Our rationale is as follows:

- First, estimating a full demand system is more complex. We would need to make more assumptions (e.g. cross-price elasticities) about which we have little data. Therefore, it is not clear the precision of our estimates would be increased by adopting a more complex approach.

- The thresholds we have estimated will be too low if, in fact, the unbundled tariff leads to consumers choosing the 'wrong' device to make a call more often than they do at present. It is questionable whether this would be the case. In other words, the impact if fixed/mobile substitution were modelled is ambiguous.[72] On the one hand, if the unbundled tariff improves consumers' price awareness then they may choose the 'wrong' device less often (a benefit that is not captured in our modelling). On the other hand, if consumers' awareness of the price of calls from one device improves by much more than their awareness of the price of calls from the other device then this may skew their choice of whether or originate calls using a landline or a mobile. If consumers choose the 'wrong' device more often then this is a potential detriment that is not captured in our modelling.

- The thresholds we have calculated reflect across the board changes to both fixed and mobile calls (consistent with the fact that the unbundled tariff would apply to both fixed and mobile OCPs). As a result, the extent of substitution between fixed and mobile calls to the unbundled number ranges consistent with our modelling assumptions may not be material.

[72] Moreover, it is not clear how costly any errors are. The 2010 Flow of Funds study indicates that, in 2009, the average actual price of fixed NGCs was 20ppm and the average actual price of mobile NGCs was 33ppm (excluding VAT). This suggests that, once VAT is included, the extra cost of making a mobile call may average around 15ppm. This 15ppm figure does not take any convenience factors into account.

- When modelling the reduction in price overestimation, the threshold we calculate is the proportionate fall in the gap between actual and expected prices for all calls. In other words, we have not modelled a disproportionate change in consumers' price expectations on one device compared to the other. Moreover, given most thresholds are low (generally 10% or less – see below), the modelled change in relative ppm prices between fixed and mobile calls is likely to be low. This implies that, for the types of threshold we have modelled, substitution between fixed and mobile calls is unlikely to be a major factor.

- When modelling the shift in demand we have assumed that there is no change in expected prices. As a result, in this case, substitution between fixed and mobile calls is unlikely to be material.

Substitution between number ranges

A16.91 We have not modelled substitution between number ranges. However, a change in the expected price of calls to one non-geographic number range might lead to substitution to or from other non-geographic number ranges. We cover off this point relatively briefly since it raises similar modelling issues to fixed and mobile substitution, which is already discussed above.

A16.92 We have adopted a simplified approach and not modelled substitution between number ranges. Our rationale is as follows:

- In order to address substitution between number ranges we would need to make a series of assumptions about the cross-price elasticities between various number ranges. Since we have modelled five number ranges then we would need a 5x5 matrix setting out the various elasticities. Moreover we would also need to consider whether to model substitution to and from other number ranges that we are not unbundling, in particular 03 and 080. As a result, capturing substitution between number ranges could lead to a significant increase in the complexity of our modelling and in the number of assumptions that we would need to make. As a result, it is far from clear that the precision of our estimates would increase.

- The thresholds we have estimated will be too low if, in fact, the unbundled tariff leads to consumers calling a sub-optimal non-geographic number more often. Such sub-optimal calls occur if there is a superior service on another number range (in terms of price and/or quality) but the consumer decides not to call it because their expectations about the relative prices of calling different number ranges are incorrect. It is questionable whether this type of consumer error would increase as a result of the unbundled tariff. In other words, the impact if substitution between number ranges were modelled is ambiguous.

- The thresholds that we have calculated reflect across the board changes to all the number ranges that we have modelled (since they are all unbundled). Since relative expected prices do not change much in our modelling, the extent of substitution for calls to different unbundled number ranges may not be material.

- More generally, it is not clear whether substitution between number ranges is in fact a material issue. On the one hand, a reasonable proportion of consumers may be locked in to calling a particular SP. Moreover, there is evidence that somewhat different types of services are often provided via different non-

geographic number ranges.[73] On the other hand, where the services provided via different non-geographic numbers are substitutes, it seems likely that consumers would be willing to substitute from a 0845 call (say) to a 0844 call.

Dispersion in actual and expected prices

A16.93 In practice price expectations are dispersed, with some consumers overestimating prices to a varying degree and others underestimating prices. Similarly the actual price a consumer pays for a call depends on which OCP they subscribe to and (particularly in the case of 09 calls) which particular service they call.

A16.94 Our modelling takes into account two major sources of price dispersion, by separately modelling (i) fixed and mobile calls; and (ii) different number ranges. However within those broad categories we have used the mean expected price of calls and the average actual price of residential calls to calibrate the demand curves. We refer to this below as an 'averaging' approach.

A16.95 In some circumstances, the averaging approach that we have adopted can underestimate consumer detriment. As a result, it can underestimate the benefits of addressing that detriment through the unbundled tariff. To illustrate consider the following two illustrative examples, both of which focus on the detriment caused by price misperceptions.

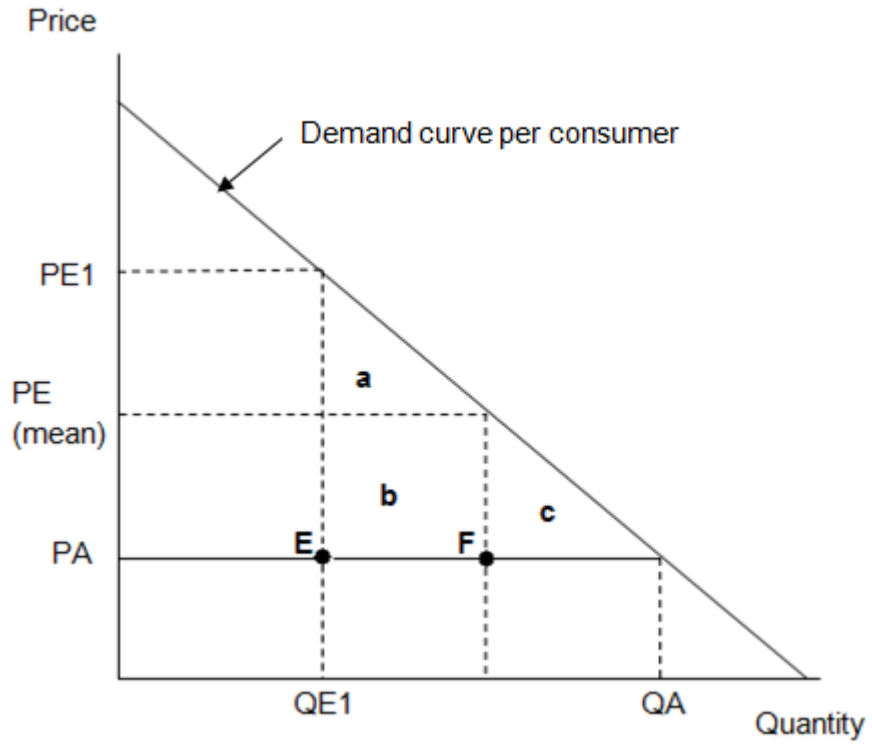
A16.96 The first illustrative example is shown diagrammatically in Figure A16.10.

- Suppose that the actual price of calls is PA and that there are 100 consumers who have identical demand curves and only differ in their expected price.
- Fifty consumers correctly believe that the price is PA. Since their beliefs are correct, these consumers do not suffer any detriment. The other 50 consumers overestimate the price and incorrectly believe that it is PE1. As a result, these consumers make too few calls (as shown by quantity QE1 compared to QA) and are located at point E in Figure A16.10. These consumers suffer detriment equal to area a+b+c. Total detriment, added up across all consumers, is equal to 50(a+b+c).
- If instead we adopt an averaging approach then the mean expected price is halfway between PE1 and PA. The average consumer is thus assumed to be at point F in Figure A16.10 and suffers detriment equal to area c. Total detriment, added up across all consumers, is thus calculated to be 100c.
- The averaging approach thus leads to a lower estimate of total detriment (namely 100c) than an approach that takes price dispersion into account (where detriment is 50(a+b+c)).[74]

[73] One reason for this is the differences in termination rates and calling prices associated with different number ranges. In particular 09 services are likely to be very different to those provided through most 08 numbers.

[74] Mathematically, this is because the triangular area showing the extent of consumer detriment increases at a rate that is proportionate to the square of the difference between the actual and the expected price. Consumers that significantly overestimate the price incur disproportionately higher detriment. However the use of an average expected price places insufficient weight on this.

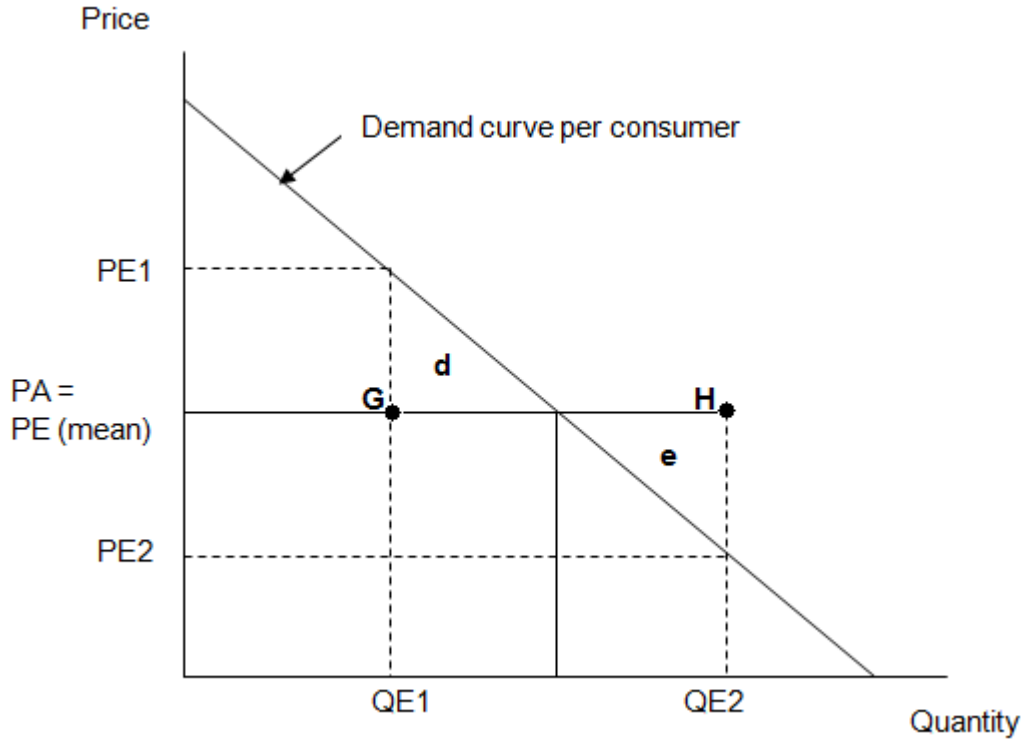
Figure A16.10: First illustrative example



A16.97 The second illustrative example is shown diagrammatically in Figure A16.11.

- Suppose that the actual price of calls is PA and that there are 100 consumers who again have identical demand curves differing only in their expected price.
- Fifty consumers overestimate the price and incorrectly believe that it is PE1. These consumers are located at point G in Figure A16.11 and suffer detriment equal to area d as a result of their under-consumption. In contrast, the other fifty consumers underestimate the price and incorrectly believe that it is PE2. These consumers are located at point H in Figure A16.11 and suffer detriment equal to area e as a result of their over-consumption. Total detriment, added up across all consumers, is equal to 50(d+e).
- If instead we adopt an averaging approach then the mean expected price is halfway between PE1 and PE2. This equals the actual price (PA) and thus, under the averaging approach, the average consumer is assumed to suffer no consumer detriment.
- The averaging approach thus leads to a lower estimate of total detriment (zero) than an approach that takes price dispersion into account. Intuitively this is because, under the averaging approach, price underestimation has the effect of offsetting price overestimation, whereas detriments arise in both cases.

Figure A16.11: Second illustrative example



A16.98 In both the illustrative examples explained above, all consumers have the same demand curve, which is a simplification of the variation in demand we would expect in reality. In practice, the averaging approach may lead to the demand curve being calibrated differently. As a result, the impact of an averaging approach is uncertain.

A16.99 Indeed, if we were to try and take price dispersion into account in our modelling it is not obvious how we would go about calibrating the demand curve.[75] In order to calculate the thresholds at which the benefits of the unbundled tariff outweigh the costs, we would also need to specify how the unbundled tariff affects the dispersion of expected prices.

A16.100 We consider that our averaging approach is fit for purpose. It is not clear that an averaging approach overestimates the benefits of the unbundled tariff. Similarly it is not clear that the added complexities of trying to take price dispersion into account would improve the accuracy of our estimated thresholds.

A16.101 In addition, Table A16.12 below shows the mean, mode and median expected prices from the 2009 Consumer survey.[76] With the exception of 09 calls, the median

[75] Further, insofar as expected prices are correlated with actual prices (i.e. consumers that pay a higher actual price tend to expect the price of calls to be higher), our data does not allow us to take this into account.

[76] As explained above, we have assumed that expected 0843/4 prices are the same as for 0845.

and mode[77] are lower than the mean. However they are consistently higher than the mean expected prices in the 2011 Consumer survey (except for 09).[78] Thus, where we use the 2011 Consumer survey figures we are taking a more conservative approach than if we used the mode or median expected prices from the 2009 Consumer survey. In our sensitivity testing of the results, we have explored the impact of using these alternative measures of the expected price.

Table A16.12: Mean, mode and median expected prices from the 2009 Consumer survey

Perceived prices (£pm)	0843/44		0845		0870		0871		09	
	Fixed	Mobile	Fixed	Mobile	Fixed	Mobile	Fixed	Mobile	Fixed	Mobile
2009 mean	0.30	0.46	0.30	0.46	0.39	0.51	0.39	0.51	0.70	0.70
2009 median	0.18	0.38	0.18	0.38	0.38	0.38	0.38	0.38	0.76	0.76
2009 mode	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	1.1	0.93
2011 mean	0.15	0.32	0.15	0.32	0.24	0.34	0.24	0.34	0.46	0.47

The effects of the unbundled tariff that we have not modelled

A16.102 Finally we briefly summarise various other effects of the unbundled tariff that are not captured in the modelling described above namely:

- our concerns in relation to actual prices and vulnerable consumers;
- the impact on business callers, SPs, OCPs and TCPs; and
- migration by SPs.

Actual prices and vulnerable consumers

A16.103 In Table A16.1 above we set out seven concerns about the current operation of the retail market. As explained above, we would anticipate that the unbundled tariff will help address all of these concerns. However we have omitted a number of these benefits when modelling the thresholds at which the benefits of the unbundled tariff outweigh the costs.

[77] For the majority of call types, "don't know" was the most popular response. However, for the purposes of this exercise, we have calculated the mode by focussing on the most popular numerical response.

[78] As explained above, it is likely that the 2011 Consumer survey understates the price that consumers expect to pay for NGCs. We have not calculated the mode and median figures for the ppm estimates from this survey, particularly as this would not take into account those respondents that did not know the price of calls but did have a view on whether or not they were expensive.

- In particular, we have not modelled the impact of a change in actual non-geographic calls prices (Concern 5; this is interrelated with our Concerns 3 and 4 in relation to competition between OCPs and SPs).[79] This is because the prices of NGCs are interrelated with the price of other telecoms services (the tariff package effect). This makes the welfare effects difficult to quantify.

- We have not taken into account the particular weight we attach to the supply of socially important services to vulnerable consumers (Concern 7). This is because it is difficult to attach a monetary value to this effect.

A16.104 In paragraph A2.232 of the December 2010 Consultation we noted that we had not modelled the impact of a fall in actual NGC prices. In response, Vodafone stated that Ofcom failed to demonstrate that actual prices are unduly high.[80] Further Vodafone noted that Ofcom's figures suggest consumers significantly overestimate prices and Vodafone considered that correcting this would have a greater impact than a "marginal" change in the actual price.[81]

A16.105 We do not agree with Vodafone that we have failed to demonstrate that the pattern of actual retail prices is distorted. Our evidence and reasoning is set out in Annex 8. However we do agree with Vodafone that the potential benefits from addressing the lack of price awareness could well be larger than the benefits from small changes in actual prices (given the extent to which consumers misperceive prices for NGCs and offsetting impacts via the tariff package effect).[82]

Impact on business callers, SPs, OCPs and TCPs

A16.106 As explained above, our modelling estimates some of the benefits to residential consumers. We have not modelled the benefits of the unbundled tariff for business consumers, OCPs, TCPs and SPs.[83] Modelling the effect on these other classes of stakeholder would require further information. For example, to estimate the impact on SPs we would need to know the incremental benefit to them of additional calls (something that is likely to be difficult to estimate, given the diversity of SPs). In any event, the effects of the unbundled tariff that we have not modelled are likely to be positive.

A16.107 It is useful to distinguish between two effects of the unbundled tariff:

- the unbundled tariff is likely to increase the number of NGCs that are made (e.g. by reducing the tendency of consumers to over-estimate the price of such calls and increasing consumer confidence in making NGCs); and

[79] As explained above, we have modelled the pass through of OCPs' higher profits from increased call volumes to residential consumers. However we do not know what proportion of this reduction in telecoms prices would be reflected in lower prices for non-geographic calls for vulnerable consumers.
[80] Vodafone, December 2010 Consultation response, paragraph 151.
[81] Vodafone, December 2010 Consultation response, paragraph 152.
[82] Note that changes in the actual price of calls can lead to improved price awareness. See for example our proposed interventions in relation to 080 and 0500 calls.
[83] While we did calculate the impact on OCPs' incremental profits from additional call volumes, this was in order to calculate the benefits which flow back to residential callers via the tariff package effect.

- the unbundled tariff is likely to lead to greater competition between OCPs and SPs, brought about by increased price transparency and consumer price awareness.

A16.108 In terms of the effect of increased call volumes, this is likely to be positive for OCPs, SPs and TCPs:

- For OCPs, the initial impact of higher NGC volumes on profits is likely to be positive since the access charge is likely to be greater than the marginal cost of originating a NGC. The thresholds that we have modelled reflect the proportion of these incremental profits that is likely to be passed onto residential callers via the tariff package effect. However, our calculations do not take into account the proportion that may be retained by OCPs as profit.

- For TCPs, the initial impact of higher NGC volumes on profits is likely to be positive since the termination rate is likely to be greater than the marginal cost of terminating a NGC. Some of this extra profit may be retained by TCPs whilst some is likely to be passed onto SPs via lower hosting fees or a larger revenue share.

- For SPs, the initial impact is likely to be positive as they are likely to benefit from receiving extra calls. Some of SPs' extra profit may be retained whilst some may be passed on in a variety of ways (including being passed to callers via service improvements, thereby addressing Concern 6 and potentially leading to a shift in demand).

A16.109 In terms of the impact of greater competition, increased competitive pressures on SPs and OCPs are likely to have a positive overall effect (looking at all stakeholders, including callers).[84]

A16.110 Finally, we have qualitatively considered the impact on business callers in Section 10 as part of our assessment of the unbundled tariff. In Section 12 we also consider whether the unbundled tariff should apply to business callers. In particular we are inviting comments from stakeholders as to whether the unbundled approach would lead to particular regulatory burdens for business consumers. In the light of the responses we receive we will decide whether or not the unbundled tariff should apply in a different fashion in the case of some business callers. The scope for flexibility towards business callers means that this intervention should, at the worst, avoid imposing a significant negative effect on them and may be beneficial.

Migration by SPs

A16.111 Finally, applying the unbundled tariff to 0845 and 0870 calls may lead to some SPs migrating away from those number ranges, such as to 03 (see Section 11).[85] This will tend to reduce the volume of calls to 0845 and 0870 and increase the volume of calls to number ranges such as 03. We have not taken this into account in our

[84] Obviously increased competition is likely on average to have a negative impact on suppliers' profits, but our view is that it is generally likely to be outweighed by the wider benefits, such as lower prices for customers.

[85] Similarly our interventions in relation to 080 and 0500 may lead to some 080 SPs migrating to the cheaper unbundled ranges such as 03.

modelling. Doing so would involve assessing how much better or worse a consumer fares if a number is on 03 rather than 0845/0870. This is not straightforward.

EE's proposed approach to modelling

EE's response to the December 2010 Consultation

A16.112 EE considered that Ofcom's detriment calculation in the December 2010 Consultation was "conceptually flawed" because it attributed any price misperception (even those that were common to geographic calls) to market failures that related solely to NGCs.[86] EE cited the 2009 Consumer survey, in which a significant proportion of consumers responded "don't know" when asked the price of calls to 01/02 numbers. EE thus inferred that "A lack of price awareness … seems pervasive even where there is no market failure".[87] EE thus attempted to estimate the additional price misperception associated with NGCs, over and above geographic calls.[88] Tables A16.13 and A16.14 below show the estimates of the actual price and the perceived price used in the 2010 Consultation for each of fixed and mobile calls and EE's adjusted estimates of the perceived price (in which EE tried to reflect the incremental misperceptions associated with NGCs).[89]

Table A16.13: Fixed call prices used for detriment calculations in the December 2010 Consultation with EE's adjustments

	Actual price (ppm) (excl. VAT)	Expected price (consultation) (ppm)	Expected price (EE method A) (ppm)	Expected price (EE method B) (ppm)
03	2.9	11.1	4.1	6.4
0800	0	6.1	0	0
0845	3.6	29.8	4.0	6.4
0870	6.1	38.7	7.8	15.3

Source: Actual price and expected price taken from 2010 Consultation, Table A2.21. Adjusted expected prices taken from EE's December 2010 Consultation response,, annex 1, paragraph 9.

[86] EE, December 2010 Consultation response,annex 1, paragraph 3.
[87] EE, December 2010 Consultation response, , annex 1, paragraph 4. Also paragraph 20.
[88] Specifically, suppose the proportion of consumers that responded "don't know" when asked the price of 01/02 calls is X and the proportion responding "don't know" when asked the price of a non-geographic call is Y. EE referred to (Y-X)/Y as the "marginal uncertainty" associated with a particular number range. EE then used this percentage to derive a new figure for perceived price of non-geographic calls. This is done either by scaling up the actual price associated with non-geographic calls (which it referred to as "Method A") or by scaling down the difference between the actual price of non-geographic calls and the perceived price reported in our survey responses (which it referred to as "Method B"). EE, December 2010 Consultation response, annex 1, paragraphs 7-10.
[89] In order to correct an error in the December 2010 Consultation, the actual price figures need to be uplifted by 15% to reflect VAT.

Table A16.14: Mobile call prices used for detriment calculations in the December 2010 Consultation with EE's adjustments

	Actual price (ppm) (excl. VAT)	Expected price (consultation) (ppm)	Expected price (EE method A) (ppm)	Expected price (EE method B) (ppm)
03	1.0	22.8	1.4	10.5
0800	14.1	28.6	15.9	15.9
0845	15.3	45.7	18.6	21.9
0870	14.3	51.0	18.4	24.6

Source: Actual price and expected price taken from 2010 Consultation, Table A2.21. Adjusted expected prices taken from EE's December 2010 Consultation response, annex 1, paragraph 9.

A16.113 EE's adjustments mean that the expected prices of NGCs are much closer to actual prices. As a result, EE estimated that the overall level of consumer detriment was £4m under its "Method A" and £40m under its "Method B".[90] In addition, EE considered that since many NGC services are called infrequently, consumers may inherently have a greater price misperception for NGCs. EE suggested reducing the estimated consumer detriment by a further 50% to reflect this factor.[91]

Ofcom's view

A16.114 We have considered whether to adjust expected prices in a similar fashion to that proposed by EE. We do not consider that such an adjustment is appropriate for the following reasons.

A16.115 First, as explained in Annex 8 we do not accept EE's comparison with geographic calls. In addition, as explained in that Annex, we think EE's focus on the proportion of respondents saying "don't know" when asked the price of various calls in the 2009 Consumer survey is potentially misleading since it obscures important differences in consumers' perceptions of geographic calls and NGCs.

A16.116 Second, the motivation behind EE's adjustments is that consumers will always make some residual level of errors, regardless of how Ofcom intervenes. We consider that a more natural way to address this is by through considering whether the thresholds that we calculate are likely to be exceeded. Our assessment of the unbundled tariff in Section 13 carefully considers how large an increase in price awareness is plausible.

Results

A16.117 The results and sensitivities of our calculations with respect to 0843, 0844, 0845, 0870, 0871 and 090 are presented in Tables A16.15 and A16.16 below. We first discuss the thresholds for the improvement in price perception (i.e. the reduction in

[90] EE, December 2010 Consultation response,, annex 1, paragraphs 11-12.
[91] EE, December 2010 Consultation response,, annex 1, paragraph 27(a).

the extent of price overestimation). We then discuss the thresholds for the shift in demand.

Improvement in price perceptions (reduction in price overestimation)

A16.118 We first set out the results in our base case. To obtain the results in Table A16.15 below, we make the following assumptions:

- we use an log linear demand function;
- an own price elasticity of -0.3;
- to convert the average prices based on the 2010 Flow of Funds study into the price paid by residential consumers we have applied a 14% uplift to fixed call prices and a 23% uplift to mobile call prices. To convert the call volumes in the 2010 Flow of Funds study into residential call volumes we gave applied a 31% downlift;
- a modelling horizon of 10 years;
- use of Delayed Scenario 1 to model the rate at which the benefits are realised and
- overall NGC volumes are declining by 10% per year.

Table A16.15: Proportion of price overestimation that is removed (threshold) – sensitivity to costs

Cost scenario	Proportion of price overestimation that is eliminated (threshold)			
	2009 mean	2009 median	2009 mode	2011 mean
Low costs	2.6%	4.4%	2.1%	6.7%
Medium costs	3.3%	5.7%	2.8%	8.7%
High costs	4.1%	7.0%	3.4%	10.7%

A16.119 The different columns in Table A16.15 show the impact of using different assumptions about the expected price of non-geographic calls. Three columns show the effect of using the mean, mode and median expected price from the 2009 Consumer survey. The final column shows the effect of using the mean expected price from the 2011 Consumer survey.

A16.120 To illustrate how to interpret these results, imagine, for simplicity, that there is a 10ppm gap between average expected prices and actual prices on all number ranges. If the threshold calculated by the model (in terms of a reduction in price overestimation) was 10%, this means that the gap between average expected prices and actual prices would have to reduce by (just) over one-tenth – i.e. (just) over 1ppm – in order for the benefits of the unbundled tariff to outweigh the costs.

A16.121 In our base case, using the results from the 2009 Consumer survey, the proportion of price overestimation that needs to be eliminated for the benefits of the unbundled tariff for residential consumers to outweigh the resource costs is consistently low: less than 10%. The threshold is slightly higher if we instead use the results from the 2011 Consumer survey, but is still less than 11%.

A16.122 We have explored the impact of varying our assumptions individually. Table A16.16 below sets out the effects of altering some of our assumptions in our base case and using our medium estimate of the resource costs of the unbundled tariff. This suggests that the threshold for the price overestimation that needs to be eliminated would not be significantly altered if our individual assumptions are varied.

Table A16.16: Proportion of price overestimation that is removed (threshold) – sensitivity to other assumptions.

Changes to base assumptions	Proportion of price overestimation that is eliminated (threshold)
Base case	3.3%
Linear demand function	3.3%
Elasticity: -0.2	5.1%
Elasticity: -0.4	2.5%
Fixed price uplift: +25%	3.5%
Fixed price uplift: +5%	3.3%
Mobile price uplift: +40%	3.4%
Mobile price uplift: +10%	3.3%
Volume downlift: -32%	3.4%
Volume downlift: -30%	3.3%
Discount period: 5 years	4.5%
Discount method: Simple	3.0%
Annual decline in NGC volumes: 15%	4.4%
Immediate benefits (Immediate Scenario)	2.9%
Slower benefits (Delayed Scenario 2)	3.5%

A16.123 Finally, we have considered the effect of varying multiple assumptions in the same direction. To do this, we have constructed an “optimistic” case, in which our assumptions are adjusted in a way that will tend to increase the modelled benefits of the unbundled tariff. We have also constructed a “pessimistic” case, in which our

assumptions are adjusted in a way that will tend to reduce the modelled benefits of the unbundled tariff. The purpose of this is to estimate lower and upper bounds, i.e. a range outside of which it is very unlikely that any results will lie. Notwithstanding this, we have placed more weight on the results generated using our base case as this reflects assumptions that we consider are more likely and appropriate in this context. The specific assumptions used in the optimistic and pessimistic cases are set out in Table A16.17 below.

Table A16.17: Assumptions underlying our optimistic and pessimistic cases (threshold for proportion of price overestimation that is eliminated)

	Optimistic case	Base case	Pessimistic case
One off, up-front cost of the unbundled tariff	£68.8m	£77.8m	£86.7m
Annual cost of the unbundled tariff	£1.8m	£3.8m	£5.8m
Demand function	Constant elasticity	Log linear	Linear
Elasticity	-0.4	-0.3	-0.2
Fixed price uplift	+5%	+14%	+25%
Mobile price uplift	+10%	+23%	+40%
Volume downlift	-30%	-31%	-32%
Discount period	10 years	10 years	5 years
Discount method	Simple	Spackman	Spackman
Annual decline in NGC volumes	-10%	-10%	-15%
Timing of the benefits of the unbundled tariff	Immediate	Delayed Scenario 1	Delayed Scenario 2

A16.124 The threshold at which the benefits of the unbundled tariff outweigh the resource costs in our optimistic and pessimistic cases are set out in TableA16.18. As before, we present the results showing the impact of using different assumptions about the expected price of non-geographic calls.

Table A16.18: Results of our optimistic and pessimistic cases

	Proportion of price overestimation that is eliminated (threshold)			
	2009 mean	2009 median	2009 mode	2011 mean
Optimistic case	0.4%	0.6%	0.3%	0.9%
Base case	3.3%	5.7%	2.8%	8.7%
Pessimistic case	11.6%	21.1%	9.5%	34.9%

A16.125 Even in our pessimistic case, using the mean and mode of expected prices from the 2009 Consumer survey still produces fairly low thresholds (approximately 15% or less). The threshold is further increased in the pessimistic case if we instead use median expected prices from the 2009 survey. If we use the much lower expected prices produced by the 2011 Consumer survey then there is a sharp increase in the threshold, to around 35%.

A16.126 In summary, our sensitivity analysis gives us comfort in our base case results for the proportion of price overestimation that is eliminated. It is only if multiple assumptions are varied in a way that will tend to diminish the modelled benefits of the unbundled tariff that the threshold increases sharply. We have set out the rationale for our base case assumptions earlier in this Annex. In particular, we consider that the 2011 Consumer survey results are likely to understate consumers' beliefs about prices, given that we only asked for a ppm estimate of call prices from respondents that believed they knew the price of non-geographic calls.

Shift in demand

A16.127 We now discuss the thresholds we have calculated in relation to a shift in demand. Table A16.19 sets out the results of our base case (our base case assumptions are set out in paragraph A16.118 above). The different columns in this Table show the impact of using different assumptions about the expected price of non-geographic calls.

Table A16.19: Shift in overall demand (threshold) – sensitivity to costs

Cost scenario	Shift in overall demand (threshold)			
	2009 prices	2009 median	2009 mode	2011 mean
Low costs	0.9%	1.2%	0.8%	1.5%
Medium costs	1.2%	1.5%	1.1%	1.9%
High costs	1.5%	1.8%	1.3%	2.3%

A16.128 To illustrate the meaning of these results, if the threshold calculated by the model (in terms of a shift in demand) was 10%, it would mean that for the benefits of the unbundled tariff to (just) outweigh the costs, demand for non-geographic calls would

have to increase by (just) over 10%. So, to consider a crude example, if 1 billion minutes of calls were made to non-geographic numbers under the status quo, then the total number of call minutes to these numbers would have to increase to 1.1 billion minutes as a result of the unbundled tariff.

A16.129 In our base case, the shift in demand needed for the benefits of the unbundled tariff for residential consumers to outweigh the resource costs is consistently low: less than 3%.

A16.130 We have explored the impact of varying our assumptions individually. Table A16.20 below sets out the effects of altering some of our assumptions in our base case and using our medium estimate of the resource costs of the unbundled tariff. This suggests that the threshold for the shift in demand would not be significantly altered if our individual assumptions are varied..

Table A16.20: Shift in overall demand (threshold) – sensitivity to other assumptions.

Changes to base assumptions	Shift in overall demand (threshold)
Base case	1.2%
Linear demand function	1.8%
Elasticity: -0.2	0.9%
Elasticity: -0.4	1.5%
Fixed price uplift: +25%	1.2%
Fixed price uplift: +5%	1.2%
Mobile price uplift: +40%	1.2%
Mobile price uplift: +10%	1.2%
Volume downlift: -32%	1.2%
Volume downlift: -30%	1.2%
Discount period: 5 years	1.6%
Discount method: Simple	1.1%
Annual decline in NGC volumes:15%	1.6%
Immediate benefits (Immediate Scenario)	1.1%
Slower benefits (Delayed Scenario 2)	1.3%

A16.131 Finally, we have considered the effect of varying multiple assumptions in the same direction. We have done this using the “optimistic” and “pessimistic” cases set out above. The threshold at which the benefits of the unbundled tariff outweigh the

resource costs in our optimistic and pessimistic cases are set out in Table A16.21 below. As before, we present the results showing the impact of using different assumptions about the expected price of non-geographic calls.

Table A16.21: Results of our optimistic and pessimistic cases

	Shift in overall demand (threshold)			
	2009 prices	2009 median	2009 mode	2011 mean
Optimistic case	0.2%	0.2%	0.2%	0.2%
Base case	1.2%	1.5%	1.1%	1.9%
Pessimistic case	3.0%	3.7%	2.7%	4.5%

A16.132 In our pessimistic case, the threshold for the shift in demand increases to between 2.7% and 4.6%. While this is markedly higher than our base case figures (1.1% to 1.9%) in proportionate terms, in absolute terms the threshold for the shift in demand still remains relatively low.

Conclusions on thresholds

A16.133 In conclusion, the objective of this modelling is to give a broad feel for the results or orders of magnitude, rather than precise figures. As shown in Tables A16.15 to A16.16, as well as A16-18 to A16.21 above:

- In our base case, eliminating between 2.1% and 10.7% of the gap between expected and actual prices would suggest that benefits of the unbundled tariff to residential consumers (just) outweigh the resource costs. Individually varying our assumptions does not significantly affect these figures. It is only in a pessimistic case, which involves the aggregate effect of multiple unfavourable assumptions, that these thresholds rise much above 10%. However, as stated above, the pessimistic case is only intended to provide an upper bound rather than to identify a likely outcome and so we place less weight on this result.

- In our base case, a shift in demand of 0.8% to 2.3% would create benefits for residential consumers that (just) outweigh the resource costs of the unbundled tariff. Individually varying our assumptions generally does not significantly affect these figures. In a pessimistic case (with multiple adverse assumptions) the thresholds are higher, namely in a range of 2.7% to 4.5% but, for the reason set out above, we place less weight on this result.

A16.134 Given our generally conservative modelling assumptions and since we have not included all of the benefits of the unbundled tariff, these thresholds are likely to be biased upwards i.e. biased towards underestimating the benefits of the unbundled tariff. In particular:

- we do not model all benefits of the unbundled tariff (e.g. addressing Concerns 3, 4, 5 and 7 from Table A16.1 above);

- we do not model the benefits for OCPs (apart from those that are passed on to consumers via the TPE), TCPs and SPs;

- in modelling a shift in demand by pivoting the demand curve (rather than as a parallel shift in the demand curve) we may be understating the benefits of improved service availability and quality (i.e. addressing Concern 6); and

- we have modelled a reduction in price overestimation and a shift in demand separately i.e. we have not modelled the additional benefits that come from combining these effects. In practice, we would expect both effects to occur as a result of the unbundled tariff.

Part B – Annex 17

Focussing intervention at the wholesale level

Introduction

A17.1 In Section 9 we discuss the remedies put forward in the December 2010 Consultation for the main revenue sharing ranges. Various interventions at the retail level (maximum prices, the unbundled tariff, information remedies) are considered in that Section. In addition, in this Annex, we consider whether the appropriate point to focus our intervention is the wholesale level.

A17.2 This Annex sets out our analysis of two wholesale focused approaches:

- linking termination rates to retail prices; and
- regulating the level of termination rates.

A17.3 Some stakeholders indicated support for the second of these options in particular, arguing that it would reduce or remove the need for further intervention at the retail level.

Link termination rates to retail prices

Introduction

A17.4 In recent years, some TCPs have begun linking termination rates for calls to non-geographic numbers to each OCP's average retail price charged for calls to those numbers. We refer to such termination rate schedules as "variable termination rates". Variable termination rates have the potential to change OCPs' retail pricing behaviour.[92]

A17.5 In the December 2010 Consultation, we considered whether variable termination rates could address our concerns. We recognised that variable termination rates might be developed by industry participants, rather than being initiated by regulation. We recognised that variable termination rates introduced by industry could also be relevant to our analysis of the status quo, the situation absent regulation and the unbundled remedy.[93]

A17.6 Variable termination rates could take several forms. One example is the schedules introduced by BT for 080, 0845, 0870 and other calls. Stakeholders have sometimes referred to these as "ladder pricing", given the stepped way in which termination rates increase as average retail prices rise. Another example of variable

[92] Where the termination rate explicitly depends on the retail price this potentially changes the pricing incentives facing OCPs. In contrast, termination rates which vary between classes of OCP (such as when BT which set a lower 080 origination payment for mobile OCPs in NCCN 911) but which do not explicitly depend on retail prices are unlikely to have this effect.

[93] December 2010 Consultation, paragraphs A4.54-A4.57.

termination rates would be a charge that increases proportionately with the OCP's average retail price, rather than in steps.[94] In the December 2010 Consultation we said that we had abstracted from our determinations of the disputes we had received in relation to BT's specific variable termination rate schedules for 080, 0845 and 0870 calls.[95]

A17.7 In the December 2010 Consultation we took the view that there were likely to be significantly more effective ways than variable termination rates to address the market failures and concerns in relation to non-geographic calls and to promote improved outcomes for consumers.[96]

A17.8 BT had sought to introduce schedules of variable termination rates and, since the December 2010 Consultation, the CAT has issued the 08x CAT Judgment upholding BT's right to do so. A number of stakeholders' responses to the December 2010 Consultation also commented on our analysis of variable termination rates. Our updated analysis of variable termination rates is set out below and is structured as follows:

- first, we summarise our position in the December 2010 Consultation;
- second, we set out a high level overview of stakeholders' responses;
- third, we set out some specific observations on the 08x CAT Judgment;
- fourth, we set out a detailed assessment of stakeholders' responses and our current position; and
- finally, we summarise our conclusions on variable termination rates.

A17.9 Our analysis in the December 2010 Consultation was fairly complex and, in the interests of brevity, we do not repeat all the detail that was set out in that document. Rather we summarise the 2010 analysis and then respond in detail to the representations that we have received. Therefore, the analysis below needs to be considered in conjunction with the December 2010 Consultation.

Ofcom's position in the December 2010 Consultation

Preliminary observations

A17.10 In the December 2010 Consultation we stated that variable termination rates left the balance of prices between callers and SPs to be determined by TCPs. We stated that it was not clear that TCPs, acting in their own self-interest, had the right incentives to set a reasonably efficient balance of prices.[97] Indeed different TCPs (and SPs) might have different preferences and incentives, implying that they

[94] We understand that at least one TCP (Gamma) has sought to introduce such a schedule. 0845/0870 Dispute Determination, paragraph 3.48(iv).
[95] December 2010 Consultation, footnote 477 to paragraph A4.57.
[96] December 2010 Consultation, paragraph A4.96. Our analysis was set out at paragraphs A4.54-A4.96.
[97] December 2010 Consultation, paragraph A4.63.

targeted different retail call prices as the outcome of their variable termination rates.[98]

A17.11 We highlighted that if variable termination rates induced OCPs to lower retail prices then this might lead to increased call volumes (which might benefit the TCP) but would reduce the per minute termination revenue earned by the TCP. We stated that it was not clear which of these effects would dominate and therefore there was some ambiguity in the incentives on a TCP setting variable termination rates.[99]

A17.12 In the December 2010 Consultation we recognised that the incentives facing a TCP might also be affected by the preferences of its SP customers.[100]

- For example, some SPs might prefer a lower retail call price whereas others might prefer a greater revenue share. The former might incentivise the TCP to introduce variable termination rates that encouraged lower retail prices whereas the latter might prefer variable termination rates that did not incentivise a strong retail price reduction.

- In principle, competitive pressures at the hosting level might incentivise TCPs to introduce variable termination rates that internalised the vertical externality by incentivising OCPs to charge the retail price preferred by the SP. However, TCPs' incentive to do so might be weakened if OCPs did not set different retail prices for calls to different TCPs.

- Moreover SPs (like OCPs) are subject to the horizontal externality and so might not have the right incentives to deliver the best outcome for callers.

A17.13 TCPs are in any event reliant on the design of the variable termination charge incentivising a behavioural response from OCPs to deliver the desired retail prices. We stated that providing the right incentives to create this response was likely to be a complex task, the outcome of which is uncertain and may lead to unintended consequences.[101]

A17.14 We now summarise the evaluation in the December 2010 Consultation against our five assessment criteria. [102]

Consumer price awareness

A17.15 We stated that variable termination rates would not directly address poor consumer price awareness. Any effect would be an indirect one, relying on the termination rate schedule creating the right incentives for OCPs to change their non-geographic

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[98] December 2010 Consultation, paragraph A4.72.
[99] December 2010 Consultation, paragraphs A4.63-A4.65.
[100] December 2010 Consultation, paragraphs A4.66-A4.70.
[101] December 2010 Consultation, paragraphs A4.71-A4.72.
[102] In the December 2010 Consultation we highlighted practical issues with variable termination rates. For example, determining a methodology for calculating each OCP's average retail price (and therefore the termination rate that it pays) given practical complications such as the range of retail tariffs, changes in retail prices over time and the position of wholesale partners such as MVNOs. We abstracted from these issues in order to determine the effectiveness of an industry led approach, if it were achieved. December 2010 Consultation, paragraphs A4.59-A4.60.

call pricing in a way which ultimately improves price transparency and awareness.[103]

A17.16 As discussed above, it is unclear whether TCPs and SPs have an incentive to reduce non-geographic call prices. Further, different TCPs may adopt different schedules of variable termination rates which have different target prices for the same number range. Moreover, the outcome is also dependent upon the design of the schedule introduced and the behavioural response it incentivises from OCPs. We stated that it is likely to be difficult for TCPs to predict and incentivise particular responses from OCPs due to the complexity and uncertainty around OCP pricing decisions and responses to this approach. We considered that these decisions would be further complicated since the variable termination rate schedules may differ between TCPs and could be varied by TCPs at different times.[104]

A17.17 We stated that a relationship between retail prices and termination rates adds a layer of complexity to OCP price setting behaviour (particularly if the schedule of variable termination rates differs by TCP), and it is not clear how OCPs would react to such an approach. As a result, the effect for consumers and price awareness is uncertain. Similarly in the December 2010 Consultation we stated that it is unclear whether the vertical and horizontal externalities would be internalised.[105]

A17.18 We also stated that even if variable termination charges change the level of retail prices, this may not automatically improve price awareness. For example, mobile OCPs generally set very simple price structures for non-geographic calls. However consumer awareness of the price of mobile calls remains very low. In addition, the variable termination rates and retail prices would be susceptible to change by any TCP or OCP at any time, according to their own incentives. Therefore SPs would still not have certainty about the retail price consumers would pay to reach their service, so the provision of accurate price information would remain difficult for SPs. Our view in the December 2010 Consultation was thus that it was not clear that variable termination rates would help price transparency and improve price awareness.[106]

Efficient prices

A17.19 In the December 2010 Consultation we stated that the uncertainty around the effect on retail prices and price awareness means it is difficult to determine what effect the variable termination charges could have on the structure of prices, and therefore whether they would lead to a more efficient retail pricing structure. Further, as discussed above, the structure of prices may still fail to reflect the preferences of SPs or consumers (i.e. fail adequately to internalise either the vertical or the horizontal externalities). The efficient price level to be targeted may also be difficult for the TCP to know.[107]

A17.20 The mechanism by which variable termination rates seek to provide incentives to OCPs to reduce their non-geographic call prices is by the threat of higher termination charges if OCPs do not do so. We stated that if the variable termination

[103] December 2010 Consultation, paragraph A4.73.
[104] December 2010 Consultation, paragraphs A4.74-A4.78.
[105] December 2010 Consultation, paragraphs A4.79
[106] December 2010 Consultation, paragraphs A4.81-A4.83.
[107] December 2010 Consultation, paragraphs A4.84-A4.85 and A4.87.

rates fail to induce retail price reductions all the way down to the target level, not only is the mechanism ineffective in achieving the desired outcome, it may also be inefficient, because the result involves higher termination charges. In particular, there is the potential for an undesirable tariff package effect although any increased revenue share to the SP might lead it to increase the quality or variety of non-geographic services. In the December 2010 Consultation we stated that it is uncertain whether the overall effect is desirable or detrimental to consumers.[108]

A17.21 In summary, our view in the December 2010 Consultation was that the suitability of variable termination charges is highly dependent on achieving a structure which incentivises all OCPs to reduce their non-geographic call prices to the "correct" level and improves price transparency. Therefore we considered that the structure of prices is likely to continue to be suboptimal under variable termination rates as it was unclear that TCPs have the right incentives or information to target an efficient balance of prices and it was very difficult to reliably predict OCPs' pricing response. As a result, we considered that there was a significant risk of not achieving the desired outcome for consumers.[109]

Service quality, variety and innovation

A17.22 In the December 2010 Consultation we stated that the impact on service quality, variety and innovation was not clear.[110]

Access to socially important services

A17.23 Due to uncertainty around the effect on retail prices, we stated that it was not clear that variable termination charges would address our distributional concerns.[111]

Regulatory burden

A17.24 We stated that if variable termination rates arose through industry agreements then the regulatory burden would be limited (although there could be material costs of implementation e.g. related to deriving average retail prices for each OCP).[112]

Overall view in the December 2010 Consultation

A17.25 In summary, in the December 2010 Consultation we stated that variable termination rates were, at best, an indirect way to achieve desirable outcomes, such as improved price awareness and a more efficient structure of retail prices. We stated that the suitability of this option depends upon the incentives of TCPs and SPs, and the behavioural responses of OCPs. As set out above, there is a risk that those incentives are not aligned (across TCPs/SPs, within number ranges, with consumer preferences), and the behavioural response by OCPs is complex to both predict and incentivise. We thus considered that there was a great deal of uncertainty around the impact of variable termination rates and the incentives they created. We considered that these points applied whether variable termination charges were industry-led or driven by regulation. In the December 2010 Consultation we

[108] December 2010 Consultation, paragraph A4.86.
[109] December 2010 Consultation, paragraph A4.88.
[110] December 2010 Consultation, paragraphs A4.89-A4.91.
[111] December 2010 Consultation, paragraph A4.92.
[112] December 2010 Consultation, paragraph A4.93.

therefore took the view that there were likely to be significantly more effective ways than variable termination rates to address the market failures and concerns in relation to non-geographic calls and to promote improved outcomes for consumers.[113]

Stakeholders' responses to the December 2010 Consultation

A17.26 Vodafone considered that the concept of variable termination rates should be rejected and cross referred to the arguments raised in the 080 and 0845/0870 disputes.[114] Three agreed with our position in the December 2010 Consultation on variable termination rates. Three also stated that variable termination rates were impractical, in part because they were not conducive to the unbundled remedy.[115]

A17.27 BT did not support our reasoning or conclusions in the December 2010 Consultation.[116] BT stated that it did not consider that variable termination charges were a "panacea" but stated that they could potentially support other measures such as transparency and "benchmark retail pricing" –.[117] BT also characterised variable termination rates as a potential "safety net" under the unbundled remedy.[118] Moreover, BT considered that if OCPs are able to act with "impunity" then variable termination rates are a commercial remedy.[119] It also set out a number of more detailed criticisms of our analysis which we address in turn below.

The 08x CAT Judgment

A17.28 We briefly discussed the 08x CAT Judgment in Part A. However, in the context of our analysis of variable termination rates, it is useful to highlight five aspects of this judgment.

A17.29 First, it relates to the particular variable termination rate schedules that BT had sought to introduce in NCCN 956, NCCN 985 and NCCN 986, rather than variable termination rates more generally.

A17.30 Second, the CAT was considering appeals against our decision not to permit BT to introduce these termination rate schedules. A key question as part of that appeal was whether those termination rate schedules led to consumer benefits. The issue considered by the CAT was whether those termination rate schedules had a positive effect on consumers. In contrast, the issue at hand in this review is which form of intervention has the *greatest* benefits.

A17.31 Third, price awareness was not a central issue in the 08x CAT Judgment.[120]

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[113] December 2010 Consultation, paragraphs A4.94-A4.96.
[114] Vodafone, December 2010 Consultation response, Q6.2 on page 60.
[115] Three, December 2010 Consultation response, paragraph 61.
[116] BT, December 2010 Consultation response, Annex 4, paragraph 49.
[117] BT, December 2010 Consultation response, Annex 4, paragraph 61.
[118] BT, December 2010 Consultation response, Annex 4, paragraph 64.
[119] BT, December 2010 Consultation response, Annex 4, paragraph 62.
[120] Price awareness was briefly discussed in paragraphs 141-143 of the 08x CAT Judgment and influenced our policy preferences in relation to the price of 080, 0845 and 0870 calls. However the judgment does not contain a substantive discussion of whether BT's variable termination rate schedules would affect price awareness.

A17.32 Fourth, the CAT's view was that the assessment of whether BT's termination rate schedules provided benefits to consumers was "inconclusive".[121]

A17.33 Fifth, the CAT also identified two other "relevant factors", both of which (in its view) pointed in favour of allowing BT to introduce its proposed new termination rates:[122]

- Impact on competition: the CAT found that the introduction of the NCCNs would not have the effect of distorting competition, but that the imposition of a stringent test for the introduction of termination rate changes by TCPs would have the effect of distorting competition. The CAT noted that price control is an intrusive form of control (none of the parties to the dispute were subject to regulatory control as regards the prices for 080, 0845 or 0870 calls nor as regards the prices for terminating such calls).[123]

- BT's private law rights: BT had a contractual right to impose the NCCNs. Ordinarily, communications providers are entitled to expect their legal position to be dictated by their private law rights and obligations (including, in particular, any contracts entered into by them). Whilst the CAT did not suggest that private law rights can dictate the outcome of the dispute resolution process, they are relevant factors to take into account.

A17.34 Given the presence of these two other factors, the CAT considered that it was not enough for the welfare analysis to be simply inconclusive. For BT's NCCNs not be to fair and reasonable the welfare analysis must clearly demonstrate that the interests of consumers will be disadvantaged.[124] They therefore held in this case that the NCCNs under consideration were fair and reasonable,

A17.35 It should also be noted that the CAT 08x Judgement is currently under appeal to the Court of Appeal. The grounds of appeal brought by the mobile OCPs include a specific challenge the CAT's reliance upon the two "relevant factors" discussed at paragraph A17.33 above. The appeal is not due to be heard before April of this year.

Ofcom's current position

A17.36 We now set out our current position. This is structured as follows:

- first, we provide an overview of our position; and

- second, we set out a detailed assessment of responses to the December 2010 Consultation.

Overview of our position

A17.37 Having considered stakeholders' responses and wider developments since the December 2010 Consultation, we continue to believe that the analysis of variable termination rates in the December 2010 Consultation is sound. Crucially we remain of the view that there is a great deal of uncertainty around the impact of variable

[121] This was the outcome of the discussion of "Principle 2(i)". 08x CAT Judgment, paragraph 446.
[122] 08x CAT Judgment, paragraphs 443, 444 and 447.
[123] 08x CAT Judgment, paragraph 442.
[124] 08x CAT Judgment, paragraph 448.

termination rates and the incentives they create. In this regard we note the finding in the 08x CAT Judgment that the effect on consumers was "inconclusive". [125] Therefore there are likely to be significantly more effective ways to address the market failures and concerns in relation to non-geographic calls and to promote improved outcomes for consumers.

A17.38 On 1 August 2011, the CAT upheld BT's right to introduce the variable termination rates set out in NCCN 956, NCCN 985 and NCCN 986. In Table 14.3 in Part C we set out mobile OCPs' retail 080 prices as of January 2012. It is notable that different OCPs have reacted to the commercial influences on 080 prices in very different ways. At one extreme, T-Mobile set a price of 7ppm to its pre-pay subscribers whereas at the other extreme Orange set a price of up to 20ppm for its post-pay subscribers. Moreover Vodafone set the same price for both its pre-pay and post-pay subscribers, whereas O2 and Three did not change their prices. We accept that there may be further changes in retail prices – as discussed above, the 08x CAT Judgment is currently on appeal and, as noted in Part A, the price of mobile calls to 080, 0845 and 0870 numbers are in a state of flux. Nonetheless the very different reactions of mobile OCPs highlight the uncertainties about the influence of termination rates on retail prices.

A17.39 BT advanced a number of criticisms of the detail of our analysis which we address below. However we do not consider that any of BT's –objections resolve our central concern about the difficulties of predicting the effects of variable termination rates. Nor do they support the view that variable termination rates are superior to the other main options for intervention that we are considering, namely maximum call prices or the unbundled tariff. Indeed even BT supported the introduction of the unbundled tariff and stated that variable termination rates were not "a panacea for a properly developed plan involving [non-geographic call services] …"[126]

Detailed assessment of responses to the December 2010 Consultation

A17.40 We now assess the points of detail that were raised in response to the December 2010 Consultation. For clarity, we have grouped these points under the following headings:

- whether TCPs have an incentive to reflect SPs' preferences;
- SPs' incentives when targeting retail prices;
- the predictability of the effects of variable termination rates;
- the impact of variable termination rates on consumer price awareness; and
- the impact on service quality, variety and innovation.

TCPs' incentives to reflect SPs' preferences

A17.41 Variable termination rates are set by TCPs. The position in the December 2010 Consultation on the extent to which TCPs have an incentive to reflect SPs preferences is set out above.

[125] This was the outcome of the discussion of "Principle 2(i)". 08x CAT Judgment, paragraph 446.
[126] BT December 2010 Consultation response, page 3 and Annex 4, paragraphs 61 –.

A17.42 In response, BT stated that TCPs operate in a competitive hosting market and that SPs are able to easily switch between them. Accordingly it is not in TCPs' interests to set a termination rate which incentivised OCPs to set a price that did not meet SPs' expectations.[127]

A17.43 As noted in Annex 9, the available evidence suggests that the hosting market is broadly working well for SPs. We accept that competitive pressures at the hosting level generally create an incentive for TCPs to behave in a way that reflects SPs' preferences.[128] However, in the December 2010 Consultation we expressed a concern that arises in the case of SPs that have a preference for lower retail call prices. To illustrate, if TCP A introduced variable termination charges that led OCPs to reduce their retail call prices, but the OCPs reduced prices for calls to all TCPs, then other TCPs would also benefit and TCP A may not gain a clear competitive advantage over other TCPs. This affects the competitive motivation for an individual TCP to target lower retail prices, in line with SPs' preferences.[129]

A17.44 In response to this argument, BT accepted that this is a "theoretical possibility". However, it stated that any "benefit" to other TCPs would be competed away. Moreover BT considered that Ofcom should not be concerned about TCPs' interests if the outcome is beneficial for consumers.[130]

A17.45 Our argument is that a TCP may have a diminished incentive to behave in a way that reflects SPs' preferences because it does not gain a competitive advantage by doing so. In other words, our argument is that TCPs may not face a competitive incentive to behave in a way that benefits SPs. BT's rationale for claiming that the "benefit" to other TCPs would be "competed away" in these circumstances is thus unclear. BT did not provide an explanation of the reasoning behind its argument – .The relevance of TCPs' interests to this particular argument is to help understand whether TCPs have an incentive to reflect SPs' preferences. BT's comment that we should not be concerned about TCPs' interests –is misplaced and may reflect a misunderstanding of Ofcom's argument. Our concern about TCP's incentives is that they may prevent outcomes that are the most beneficial to consumers (and we are not concerned about TCPs' incentives *per se*). The complications relating to TCPs' incentives illustrate the difficulties in predicting how TCPs would behave which, in turn, is a source of uncertainty for the effect of variable termination rates on consumers.

SPs' incentives when targeting retail prices

A17.46 Insofar as SPs influence the variable termination rate schedule set by TCPs, this raises the question of what schedule SPs would prefer.

A17.47 BT argued that it is not in TCPs' interests to set a termination rate which incentivised OCPs' to set a price that did not "comply with the industry expectation

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[127] BT December 2010 Consultation response, Annex 4, paragraph 50.

[128] A point we made in December 2010 Consultation, paragraph A4.66.

[129] December 2010 Consultation, paragraph A4.68. This paragraph also noted that mobile OCPs' practice was not to set different retail prices for calls to different TCPs. Paragraphs A3.151-A3.155 of the December 2010 Consultation which also considered whether OCPs would set different retail prices depending on which TCP terminated a call.

[130] BT December 2010 Consultation response, Annex 4, paragraph 53.

of the retail price".[131] BT characterised a TCP attempting to incentivise OCPs to raise prices as an unrealistic and extreme scenario –.[132]

A17.48 In December 2010 Consultation we stated that some SPs may have strong preferences for lower prices for calling their service. In contrast, other SPs may prefer a greater revenue share, and so encourage the TCP to set a variable termination rate schedule which does not incentivise a strong price reduction from OCPs but instead generates a greater termination charge (and profit margin) per minute. We also stated that there is generally a mix of different SPs on each number range.[133] We remain of the view that some SPs are likely to prefer higher termination revenues to lower retail call prices, although preferences are likely to vary between SPs and between number ranges. This is illustrated by responses to the 2011 SPs survey. We asked 080 and 0845 SPs what one aspect of 080/0845 they would most like to change:

- in terms of 080 SPs, 45% said the price that mobile callers pay whereas 39% said how much the SP pays to receive the call;[134] and
- in terms of 0845 SPs, 65% said that callers should be charged the same amount as for calls to a normal landline whereas 14% would prefer to change the cost to the SP of operating the 0845 number.[135]

A17.49 We do not consider that it is unrealistic to suggest that some SPs might risk higher retail call prices from OCPs in return for higher pence per minute termination revenues.[136] However we accept that we do not know what proportion of SPs may have such preferences.

A17.50 In the December 2010 Consultation, we recognised that some SPs may care sufficiently about the call price paid by the caller that they have an incentive to provide the best outcome for consumers (e.g. those SPs subject to strong competitive pressure or providing a socially important service). However, many SPs are likely to be subject to the horizontal externality. These SPs have an incentive to set higher call prices than would maximise the benefit of the non-geographic call system to consumers.[137] In response, BT stated that our position is not backed by evidence. Moreover, BT stated that the existence of SPs whose customers are

[131] BT December 2010 Consultation response, Annex 4, paragraph 50.
[132] BT December 2010 Consultation response, Annex 4, paragraph 60.
[133] December 2010 Consultation, paragraphs A4.66 and A4.70.
[134] 11% of respondents wanted to be able to advertise the exact price to callers and 5% said "don't know". 2011 SPs survey, question 13.
[135] 16% of respondents wanted to be able to advertise the exact price to callers and 5% said "don't know". 2011 SPs survey, question 30.
[136] To illustrate, consider a SP that is primarily interested in maximising termination profits from calls to its number. Suppose that initially all OCPs pay the same termination rate for calls to that SP, regardless of how large a retail margin the OCP earns on the call. It could be argued that the SP would not want an across the board rise in termination rates (assuming the initial position were a profit-maximising equilibrium). However, this reasoning does not apply where the structure of termination rates changes. Variable termination rates potentially allow the SP to price discriminate between those OCPs that earn high retail margins and those that do not. As a result, the SP may wish to charge higher termination rates to some OCPs (something that was not possible when termination rates were uniform), even if this risks an increase in retail prices by those OCPs.
[137] December 2010 Consultation, paragraph A4.69.

"locked in" does not necessarily constitute a market failure in the same way that OCP's behaviour does.[138]

A17.51 Our evidence in relation to the horizontal externality is set out in Annex 8. The horizontal externality arises because callers make inferences about the price of calling one number based on:

- the price of calls to similar numbers; and
- the price of calls to that number on a different device (e.g. mobile rather than landline).

A17.52 We see no reason why callers would cease to make these inferences if it was the SP responsible for the price of calls rather than the OCP. We thus continue to believe that some SPs would not take the horizontal externality into account.

A17.53 While the argument raised in relation to locked-in callers is not entirely clear, we presume it is related to the issue of whether some SPs have an incentive to seek higher call prices. We have addressed this argument above.

Predictability of the effects of variable termination rates

A17.54 In the December 2010 Consultation we stated that variable termination charges add a layer of complexity to OCP price setting behaviour and it is not clear how OCPs would react to such an approach. We listed a variety of factors that will influence an OCP's response.[139] BT stated that these were unfounded assertions –.[140] BT considered that Ofcom failed to adequately explain the potential unintended consequences that could flow from variable termination charges.[141] Further, BT considered that all interventions are likely to have some unintended consequences, including the unbundled tariff –.[142]

A17.55 The 08x CAT Judgment relates to particular schedules of variable termination rates i.e. the schedule of termination rates being assessed was known. The 08x CAT Judgment set out at paragraphs 280-384 "an assessment of the economic effects of the introduction of the NCCNs, and whether these economic effects will be beneficial or otherwise." The CAT concluded at paragraph 379 that:

> "Fundamentally, [this] analysis is inconclusive, due to a lack of empirical evidence. … a reliable assessment of elasticity of demand is not possible. Whilst it is possible to conclude that prices for 080, 0845 and 0870 calls will, on balance, fall, it cannot be said how far they will fall, nor what volumes of calls there will be at any given price. Equally, the extent of the [tariff package effect for mobile subscribers] is essentially unknown."

A17.56 This highlights the uncertainties in forming a view about the implications of variable termination rates. Although we treat such evidence cautiously, this is reinforced by the disparate reactions of mobile OCPs to BT's variable termination rates for 080

[138] BT December 2010 Consultation response, Annex 4, paragraph 54.
[139] December 2010 Consultation, paragraph A4.79.
[140] BT December 2010 Consultation response, Annex 4, paragraph 60.
[141] BT December 2010 Consultation response, Annex 4, paragraph 56.
[142] BT December 2010 Consultation response, Annex 4, paragraphs 57, 59 and 66 –.

calls (see above). Moreover in the case of variable termination rates applying across the sector there are additional complications that did not arise before the CAT. As explained above and in the December 2010 Consultation:

- the incentives on TCPs and SPs when designing systems of variable termination rates are uncertain. This makes it difficult to form a view about what types of OCP behaviour TCPs/SPs will try to incentivise. In contrast, the CAT had specific termination rate schedules from one TCP before it; and

- OCPs' may be faced with different schedules of variable termination rates from different TCPs. This makes it more difficult to assess how OCP would react.

A17.57 We thus remain of the view that it is difficult to predict how OCPs' retail pricing of both non-geographic calls and other telecoms services may change under a system of variable termination rates. In short, variable termination rates involve trying to indirectly influence retail prices via the termination rate. We consider that it is difficult to 'fine tune' retail prices in this way and that attempting to do so runs a risk of unanticipated changes in the pattern of retail prices.

A17.58 In contrast, the uncertainties associated with the impact of the unbundled remedy on retail prices are smaller. Since that proposal involves setting tariff principles at the retail level, we have a far clearer idea of how the structure of retail prices may change. This in turn makes it easier for us to assess the implications for factors such as price awareness etc. Clearly the full effects of the unbundled remedy are uncertain, but we nonetheless consider that this remedy is more predictable that relying on variable termination rates.

Impact on price awareness

A17.59 As explained above, in the December 2010 Consultation we stated that even if variable termination rates led to changes in retail prices, it is not clear that price awareness would improve.

A17.60 BT considered that concerns about the uncertain incentives facing TCPs when setting variable termination rates were misplaced since consumers will benefit if variable termination charges incentivise an OCP to set prices with are reasonably in line with other OCPs.[143]

A17.61 In order for a SP to accurately promote the price of calling its service, it must be confident that all OCPs are setting the same price.[144] However, in principle, if all OCPs set prices that are reasonably in line with each other then this might make it easier for callers to learn non-geographic call prices. But there would still be significant impediments to learning non-geographic call prices. Most callers do not

[143] BT December 2010 Consultation response, Annex 4, paragraph 51. This argument was presented as a rebuttal to paragraphs A4.64-A4.65 of the December 2010 Consultation, in which we explained why it is not clear whether TCPs will target reductions in non-geographic calls prices by OCPs or increases in termination payments. It is not clear how these paragraphs are addressed by BT's argument and we have instead treated it as an argument why variable termination rates may improve consumer price awareness.

[144] The OCP could also advertise accurate prices if all OCPs of the same type priced in the same fashion. For example, it could state "calls cost X ppm from landlines and Y ppm from mobiles" in advertisements.

call non-geographic numbers often.[145] Moreover, unless retail prices are stable then learning is likely to be difficult.

A17.62 Furthermore this begs the question of whether OCPs would in fact set similar retail prices. In our view, this is far from certain. As discussed above and in the December 2010 Consultation, it is difficult to predict how OCPs will behave and in any event they may not all behave in the same fashion.

A17.63 As discussed above in the context of whether TCPs have an incentive to reflect SPs' preferences, BT's comment may reflect a misunderstanding of Ofcom's argument. Our concern is not about TCP's incentives *per se*, but that such incentives may deter the most beneficial outcome for consumers.

Impact on service quality, variety and innovation

A17.64 In the December 2010 Consultation we explained why the impact on service quality, variety and innovation is not clear.[146] In response, BT stated that, in the 0845/0870 Dispute Determination, we acknowledged the presence of indirect effects and that there were "externalities" that lower retail call prices would bring.[147]

A17.65 In the December 2010 Consultation we identified a number of different effects on SPs' incentives to improve service quality, variety and innovation:[148]

- If non-geographic call prices reduced or the termination rate increased to the level desired by the SP (internalising the vertical externality), then SPs may well benefit from the variable termination rates, either in terms of stimulating call volumes or receiving the desired level of revenue. This could incentivise innovation by SPs.

- However it was not clear that variable termination rates would improve price transparency or adequately internalise the vertical and/or horizontal externalities (as discussed above).

- If the result were higher termination charges and revenue share, there might be an enhanced incentive for SPs to invest. However, as noted above, the potential associated adverse effects of higher termination charges would also need to be taken into account.

A17.66 We have already discussed the first two of these effects (impact on retail price levels, externalities and price awareness) above. In terms of the third aspect, in the 0845/0870 Dispute Determination we stated that:

- BT's variable termination rate schedules "may have positive indirect benefits for consumers, in that the additional revenues generated by BT will be available to

[145] The proportion of consumers that "regularly" or "sometimes" (every week or every month) call non-geographic numbers from their landline was 35% for 080, 27% for 0845/0870, 16% for 0844/0871 and 4% for 09. For mobile calls it was 7% for 080, 8% for 0845/0870, 5% for 0844/0871 and 1% for 09. 2010 Consumer survey, questions 21 and 25.

[146] December 2010 Consultation, paragraphs A4.89-A4.91.

[147] BT did not provide a paragraph reference to the 0845/0870 Dispute Determination to support its claims. BT December 2010 Consultation response, Annex 4, paragraph 65.

[148] December 2010 Consultation, paragraphs A4.89-A4.91.

improve BT's hosting services or passed through over time to 0845/0870 service providers to improve their service to callers."[149]

- "However, for consumers of 0845/0870 calls to benefit from the Indirect effect, it is also necessary that SPs improve the availability or quality of the services that they offer. It is not clear that this will necessarily occur because many SPs are likely to have chosen these number ranges in large part due to the call price they expect OCPs to offer, not because of revenue share. Our conclusion in respect of the Indirect effect is, therefore, that while there may be sufficient competitive pressure on BT to ensure that some benefits are passed on over time to SPs, it is not clear that callers to 0845/0870 numbers will necessarily benefit."[150]

- "We … consider that it is uncertain whether and to what extent SPs will improve the availability or quality of their services to the benefit of 0845/0870 consumers (even if there is pass-on by TCPs of higher termination charges into better deals for hosting services to those SPs)."[151]

A17.67 In addition, in relation to the third factor, the 08x CAT Judgment stated that: "OFCOM suggested that … if there was a revenue flow to call recipients/service providers which would enable them to provide a better service, this was – if not the primary objective – at least a secondary benefit that should be taken into account. We disagree with this. Whilst it might be going too far to say this was a wholly irrelevant factor, we consider it to be so minor in importance that it should not have been taken into account by OFCOM".[152]

A17.68 The CAT's conclusions relate to the specific variable termination rates proposed by BT in NCCN 956, NCCN 985 and NCCN 986 in the context of dispute resolution under the current regime for non-geographic calls. Nonetheless, even putting this factor to one side, we consider that since the impact of variable termination rates on retail price levels and price awareness are uncertain, the impact on service quality, variety and innovation is also uncertain.

Conclusion on linking termination rates to retail prices

A17.69 In summary, our updated assessment continues to support the analysis of variable termination rates in the December 2010 Consultation. Crucially we remain of the view that there is a great deal of uncertainty around the impact of variable termination rates and the incentives they create. Therefore there are likely to be significantly more effective ways to address the market failures and concerns in relation to non-geographic calls and to promote improved outcomes for consumers.

Regulating termination rates

A17.70 Mobile OCPs, in their responses to the 2010 Call for Inputs, considered that the most appropriate intervention was regulation of the level of termination rates but no further intervention at the retail level. In the December 2010 Consultation we took

[149] 0845/0870 Dispute Determination, paragraph 9.27.
[150] 0845/0870 Dispute Determination, paragraph 9.28.
[151] 0845/0870 Dispute Determination, Annex 3, paragraph 5.227.
[152] 08x CAT Judgment, paragraph 377.

the view that this option was unlikely to be an effective way to address the consumer concerns that we had identified.[153]

A17.71 In its response to the December 2010 Consultation, Vodafone reiterated its support for simply regulating termination rates, without an extension of retail regulation. Similarly EE and Virgin Media supported regulation of termination rates but suggested that this could be combined with initiatives to provide additional information to retail consumers.

A17.72 The common feature of these stakeholder suggestions is that they place regulation of termination rates at the heart of any intervention. Our analysis of this option is set out below and is structured as follows:

- first, we summarise responses to the December 2010 Consultation on this issue;
- second, we set out our position; and
- finally we evaluate this option against our assessment criteria.

Consultation responses

Vodafone

A17.73 Vodafone suggested that the December 2010 Consultation failed to consider its proposal for regulating termination at the wholesale level, without extending regulation to the retail level (which Vodafone viewed as competitive).[154]

A17.74 Vodafone accepted that cost based termination rates may not be appropriate for number ranges where revenue sharing is envisaged.[155] [✂]:[156]

- [✂];[157] and
- [✂].[158]

A17.75 [✂].[159]

EE

A17.76 EE stated that there are problems at the wholesale level and cited as evidence the NCCN 500 case and the recent disputes over BT's variable termination charges.[160] In particular, EE considered that TCPs act as a "bottle-neck" and that BT (as a TCP) enjoys SMP.[161] EE considered the ability of TCPs with SMP to set unregulated termination rates to be a critical issue that requires intervention at the

[153] December 2010 Consultation, paragraphs A4.97-A4.100.
[154] Vodafone, December 2010 Consultation response, Q6.2 on page 60.
[155] Vodafone, December 2010 Consultation response, Q6.2 on page 60.
[156] [✂].
[157] [✂].
[158] [✂].
[159] [✂].
[160] EE, December 2010 Consultation response, Q6.2, paragraph 3.
[161] EE, December 2010 Consultation response, Q5.1, paragraph 8.

wholesale level.[162] EE favoured a market review of the non-geographic wholesale market.[163] EE suggested combining this wholesale intervention with industry-led "transparency initiatives".[164]

A17.77 EE stated that the current position, with regulated fixed and mobile call termination rates and unregulated non-geographic termination rates, was an "anomaly" that should be corrected.[165] EE stated that, under the Common Regulatory Framework, NRAs must first look to addressing concerns through wholesale intervention. EE stated that it is not appropriate to impose retail regulation (e.g. the unbundled tariff) in the hope that it will address concerns at both the retail and wholesale level. Rather wholesale concerns must first be addressed at the wholesale level.[166]

A17.78 EE considered that wholesale regulation would result in clear, stable and non-discriminatory termination rates for non-geographic calls, which would benefit consumers.[167] EE recognised that, since the termination rate also covers any micropayment to the SP, this need not be the lowest possible termination rate.[168] EE considered that consumers would benefit from this approach since they were directly affected by termination rates. Further, greater certainty about the level of termination rates "enhances" OCP's ability to include non-geographic calls within bundles of inclusive minutes.[169]

Virgin Media

A17.79 Virgin Media considered that the December 2010 Consultation overemphasised the problems at the retail level and underemphasised the problems at the wholesale level.[170] It referred to our regulatory principles and stated that we should only consider intervention at the retail level when intervention at the wholesale level has been proven to be ineffective.[171] It considered that Ofcom should review the market for non-geographic call termination. Virgin Media expected that all TCPs would be found to possess SMP and that remedies would be imposed to constrain termination rates. It stated that this wholesale intervention, in conjunction with a programme of consumer education would improve consumer welfare and the operation of the non-geographic numbers regime.[172]

Three

A17.80 Three agreed that (wholesale) caps on termination rates would not address concerns at the retail level.[173]

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[162] EE, December 2010 Consultation response, Q5.4, paragraph 11. Also Q6.2, paragraph 13.
[163] EE, December 2010 Consultation response, Q6.2, paragraphs 15-17. Also Q2.3, paragraph 4.
[164] EE, December 2010 Consultation response, summary, paragraph 7.
[165] EE, December 2010 Consultation response, summary, paragraph 6. Also Q6.2 paragraphs 1-2.
[166] EE, December 2010 Consultation response, Q6.2, paragraph 18. Also summary, paragraph 7.
[167] EE, December 2010 Consultation response, summary, paragraph 7. Also Q5.4, paragraph 10.
[168] EE, December 2010 Consultation response, Q5.4, paragraph 10.
[169] EE, December 2010 Consultation response, Q6.2, paragraph 14.
[170] Virgin Media, December 2010 Consultation response, Q2.2 on page 5.
[171] Virgin Media, December 2010 Consultation response, page 3.
[172] Virgin Media, December 2010 Consultation response, Q5.4 on page 18, Q6.2 on page 19.
[173] Three, December 2010 Consultation response, paragraph 62.

Ofcom's position

A17.81 We now set out our views on the advantages and disadvantages of directly regulating the level of termination rates for calls to non-geographic numbers while leaving retail regulation essentially unchanged. Our analysis is set out as follows:

- first, we set out some observations on the legal basis for regulating termination rates;
- second, we explain why regulating termination rates would not address our retail concerns;
- third, we consider whether we have an obligation to consider wholesale regulation before we consider retail regulation; and
- fourth, we explain why our approach is not inconsistent with the treatment of other termination rates.

Legal basis for regulating termination rates

A17.82 Stakeholders suggested two different legal bases for regulating termination rates:

- EE and Virgin Media suggested that we conduct a formal market review of the wholesale market for non-geographic calls using our powers under sections 79 to 84A of the Act. Stakeholders consider that such a review would find that all TCPs possess SMP in relation to non-geographic calls. If this were the case then we could regulate the level of termination rates for non-geographic calls using our powers under the Act.[174]
- Vodafone suggested that the revised European regulatory framework does give Ofcom the ability to set maximum prices at the wholesale level (i.e. maximum termination rates). This is on the basis of Vodafone's view that the "users" of non-geographic numbers are TCP and SPs.[175] [✂].[176]

A17.83 Our observations on these two legal bases are set out below.

A17.84 In terms of the suggestion that we carry out a formal wholesale market review, as explained in Annex 10 we do not agree with EE and Virgin Media that the balance of wholesale negotiating power is consistently in TCPs' favour. Rather the position depends on the firms involved. While we accept that this does not preclude us carrying out a market review, it is likely to complicate the wholesale analysis.

A17.85 In terms of Vodafone's view that the revised European regulatory framework gives us the power set maximum termination rates, we do not agree. Our views on the interpretation of these provisions are set out in Section 5.

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[174] As recognised by stakeholders, this does not necessarily imply that all non-geographic termination rates would solely reflect the costs of termination. For example on some number ranges it might be appropriate to incorporate a degree of revenue share with the SP or a payment to the OCP. As a result, a termination rates may differ between number ranges to produce a range of wholesale price points.

[175] Vodafone, December 2010 Consultation response, Annex 4, paragraph 1.2.

[176] [✂].

Regulating termination rates would not address our concerns about the retail level

A17.86 As explained in Annexes 8 and 10 we have concerns about the operation of both the retail and the wholesale levels. Regulation of the level of termination rates would potentially address our wholesale concerns (including the effects that these may have on consumers). However the significant concerns we have about the operation of the retail level would not be addressed (i.e. poor price awareness, the horizontal and vertical externalities and the consequences that flow from these market failures).[177] We adopted the same view in the December 2010 Consultation and it accords with Three's position.[178]

A17.87 The recent history of non-geographic calls supports our view that retail concerns are unlikely to be addressed by regulating termination rates.

- Currently most of the termination rates for non-geographic calls paid by BT when it acts as an OCP are regulated by means of the NTS Call Origination Condition. As explained in Section 3, historically industry practice was that equivalent termination rates applied to non-geographic calls originated by other OCPs.[179] However during this period we still had serious concerns about the operation of the retail level, including poor consumer price awareness.[180]

- Following a series of disputes, in June 2009 we issued a determination that set cost based termination rates for 0870 calls (with a zero allowance for revenue share with the SP).[181] This followed the 0870 Statement which set out a number of measures aimed at restoring the link between 0870 call prices and the price of geographic calls.[182] However not all OCPs responded by pricing 0870 at the same level as geographic calls (in particular, mobile OCPs continued charging most consumers higher prices for 0870 calls). That said, we recognise that this system was only in place for a few months before (on 2 October 2009) BT introduced variable termination rates for calls to its 0870 numbers.[183]

A17.88 EE said that clear, stable termination rates would benefit consumers and may prompt inclusion of non-geographic calls within bundles. In our view the inclusion of

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[177] Vodafone described the retail level as "competitive" and Virgin Media downplayed the scale of retail problems. We do not agree that retail competition removes our retail concerns for two reasons. First, we have identified horizontal and vertical externalities which imply that even a competitive market would fail to deliver the efficient outcome. Second, the lack of awareness of non-geographic call prices by consumers means that competition tends to be less intense in non-geographic calls than in other services sold to consumers by OCPs. We set out our views on the operation of the retail level in greater detail in Annex 8.

[178] December 2010 Consultation, paragraph A4.98(a).

[179] This historic arrangement is breaking down, particularly following BT's introduction of variable termination rates for 080 calls from July 2009.

[180] For example, paragraph 1.7 of the 2005 NTS Consultation stated that: "Ofcom's research shows that consumers have a very low level of awareness of the price of 084 and 087 calls, because most consumers believe that the calls cost much more than is really the case."

[181] 0870 Dispute Determination: http://stakeholders.ofcom.org.uk/binaries/consultations/resolve0870calls/statement/determination.pdf

[182] See the 0845/0870 Dispute Determination, paragraphs 2.47-2.49 for further details.

[183] NCCN 986 was issued on 2 October 2009 and came into effect 1 November 2009.

these calls within bundles of inclusive mobile calls is unlikely to be commonplace. This is for a number of reasons:

- For number ranges where termination rates are not purely cost based, and instead incorporate a revenue share for the SP, it less likely that OCPs can profitably include these calls within bundles.

- As set out above, even before BT's introduction of termination rates linked to retail prices, there were problems at the retail level and mobile OCPs generally did not include non-geographic calls within bundles.

- Even if termination rates were clear and stable, this would not address the vertical and horizontal externalities. Similarly it is unlikely to address consumers' poor price awareness. For example, OCPs would still be free to adopt different retail pricing strategies meaning that SPs are unable to concisely advertise accurate retail prices at the point of call.

A17.89 This is not to imply that these calls would never be offered in bundles. For example, some mobile OCPs offer (or offered) bolt-on's that (for an additional monthly charge) allow the inclusion of some 08 calls within bundles of inclusive ('free') minutes.[184] Similarly some fixed OCPs offer free 0870 calls at certain times of the day, similar to their practice on geographic calls.[185]

A17.90 Both EE and Virgin Media suggested combining direct regulation of termination rates with information remedies at the retail level. However as set out in Section 9 we consider that information remedies alone are not sufficient to address our retail concerns.

A17.91 [✂]. Fewer wholesale price points might lead to fixed OCPs setting fewer retail price points.[186] However mobile OCPs already set a limited number of retail price points and yet, as set out in Annex 8, consumers' price awareness is poor.[187] Fewer wholesale price points are thus unlikely to, in and of themselves, improve

[184] Vodafone currently offers such a bolt-on. Approximately [✂] of its consumer post-pay subscriber base purchase this bolt-on (source: Vodafone response dated 11 November 2011 to Ofcom's 21 October 2011 formal information request, question 9(iii)). EE previously offered such a bolt-on but withdrew it due to a lack of significant customer demand and the risks associated with termination rates. EE, December 2010 Consultation response, Q4.3, paragraph 12(a).

[185] For example, BT did so in January 2009 and Talk Talk followed suit in April 2009. See December 2010 Consultation, paragraph A5.33.

[186] For example, as of 1 November 2011 Talk Talk set multiple prices within the 0843/4 and 0871/2 number ranges.
https://m1.ttxm.co.uk/sites/broadband.talktalk.co.uk/pricing/pdf/TalkTalk_NGN_prefixes_01NOV11.pdf

[187] To illustrate, on 1 December 2011 Vodafone charged its post-pay subscribers 35ppm for all 0844 and 0871 calls, EE charged its post-pay subscribers 40ppm for all 0844 and 0871 calls, Orange charged its pre-pay subscribers 35ppm for all 0844 and 0871 calls (although there appeared to be some price variation within 0844 for its post-pay subscribers), O2 charged its pre-pay subscribers 25ppm for all 0844 calls and 35ppm for all 0871 calls and O2 charged its post-pay subscribers 20.4ppm for all 0844 calls and 35.8ppm for all 0871 calls. Prices taken from company websites.

awareness of retail prices.[188] [✂]. While it might assist those callers that wished to look up call prices, in practice few callers do so.[189]

A17.92 Thus, in summary, we do consider that the various proposals for regulating termination rates would not address the significant concerns we have about the operation of the retail level.

Requirement to consider wholesale regulation before retail regulation

A17.93 We do not accept the submissions of EE and Virgin Media that Ofcom should first consider intervention at the wholesale level, rather than the retail level for the reasons set out in Section 5 of Part A. Note also that the source of our key concerns (namely poor price awareness and the vertical and horizontal externalities) is not the operation of the wholesale level – this is different to the situation that commonly applies in formal market reviews. In any event, for the reasons set out above, we do not consider that our concerns in relation to the retail provision of non-geographic calls would be addressed by wholesale intervention.

Consistency with the treatment of geographic and mobile call termination rates

A17.94 EE considered that the treatment of termination of non-geographic calls was inconsistent with the treatment of geographic and mobile call termination (both of which are regulated).

A17.95 We consider that there are significant differences between non-geographic calls and calls to either mobiles or geographic numbers. In particular, we have significantly fewer concerns about the operation of the retail level in relation to geographic calls and calls to mobiles. Rather, for geographic calls and calls to mobiles, our primary concern is at the wholesale level (where we have identified SMP). In other words, the differences in our approach reflect differences in the market circumstances.

Evaluation against our assessment criteria

A17.96 We have evaluated the option of regulating termination rates against our five assessment criteria.

A17.97 In terms of consumer price awareness, as explained above our concerns stemming from the operation of the retail level are unlikely to be addressed. For example, OCPs would continue to be able to set retail prices as they see fit, prices for calls to a particular number would continue to vary between OCPs and SPs would continue to face difficulties in accurately communicating the price of calling them.

A17.98 In terms of efficient prices:

[188] Lack of retail price points can also impede competition between SPs. For example, see the discussion of DQ providers in Annex 8.

[189] Only 18% of respondents to the 2009 Consumer survey had ever looked up pricing information to determine the cost of a call (question 33). In the 2011 Consumer survey we asked respondents that had considered making a call to a number they were unsure of whether they had looked up pricing information to find out the cost of a call (question GL09B). Only 5% of respondents usually or always look up this information; a further 18% did so occasionally.

- our concerns stemming from the operation of the retail level are unlikely to be addressed (i.e. the vertical and horizontal externalities and the effects of poor price awareness);

- however absent Ofcom's involvement the operation of the wholesale level may have adverse effects on retail prices. For example, the level of termination rates can affect retail prices. The concerns about efficient prices that stem from the operation of the wholesale level are likely to be addressed if we were to regulate termination rates.

A17.99 In terms of service quality, variety and innovation:

- our concerns stemming from the operation of the retail level are unlikely to be addressed;

- however any negative consequences of inappropriate termination rates on SPs are likely to be addressed.

A17.100 In terms of access to socially important services, regulation of termination rates is unlikely to address this concern. There is likely to be little effect on vulnerable consumers' awareness of call prices or on the actual price of calls to socially important services (in particular, the vertical externality is unlikely to be addressed).

A17.101 In terms of the regulatory burden:

- there would be some regulatory costs for Ofcom and CPs to determine termination rates and to periodically re-review the wholesale level;

- whatever decision was taken about the particular level of termination rates may also have some costs associated with it (e.g. changes to termination rates might prompt some SPs to migrate, leading to migration costs); and

- note also that, particularly for revenue-sharing number ranges, setting termination rates may not be straightforward (assuming that such regulation was appropriate). It would entail striking a balance between prices to callers and revenues for SPs. If termination rates were set too high then this risks retail prices being too high (or SPs migrating to different number ranges, in order to try and secure a lower retail price). Conversely, if termination rates were set too low then this may harm the availability of services via non-geographic numbers (or result in SPs migrating to different number ranges, to secure higher termination rates). There is thus a risk of regulatory failure.

A17.102 In summary, our view remains the same as in the December 2010 Consultation, namely that regulating termination rates is unlikely to be an effective way to address the concerns that we have identified.

Part B – Annex 18

Assumed Handover Point

Introduction

A18.1 In this section we discuss the Assumed Handover Point ('AHP'). The location of the AHP is important in the unbundled tariff structure because the Service Charge ('SC') is the payment to the TCP for calls handed over at the AHP. Calls can be handed over at other points and where this is the case, other charges could be relevant.

A18.2 One particular area of concern for CPs is the payment for transit services in the case where the OCP does not route the call directly to the TCP. Currently, different arrangements exist for different number ranges. In some cases, the OCP pays for transit whilst in other cases the TCP pays. The use of transit services is prevalent in the routing of non-geographic calls. Respondents to the December 2010 Consultation had different views on how transit should be treated within the proposed regime. In this Section we set out our views on how we think payments for transit services should be considered and how this fits with our proposals for the location of the AHP.

A18.3 In summary, we propose that the AHP should be set based on a Near End Handover ('NEHO') regime. In the case of the BT network, this would be the Digital Local Exchange ('DLE'). In relation to transit services, we propose that in all cases where the unbundled tariff approach applies, the TCP should pay the transit provider for transit services but that the OCP should bear the costs of its interconnection circuits to the transit provider.

A18.4 Where two CPs other than BT interconnect directly, we propose that there is scope for commercial discussion on how the cost savings realised by not using a transit provider should be shared to the benefit of the two interconnected CPs.

A18.5 We seek views from interested parties on the proposals set out in this Section in relation to the AHP and transit services.

Summary of position in the December 2010 Consultation

A18.6 We considered the relevant point for the AHP in Annex 5 of the December 2010 Consultation.[190] We said that the SC should be the termination rate that would apply if the call was handed over at a particular point - the AHP. We also noted that the AHP did not need to be the actual point of handover; calls could be handed over at different points from the originating network and additional charges would apply.

A18.7 We did not set out a particular view on where we considered the most appropriate point for the AHP would be but sought views from interested parties on what approach should be taken. Further, we sought input on whether the current asymmetric responsibilities for paying for transit should be changed. Again, we did not offer a particular view but said that we would reflect the outcome of that debate in our consideration of the AHP.

[190] See paragraphs A5.200 to A5.209 of the December 2010 consultation.

Stakeholder responses

A18.8 A number of stakeholders responded in relation to the appropriate location of the AHP.

A18.9 Where respondents expressed a view on calls originating on the BT network, there was general agreement that the AHP should be at the DLE. For example, C&W noted that the current NEHO arrangements recognised the extent that a TCP had built out to pick-up traffic from BT's local exchanges, with TCPs able to derive the maximum benefit if they picked up traffic as close to the point of origin as possible. It concluded that the DLE as the AHP was the only fair way to encourage infrastructure investment and efficient routing.[191]

A18.10 However, for calls originating on other CPs' networks, there were differing views. Responses generally focused on the use of transit services and particularly on whether the OCP or the TCP should pay for transit. All respondents agreed that the current asymmetry, where the OCP pays for transit on some call types and the TCP pays on others, should be addressed.

A18.11 BT[192] argued that the TCP should pay for transit because:

- the TCP owns the traffic and makes the build or buy decision (e.g. whether to build interconnection or buy a transit service);
- for unbundled services the access charge is designed to cover the OCP's retailing and call origination costs, and it should not have to also take account of transit costs;
- for calls to Freephone numbers the OCP should not be charging for these calls and so should not be generating revenue with which to pay the transit charge. In order to remove the asymmetry in the payment of transit, then the fact that the OCP cannot pay the transit charge on Freephone means it should not pay the transit charge on all calls; and
- in order to remove the asymmetry, services not covered by the unbundled tariff (such as 03 numbers) should also be designated as terminator pays transit.

A18.12 EE said that its view was that the TCP should pay for transit and the OCP should hand the call over at the first opportunity in order to drive efficiency.[193]

A18.13 Verizon said it considered that the TCP should pay for transit. In its view, moving to an OCP pays model for transit for all non-geographic ranges would be very onerous on it. It argued that the "TCP pays" model for transit would be consistent with the principle of rewarding network investment.[194]

A18.14 Vodafone was also of the view that the TCP should pay for transit.[195]

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[191] C&W, December 2010 Consultation response, pp.34-40.
[192] BT, December 2010 Consultation response, pp.38-39.
[193] EE, December 2010 Consultation response, p.55.
[194] Verizon, December 2010 Consultation response, paragraphs 33-38.
[195] Vodafone, December 2010 Consultation response, p.17.

A18.15 C&W argued that the OCP should pay for transit in all cases. C&W argued that this was the only way to incentivise efficient routing and to ensure that the costs of using a transit provider were borne by the party that caused the costs to be incurred. It also said that an OCP pays approach would reward network investment. C&W explained that the issue was particularly acute because, even in the case where it was the TCP and had direct routes to some OCPs, the traffic was delivered via a transit provider rather than on the direct route.[196]

A18.16 C&W noted that it recognised a counter argument could be made for 080 traffic since the OCP would receive no revenue for these calls, but it said this could be rectified by an adjustment to the origination payment paid by the TCP to the OCP. C&W also said that Ofcom should not assume the issue of transit could be resolved outside the NGCS review and that, in fact, we should conclude on the issue within the scope of this review. This would provide a clear path to any changes needed. C&W said this was especially needed as there would be differing views, given that different parties would have differing commercial incentives. Because of this, it was unlikely that industry consensus on change would be achievable absent direction from Ofcom, and so the status quo would be maintained.

A18.17 Colt agreed with C&W's point that requiring the OCP to pay for transit would encourage efficient routing.[197]

A18.18 FCS said it preferred that the OCP paid for the transit charge and that this should be factored into its AC.[198]

A18.19 Another respondent [✂] argued that an OCP pays model for transit would incentivise efficient routing for all. It said that a detailed consideration of the interaction of the proposed regime with the transit market was needed because, whilst there may be some direct routing between large carriers, transit would be used for the majority of number ranges.[199]

A18.20 Three also said the transit payment should be part of the AC – that is, that the OCP should pay for transit – because, in its view, the TCP would not always be privy to whether an OCP utilised transit services.[200]

Discussions on Assumed Handover Point and transit at the industry working groups

A18.21 These issues were also discussed in detail at the industry working groups, in particular the Commercial Working Group ('CWG') which met several times over the course of last year. As highlighted in Annex 14, there was no consensus position on the best approach, but instead a division between those that favoured NEHO and, others that favoured a far end handover approach, as well as a division between those that supported an OCP pays transit model compared to a TCP pays.

[196] C&W, December 2010 Consultation response, pp.39-40.
[197] Colt, December 2010 Consultation response, p.12.
[198] FCS, December 2010 Consultation response, p.22.
[199] [✂]
[200] Three, December 2010 Consultation response, p.22.

There was support from some members, however, for a standardisation of the transit payment arrangements.[201]

A18.22 As part of the CWG discussions we presented an initial proposal for an OCP pays transit, far-end handover model. We have now revised our proposal based on the analysis set out below.

Our position on responses and proposals for Assumed Handover Point

A18.23 We now set out our proposals for the AHP and the impact of the use of transit, taking into account the responses to the December 2010 Consultation and the discussions at the CWG.

Location of the AHP

A18.24 In considering the appropriate location of the AHP we need to consider what approach to call routing is likely to provide the right incentives for the efficient delivery of non-geographic calls.

A18.25 For non-geographic calls, the terminating location cannot be ascertained from examination of the dialled digits. Therefore, the OCP is in no position to efficiently route the call to the nearest point of handover to where the call terminates which may in any event vary over time. Only the TCP, which provides the non-geographic call service, is able to optimise routing by carrying out any number translation or analysis required to determine the actual point of termination of the call as close as possible to the point of origination of the call. Therefore, routing mechanisms that lead to the TCP receiving traffic as near to the point of origination as possible are most likely to deliver efficient outcomes. This is the NEHO mechanism. It suggests that the AHP should be as close to the point of the origination of the call as is reasonably possible.

Location of the AHP on BT's network

A18.26 For calls that originate on BT's network, the discussion above would mean that the DLE is the appropriate point to consider as the AHP. For non-geographic calls that originate on BT's network and terminate on other CPs' networks, the current interconnection model allows each CP to interconnect to BT at the DLE and receive calls to its non-geographic numbers at this point. However, if the CP does not interconnect with the DLE, BT conveys the call across its network to the first point where it can be handed over. An extra charge is incurred by the TCP for this conveyance by BT.[202] Therefore, the current approach to the routing of BT originated calls is consistent with an approach where the AHP is considered to be the DLE.

[201] This issue was discussed at the CWG meeting on 14 July 2011, the notes of that meeting are available on Ofcom's website here: http://stakeholders.ofcom.org.uk/telecoms/groups/nts-focus-group/notes-of-meetings/ngcs-14072011

[202] A reduced termination payment is made to the TCP where the call is handed over at the a point other than the DLE.

Location of the AHP on networks other than BT

A18.27 Calls that originate on networks other than BT should still be handed over to the TCP as soon as possible because it is still the case, irrespective of the OCP, that more efficient call routing is likely to occur the sooner the TCP network is able to determine the actual point of call termination. Therefore, the AHP for calls originating on non-BT networks would also be the CP equivalent of the DLE.

A18.28 Whilst networks of CPs other than BT may not be structured the same as BT, so that there are no stand-alone DLEs (instead, each switch may serve as both a DLE and tandem), the call still originates on a switch in the OCP's network. Thus the AHP can be taken as being the originating switch in non-BT networks.

A18.29 There are a number of Next Generation Networks ('NGNs') deployed in the UK. We consider that for an NGN, where the technology is such that there is not a direct equivalent of the BT DLE, the appropriate interpretation would be that the AHP should be considered to be at the point of interconnection that is closest to the origination of the call.

A18.30 For calls that originate on networks of CPs other than BT and terminate on BT's network, the current routing arrangements would be consistent with the AHP being at the originating switch/point of interconnection closest to the origination of the call.

A18.31 For calls that originate and terminate on non-BT networks, we also need to consider transit arrangements, which we discuss in the following sub-section.

Impact of transit arrangements

A18.32 CPs other than BT are less likely to interconnect to each other. As such, there is a far greater likelihood that a transit network will be included within the call routing. In general, all CPs are connected to BT and so transit via the BT network is common for calls originating and terminating on networks other than BT. However, the CP responsible for paying the transit fee differs, depending on the number range.

A18.33 A number of CPs that responded to the December 2010 Consultation argued that the regime for which CP pays for transit should be consistent, although views as to whether this should be the OCP or the TCP differed. Some respondents argued that an "OCP pays" model incentivises efficient investment and/or routing, whereas others argued that a "TCP pays" model would have this effect. This division of views was also reflected in the discussions at the CWG highlighted above.

A18.34 BT argued that because the OCP does not (or should not) receive revenue for Freephone calls, it cannot pay for transit. Because of this, and to remove the asymmetry that currently exists, BT argued that this means the TCP should pay for transit in all cases. We do not necessarily agree with this – we have set out in Sections 16 and 17 of this document that for Freephone a slightly different regime is needed so that the OCP receives a call origination payment from the TCP to cover the costs it incurs, which it does not recover through an Access Charge. However, if the nature of the payment regime for Freephone leads to a requirement for a certain approach to paying for transit on Freephone calls, we do not believe this should therefore automatically mean the same regime should apply elsewhere, if reasons exist for a different approach. However, in the discussion below we do not consider that different regimes would be required and so do not discuss this point further.

A18.35 BT also argued that the TCP should pay for transit on calls to 03 numbers to remove the asymmetry. However, we are not proposing to implement our unbundled tariff structure on 03 numbers and as such do not include them within the following discussion. The requirement for the OCP to pay for transit for 03 numbers results from our determination of a dispute between EE and BT.[203]

A18.36 The discussion above regarding the location of the AHP means that the TCP is responsible for all costs beyond the originating switch in the OCP's network. Thus, if the TCP directly connects to the originating switch in the OCP's network, it covers all costs except those of the originating switch. However, if the OCP pays for transit, it would be in the interests of the TCP not to interconnect directly at the originating switch but instead to receive all traffic via a limited number of points of interconnection to the transit provider, because this would reduce its own costs. This would increase the costs of OCPs. In the extreme, the TCP could accept calls to its non-geographic numbers over only one point of interconnection to the transit provider. This would mean the call could be potentially routed a significant distance before the final destination of the call is determined, leading to inefficient end to end call routing.

A18.37 Where the TCP pays for transit it is in its own interests to minimise the costs of this transit. To the extent it can reduce or remove these costs by extending its network, this is likely to increase the efficiency of call routing. Given this, a "TCP pays" approach to transit would appear preferable as it is more likely to encourage efficient investment and routing decisions.

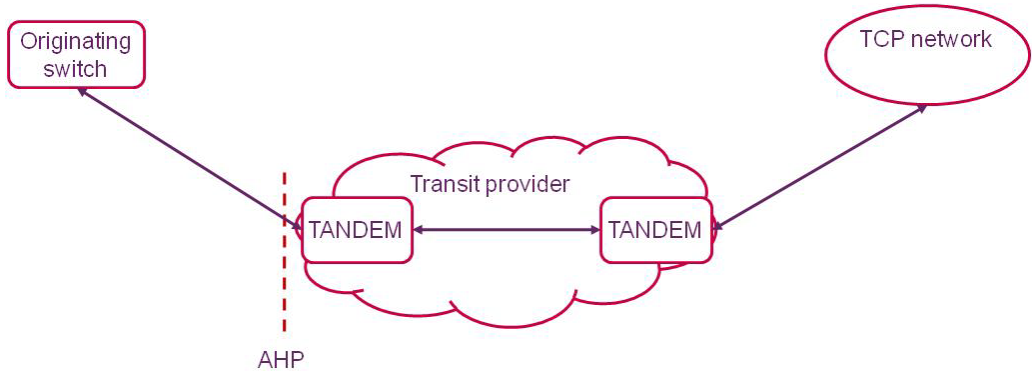
Interconnection circuits

A18.38 We also need to consider how the interconnection circuits, particularly the interconnection from the OCP to the transit provider, should be taken into account. In a "TCP pays" approach to transit, it could be argued that the TCP should also cover the cost of this interconnection circuit so that it pays for all costs beyond the originating switch in the OCP network. However, the cost of interconnection between the OCP and the transit provider is outside the control of the TCP (because it has no say in the particular way the interconnection is provided or the traffic using it). Therefore, it is likely that the costs of this interconnection would be optimised if they are covered by the OCP.

A18.39 Further, under current arrangements, the OCP typically pays for these interconnection circuits and these circuits are used for multiple traffic flows (including geographic traffic as well as non-geographic calls). Changing this approach could be complex and disruptive, resulting in additional contractual and billing arrangements and/or re-routing of traffic. We therefore are of the view that the OCP's responsibility should include the interconnection from the OCP to the transit provider. This would result in the AHP being located as shown in Figure A18.1 below.

[203] 03 Dispute Determination, available at: http://stakeholders.ofcom.org.uk/binaries/consultations/draft-everything-bt-termination/statement/determination.pdf

Figure A18.1: AHP for direct interconnection and transit routing in an OCP pays model



A18.40 Where direct routing is implemented between the OCP and TCP, because the AHP is logically at the originating switch, the TCP would, in theory, pay the costs of providing the interconnect link to directly connect to the originating switch. The TCP would therefore only seek such an interconnection if the additional cost of this interconnection circuit was offset by the saving from not paying for transit.

A18.41 The OCP may also benefit from a direct interconnect to the TCP. In theory, the OCP could save the costs of the interconnection circuit to the transit network. However, this circuit will be shared by multiple traffic types and so any potential savings may not be able to be realised in practice. Another potential benefit to the OCP is that the direct interconnect between the OCP and the TCP could be used for other traffic in addition to non-geographic calls. This could provide a benefit to the OCP to the extent that it could avoid routing other traffic types via the transit provider.

A18.42 We consider that in negotiating a direct interconnect the OCP and TCP should be free to commercially agree how to share these potential benefits/savings to make the direct interconnect approach beneficial to both parties.

A18.43 Therefore, we do not propose that the SC must be strictly applied at the originating switch where direct routing is implemented between two non-BT CPs. As we set out in the December 2010 Consultation, the call does not have to be handed over at the exact location of the AHP. Rather, the AHP provides a reference as to where the SC would be paid for a specific call routing approach. Thus, the approach shown in Figure A18.1 above indicates the AHP is at the point of ingress to the transit provider's network and so the SC is the termination rate paid by the OCP at this point. In agreeing to a direct routing approach, the OCP and TCP would agree termination payments with reference to the AHP in this transit model, taking account of the benefits available to each CP delivered by direct routing.

A18.44 Some respondents to the December 2010 Consultation identified that some OCPs route calls via a transit provider even when a direct route to the TCP exists and argued that an "OCP pays" model for transit would resolve this, because it would mean the costs of transit are paid by the CP that causes these costs to be incurred e.g. the OCP.

A18.45 There are two scenarios where an OCP and TCP may be interconnected:

- The TCP is connected to the originating switch in the OCP's network; or
- The TCP is connected to a switch other than the originating switch in the OCP's network.

A18.46 In the first of these cases we would expect that the OCP should be able to route the call directly to the TCP. We recognise that there may be some costs associated with establishing this direct routing if it is not currently in place (such as the cost of databuild on the relevant OCP switch). Nonetheless, we would expect that commercial negotiation between the OCP and TCP would be able to resolve any issues related to using this direct route, based on the approach described above in paragraphs A18.40 to A18.43.

A18.47 In the second case, the TCP is not connected to the originating switch in the OCP's network but is connected elsewhere. Therefore, for the OCP to route the call directly it must convey the call across its network. In this case the TCP should pay for this additional conveyance. This results in the TCP being presented with three options from which it can choose which it considers as the most efficient:

- Agree with the OCP to implement additional interconnects to the OCP's originating switch(es);
- Agree with the OCP to pay the OCP for the cost of conveyance beyond the originating switch to use direct interconnection to other switches in the OCP's network; or
- Receive traffic via a transit provider and pay for the transit service so provided.

A18.48 In considering the best approach, the commercial negotiations between the OCP and TCP would again be based on reference to the model in Figure A18.1 above. The decision on which approach to implement would take into account the overall benefits of the preferred approach to the OCP and TCP compared to the use of a transit provider.

Summary of proposals on AHP and transit

A18.49 There are a number of different scenarios that exist when considering non-geographic calls. Currently, for calls that either originate or terminate on BT's network, mechanisms that encourage NEHO are in place. For calls between other, non-BT CPs, there is significant use of BT as a transit provider and different approaches for different non-geographic number ranges.

A18.50 As far as possible, we think the approach to call routing and interconnection should be consistent. Nevertheless, we have taken account of existing routing configurations so that we do not propose approaches that lead to disruptive changes that do not deliver significant long term benefits.

A18.51 Based on the discussion above we consider that a NEHO model for non-geographic traffic is likely to provide the appropriate signals for efficient call routing. For number ranges where we propose that an unbundled tariff structure should be implemented, we therefore propose that:

- for BT originated calls, the AHP is considered to be the DLE;
- for BT terminated calls, the AHP is considered to be the originating switch in the OCP's network; and
- for calls where BT is neither the OCP or the TCP:
    - the AHP is at the ingress to the transit provider so that the OCP pays the costs of the originating switch plus the interconnection circuit to the transit provider whilst the TCP pays for transit; and
    - where direct routing is implemented, the two CPs may agree to vary the termination payments with reference to the SC that applies at the AHP in the model where a transit provider is used. The agreed termination payments would take account of the savings resulting from not using a transit provider and any other benefits that may accrue from having direct interconnection in place.

A18.52 We would welcome stakeholder comments on the following questions related to our proposed approach to AHP. We have set out the specific questions on which we are seeking stakeholder comments at the end of Section 10.

Part B – Annex 19

Billing system implementation costs

Introduction

A19.1 In this Annex we set out our view of the potential implementation costs of the unbundled tariff, taking into account two main areas which have been identified as potential issues:

i) the number of price points that can be supported at the retail level by OCP billing systems; and

ii) the extent of NGC tariff information presented on consumers' bills.

A19.2 We set out our proposed approach to implementation for each of these issues in Section 10 and Section 12 respectively. Using the assumptions set out in those Sections for the number of price points and the extent of tariff information on customers we have set out our provisional estimates of the implementation costs for the unbundled tariff. These estimates are then used to inform our impact assessment analysis in Section 13.

A19.3 This Annex is structured as follows:

- First we have set out our approach to costs in the December 2010 Consultation;
- We have summarised stakeholder responses on costs;
- We outline the further work we have undertaken to gather and improve our cost estimates; and
- We set out our updated cost estimates.

Approach in the December 2010 Consultation

A19.4 The 2010 Implementation Study[204] explored the implementation aspects related to OCPs' billing systems supporting the unbundled tariff structure. Based on that study, we said in the December 2010 Consultation that although OCPs would have to updated their billing systems to reflect an unbundled tariff structure, the study did not identify any insurmountable implementation barriers in adopting an unbundled tariff structure. Nevertheless, we noted it did identify some limitations with legacy retail billing systems and that all CPs would face implementation costs to adjust their billing systems.

A19.5 The OCPs responding to the 2010 Implementation Study indicated an implementation period of up to 24 months would be required, and costs in the range of £2m to £10m per firm to support both correct charging under an unbundled tariff structure and to present a bill with disaggregated call charges on a per call basis.

[204] http://stakeholders.ofcom.org.uk/binaries/consultations/simplifying-non-geo-numbers/annexes/tariff-billing.pdf

A19.6 We considered that these estimates by OCPs potentially over-estimated the complexity of an unbundled tariff structure and the information that would have to be presented in bills. We also considered that the likely initial implementation burden could potentially be reduced, for example, by not presenting the AC and SC on a per call basis, and only presenting them as charges aggregated on a per number range basis.[205]

Stakeholder responses on system changes and implementation costs

A19.7 Stakeholders did not raise any major concerns about the basic capability of combining two charges to price a NGC correctly at the retail level in response to the December 2010 Consultation. However, concerns were raised about the number of SC price points and the extent of information that should be presented in consumer bills.

A19.8 The majority of stakeholders which commented on implementation costs said it was too early to estimate the potential extent of these costs, in particular in the absence of more detailed proposals from Ofcom on how the unbundled tariff would be implemented. Some stakeholders did, however, offer some comments on the potential level of costs. C&W said the changes required to support disaggregated billing alone would cost [✂], noting that further costs would be incurred in relation to changes to interconnected systems.[206] EE disagreed that the cost estimate of £2m-£10m from the 2010 Implementation Study was an over-estimation of the implementation costs.[207] Virgin Media noted that it had not been possible in the absence of more specific proposals to establish the exact cost to industry, but it estimated that implementation costs would be, even in the least complex case, in the £millions. It noted that the exact level of cost incurred would be very sensitive to the ultimate scope and specification of any reforms.[208]

A19.9 In terms of the implementation issues surrounding the number of SC price points, we have already highlighted the main points raised by stakeholders in Section 10 in relation to the structure of the SC. In summary, the mobile OCPs noted that they faced technical constraints on the number of different retail price points that they could bill[209] and any requirement to pass through these charges would impose significant implementation costs.[210] Some mobile OCPs made recommendations

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[205] See paragraphs 7.10 to 7.12 of the December 2010 Consultation.
[206] C&W, December 2010 Consultation response, p.80.
[207] EE, December 2010 Consultation response, p.77.
[208] Virgin Media, December 2010 Consultation response, p.21.
[209] [✂]. Vodafone, December 2010 Consultation response, p.38.
[210] For example O2 commented that if it had to offer a level of granularity beyond that which it currently offered for mobile shortcodes the costs would be insurmountable. O2, December 2010 Consultation response, p.7. EE also questioned the benefits of implementing such a large range of price points. It noted the example of the 118 range, where it noted that if it was to re-price the range into bands based on wholesale price they would need around [✂] price points, whereas it noted that the bulk of the traffic and revenue was generated from just [✂] numbers. EE, December 2010 Consultation response, pp. 78-79.

on how the number of price points should be restricted, for example Three suggested a maximum of 60.[211]

A19.10 In terms of the level of information presented in customer's bills, we have set out these comments in Section 13. In summary, OCPs were largely of the view that presenting disaggregated call charges in consumers' bills would be complex and costly and would be disproportionate to the benefit. TalkTalk, Sky, UCKTA, C&W, Three and BT noted these concerns. The FCS also raised concerns about the particular costs for smaller providers.[212]

Further engagement with industry and revised implementation proposals

A19.11 Following these responses to the December 2010 Consultation, we have engaged with industry through the industry working groups[213] and on a bilateral basis to understand the constraints faced and to explore measures we could undertake to reduce the implementation costs faced by industry. Although the industry working group process was helpful in understanding the implementation aspects related to an unbundled tariff structure, it was not an appropriate forum to discuss implementation costs which were considered as commercially sensitive information by most stakeholders. Nevertheless, we have been able to obtain useful information on costs during bilateral engagements with stakeholders. We have used the information to estimate the range of costs faced by OCPs to support the unbundled tariff structures.

A19.12 As highlighted above, our engagement with industry suggested that the primary drivers of implementation costs would be the number of SC price points and the presentation of disaggregated charges in consumer bills. Another important factor is the implementation timeline; some OCPs face significant technical constraints (in terms of system capacity) in their legacy systems and would avoid large chunks of costs if these changes could be rolled into their new billing systems. OCPs with legacy billing systems also maintain a large number of discrete systems that compound the extent of required changes further increasing the costs. Although they would face costs to implement unbundled tariff structures in their new billing systems, these would be significantly reduced and they would avoid the costs of upgrading both legacy and new billing systems.

A19.13 We have summarised our approach, including the results of engagement with stakeholders, on each of the two main areas of cost below (that is the number of SC price points and the presentation of information on customers' bills).

Number of SC price points

A19.14 As set out earlier a few stakeholders have identified technical constraints in supporting a large number of SC price points. We engaged further with stakeholders to understand these issues:

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[211] Three, December 2010 Consultation response, pp. 22-23. In subsequent discussions it confirmed that this recommendation for 60 SC price points was not based on any technical limitation but primarily to reduce administrative burden and potential billing errors.

[212] FCS, December 2010 Consultation response, p.23.

[213] See Annex 14 for a summary of the output of these industry working groups.

- O2, who suggested in their December 2010 Consultation response that any level of pricing granularity greater than it currently offered for mobile shortcodes would lead to insurmountable costs, subsequently clarified that its views on costs also took into account the impact of greater granularity on presenting disaggregated charges in bills. In the absence of any requirement to provide disaggregated charges, it said it could support [✂] under an unbundled tariff structure. [✂].

- Three confirmed that its recommendation for 60 SC price points was not based on any technical limitation but primarily to reduce administrative burden and potential billing errors;

- EE said that the amount of configuration and therefore costs would significantly increase if SC price points were supported at a more granular level. It therefore preferred a reduced number of price points for ease of implementation. [✂].

- Vodafone, who identified a technical constraint on the number of price points it could bill in its response to the December 2010 Consultation, indicated that [✂].

A19.15 Based on our discussions with industry, we are not aware of any significant billing systems costs for supporting 50 or less SC price points within existing billing systems. We understand therefore that many of the technical restrictions around the number of price points would not be present in newer billing systems [✂].

A19.16 Whilst larger number of SC price points could be supported in most modern billing systems, many stakeholders indicated that the ongoing costs (e.g. administrative costs) would increase with a larger number of SC price points.

A19.17 In particular, OCPs would face annual administrative costs in managing retail price points and these costs are likely to be higher with a larger number of retail price points. The ongoing costs need to be balanced against the benefits of larger number of price points to improve competition among SPs and support innovative new services which we discuss in Section 10.

A19.18 We propose in Section 12 an implementation period of 18 months from the date of our final statement. This means that implementation is likely to take place in 2014. As a result, the technical constraints on billing a large number of price points are less likely to be a limiting factor in the number of SC price points for most stakeholders as they could add these specific upgrades to their billing systems upgrade programme.

A19.19 However, taking into account the additional costs that a larger number of price points would create, we are proposing in Section 10 that the total number of SC price points should be limited, and we set out our specific proposals in that Section.

Disaggregation of ACs and SCs in customer's bills

A19.20 The responses to the December 2010 Consultation and the discussion at the Technical Working Group suggested that the costs that would be faced by a vast majority of OCPs in implementing unbundled tariff structures could be significantly reduced by not making presentation of disaggregated charges a core aspect of the unbundled tariff .

A19.21 Some of the OCPs facing constraints in presenting disaggregated information have indicated that they are in the process of transforming their billing systems and they

would prefer not to implement costly changes in their legacy billing systems. The constraints they face might be lessened in their new billing systems which may be in place when the unbundled tariff ultimately could be implemented. Nevertheless, there would be providers who would continue to face billing system constraints and significant costs in implementing billing system changes to present disaggregated bills.[214]

A19.22 We engaged bilaterally with several stakeholders to obtain estimates of the costs of presenting disaggregated ACs and SCs in customer's bills. We also asked about the costs of other methods of presenting information in bills given the clear view that disaggregation of charges on bills would lead to significant costs. We have highlighted some of the comments below:

- Three estimated the cost of implementing changes in its billing systems to support disaggregated charges would be [✂].[215]
- Talk Talk, who noted in response to the December 2010 Consultation that presenting disaggregated charges on bills would involve a disproportionate amount of system development and cost[216], later provided estimates to indicate that the costs presenting for indicating the level of AC on bills would be [✂].[217]
- Vodafone similarly noted the associated billing system costs involved in presenting the subscriber specific AC information on bills was considerably less compared to presenting disaggregated charges.
- O2 indicated that not imposing any requirement to present disaggregated charges would reduce costs considerably, but it noted that it would still face significant costs.
- EE indicated that [✂].

A19.23 We also engaged with some smaller providers, selected for us by FCS, on the billing systems implementation aspects of the unbundled tariff. Those who responded to us confirmed to us that they could support unbundled tariff structures in their billing systems. They indicated an up-front cost of approximately £10,000 to implement the necessary changes to support a two-part tariff structure and considered that they would not incur significant annual costs.

A19.24 In summary then, our discussions with industry suggest that there are lower cost options for the presentation of unbundled tariff billing information. We whave set out proposals for what information should be included in customers' bills in Section 13 but we are no longer proposing that the AC and SC should be disaggregated. As a result we expect the costs to be lower and have used the estimates from stakeholders for some of these lower cost options (in particular presenting the AC in a bill)..

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[214] These costs might be significant for the larger number of smaller providers.
[215] [✂].
[216] Talk Talk, December 2010 Consultation response, p.4.
[217] Talk Talk, email to Ofcom 2 December 2011.

Provisional cost estimates

A19.25 We estimate that the implementation costs faced by OCPs fall in the range £10k-£3m for up-front costs and £10k-£50k[218] for annual costs on a per-firm basis. These estimates are lower than those we estimated in the 2010 Consultation.[219] Our discussions with industry subsequent to the 2010 Consultation has allowed us and the industry to better understand the drivers of the implementation costs and the impact of the proposals. These estimates are based on the following assumptions:

- Up to 60 SC price points;
- the level of access charge is indicated in consumers' bills, without any mandatory requirement to present disaggregated charges;
- the adoption of the unbundled tariff is not implemented before mid-2014 (and therefore OCPs are unlikely to face any technical constraints with legacy billing systems)

A19.26 The costs have been estimated based on the discussions we had with stakeholders subsequent to our 2010 Consultation. The costs fall in a wider range because of differences in network and billing architectures across the OCPs. Most of the OCPs would face costs at the lower end of this range and a few OCPs (mostly large mobile OCPs) with a larger number of systems would face higher costs. We have also discussed the implementation aspects with some smaller providers and/or their billing systems providers. They indicated costs towards the lower end of this range.

A19.27 Although we recognise that some OCPs, and in particular those with legacy billing systems, might face implementation costs in adopting unbundled tariff structures, we are of the view that these costs are minimised by not imposing a requirement for the disaggregation of AC and SCs on customers' bills. On the other hand, OCPs with modern billing systems and smaller OCPs with much simpler systems would, in our view, be able to adopt the unbundled tariff structure without incurring significant upgrade costs.

A19.28 We recognise that these costs are only provisional and we would welcome further stakeholder engagement to refine these cost estimates, in particular in the light of the more detailed specification of the unbundled tariff which we have set out in this consultation. We have used these cost estimates in our impact assessment in Section 13 and have set out a specific question for stakeholders on that assessment, which includes a request for further information on the level of billing costs likely to be incurred as a result of our proposals.

[218] The upper bound of the annual costs could double to £100k if the number of SC price points is increased to 100.

[219] In the 2010 Consultation, we estimated a cost range of £2m-£10m to support unbundling and presentation of disaggregated charges. Our revised estimates consider the costs without any mandatory requirement to support disaggregated charges but a requirement to display the AC element of the call (as set out in Section 12).