



Competition issues related to Core Premium content

Annex 8 to pay TV market investigation second
consultation

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Section 1

Introduction

- 1.1 The purpose of this annex is to provide more detail on a number of issues contained within section 6 of the main document on competition issues related to Core Premium content.
- 1.2 The issues that we address in this annex are as follows:
 - Incentives to supply Core Premium content: we examine a variety of points made by respondents to the December Consultation on whether Sky has an incentive to supply its premium content, especially to multiple retailers on particular platforms, and whether incentives are different for new retailers.
 - Vertical arithmetic: we provide a more detailed explanation of our ‘vertical arithmetic’ modelling exercise of Sky’s wholesale relationship with Virgin Media. We have used this model to help us understand Sky’s incentives to wholesale its premium channels to existing and potential retail competitors¹. We have also been interested to observe how Sky’s incentives depend on certain variables, in particular the level of its wholesale charges.

¹ We focus on Sky’s suites of premium channels, rather than the Core Premium content within those channels. This maintains consistency with our consumer survey questions, which (partly for ease of communication) asked customers about their packages of premium channels.

Section 2

Incentives to supply Core Premium content

Introduction

- 2.1 Our December Consultation set out several concerns related to the distribution of premium content. Section 6 of the main document takes this analysis further. This section of this annex analyses various points made on this subject in responses to the December Consultation and in subsequent submissions.
- 2.2 The points we address here are as follows:
- Overview of the incentives to wholesale Core Premium channels to third parties.
 - Final consumers' propensity to switch.
 - Distribution of Core Premium channels on new platforms.
 - Distribution of Core Premium channels to multiple retailers on the same platform.
 - The relative merits of Sky retailing its content via other platforms versus wholesaling its content to other retailers.

Overview of the incentives to wholesale Core Premium channels to third parties

- 2.3 We can distinguish between two broad effects if a vertically integrated wholesaler-retailer refuses to supply its content on a wholesale basis to a third party retailer²:
- The vertically integrated firm foregoes wholesale profits by not supplying the third party retailer. However it may divert customers from that third party retailer to its own retail arm, thereby increasing its retail profits.
 - As a consequence of its strengthened position at the retail level, the vertically integrated firm may increase its profits in some other market(s), such as the wholesale of premium channels or the retail of basic-tier only packages.
- 2.4 In their submissions, Sky and the Four Parties referred to these two effects as, respectively, “static” and “dynamic”. We address the submissions we have received on each of these issues in turn below.

² We recognise that similar issues can arise in the case of vertically separate firms. For example, a wholesale channel provider could exclusively distribute its channel via a particular retailer. In return, the retailer shares a proportion of the benefits of exclusivity with the wholesale channel provider by paying a higher wholesale price. The role of vertical integration is discussed further in paragraphs 6.88 to 6.91 of the main document.

Overview of submissions on the static incentives to wholesale Core Premium channels to third parties

Consultation responses

- 2.5 As part of its response to the December Consultation, Sky provided reports by CRA dated April 2008 (the ‘April 2008 CRA Report’) and July 2008 (the ‘July 2008 CRA Report’). In these submissions, CRA drew a distinction between Sky making its channels available on other platforms and supplying its channels to multiple retailers on the same platform. This latter issue is discussed in paragraphs 2.58 to 2.65 below.
- 2.6 CRA initially stated that there are strong incentives for Sky to make its channels available on “all efficient platforms” in order to reach more final consumers³. CRA did not explain what it meant by “efficient” in this context and in later submissions did not use this word, although it remained of the view that there were strong incentives for Sky to access subscribers on other platforms⁴. We note that, by referring to content being made available on other platforms, CRA is not necessarily implying that Sky will wholesale its channels to third party retailers on those other platforms, rather than seeking to directly retail its channels itself on those platforms.
- 2.7 CRA argued that there is no presumption that foreclosure is likely to occur. Rather, evidence specific to the facts is necessary in order to justify a concern that Sky is likely to refuse to supply its premium channels. CRA stated that the December Consultation failed to provide such evidence⁵.
- 2.8 In support of its view, CRA presented “vertical arithmetic” which analysed the trade-off between retail and wholesale profits were Sky to refuse to supply Sky Sports and Sky Movies channels to Virgin Media. A key determinant of the outcome of this trade-off is the propensity of final consumers to switch their subscription from Virgin Media to Sky. CRA argued that a high level of switching was necessary for the foregone wholesale profits from refusing to supply these channels to outweigh the additional retail profits. Accordingly CRA considered that such a refusal to supply was likely to be unprofitable for Sky⁶.
- 2.9 As part of their response to the December Consultation, the Four Parties provided a report by LECG, dated March 2008 (the ‘March 2008 LECG Report’). In contrast to CRA, LECG (for the Four Parties) argued that the static effect on profitability of withholding supply (i.e. the trade off between increased retail profits and reduced wholesale profits) is likely to be positive or, if negative, small and outweighed by the dynamic effects discussed below. This is for two reasons⁷:
- First, LECG took the opposite view to CRA on the likely level of switching. LECG considered that consumers would be very likely to switch to a retailer with more attractive content.
 - Second, LECG considered that the wholesale arm of a vertically integrated firm would only forego modest profits because rival retailers face a significant delay in monetising the wholesaler’s channels.

³ For example, October 2007 CRA Report, paragraph 6.

⁴ For example, April 2008 CRA Report, paragraph 9. July 2008 CRA Report, paragraph 36.

⁵ April 2008 CRA Report, paragraph 20. April 2008 CRA Report, paragraphs 84-85.

⁶ October 2007 CRA Report, paragraphs 46 and 64.

⁷ March 2008 LECG Report, footnote 17 on page 8.

- 2.10 In response, CRA argued that LECG had provided no evidence to support these assertions⁸.

Ofcom's position

- 2.11 We agree with CRA that there is no automatic presumption that a vertically integrated firm finds it profitable to refuse to supply its content to third party retailers, even if that firm is dominant at the wholesale level. Similarly, there is no presumption that a vertically integrated firm has an incentive to engage in an abusive refusal to supply (i.e. one that would be contrary to Article 82 EC Treaty and/or the CA98). Rather it will depend on the specific features of the industry in question and the facts at hand.
- 2.12 However, as explained in section 6 of the main document, our conclusion is that there are a number of incentives which may motivate Sky against supplying other retailers at a wholesale price which those other retailers are prepared to pay. This may reflect an unwillingness to wholesale to retailers on other platforms at a price which Sky believes would be lower than the price at which it would need to wholesale to itself on those platforms, but it may also reflect a desire to limit the growth of potential competitors. In either case, the market outcome is similar: Sky's content is not as widely available as it might be and this may limit competition.
- 2.13 In terms of the specific points raised above, we discuss CRA's vertical arithmetic in section 3 of this annex. We discuss CRA and LECG's differing views on switching costs in paragraphs 2.45 to 2.50 below. We do not agree that LECG's assertion that a vertically integrated firm would only forego modest wholesale profits necessarily holds – the effect depends upon the particular circumstances.
- 2.14 We recognise that a retailer that begins to supply a new channel is likely to face a delay in building up subscribers to that channel. Our analysis of Setanta Sports subscribers in Annex 7 (Market power in pay TV) suggests that [§<].

Inferences from the economic literature on the static incentives to wholesale Core Premium channels to third parties

- 2.15 We received a number of submissions that cited various academic papers and discussed the inferences that could be drawn from the economic literature. In particular, CRA suggested that, where a wholesaler enjoys a strong market position, it may be able to charge wholesale prices that extract a large proportion of the rents retailers generate from that wholesaler's content. Indeed, in certain economic models a monopoly wholesaler is able to extract all of the potential retail profits and thus monopolisation of the retail level would not increase the wholesaler's profits⁹. In such circumstances, the monopoly wholesaler has no incentive to withhold its content in order to monopolise the retail level. This is sometimes referred to as the "one monopoly profit" argument.
- 2.16 CRA argued that Ofcom needs to explain why the "one monopoly profit" critique does not apply¹⁰. In addition, CRA drew two inferences from the academic literature. The first concerns non-linear wholesale pricing. The second concerns linear wholesale pricing. These are addressed in turn below.

⁸ July 2008 CRA Report, paragraph 76.

⁹ See, for example, *Competition Policy: Theory and Practice*, Motta M, pages 372 and 374-375.

¹⁰ April 2008 CRA Report, paragraph 47.

Non-linear wholesale pricing

2.17 CRA asserted that a wholesale supplier who can charge non-linear prices will always have incentives to license its content to all downstream retailers. As an example of such non-linear wholesale pricing, CRA referred to a two-part tariff (i.e. a per subscriber fee plus a fixed fee). CRA suggested that, “with a two-part tariff, one can use the unit fee to remove double marginalisation and align the incentives of both upstream and downstream firms to serve a larger number of customers”¹¹. In response, the Four Parties asserted that CRA’s claim is incorrect, in particular asserting over-simplification in the academic articles purportedly referred to by Sky¹². In its report for the Four Parties, LECG advanced two criticisms:

- First, LECG argued that CRA’s claim only holds if the wholesaler is able to commit not to undermine the deal it strikes with one retailer by subsequently agreeing a lower wholesale price with another retailer¹³. In response, CRA stated that theories where the wholesale channel provider is unable to commit in this way seem inappropriate, particularly as exclusive contracts are routinely signed and enforced in the pay TV industry¹⁴.
- Second, LECG argued that CRA’s line of argumentation is irrelevant, given that in practice wholesale prices are charged on a linear (per subscriber) basis¹⁵.

2.18 We have considered these arguments carefully. Consistent with LECG’s second point, we have focused our attention overall on linear pricing models and our more detailed assessment of incentives reflects that focus. Indeed, CRA recognised that per subscriber wholesale fees are more consistent with industry practice¹⁶. With regard to non-linear pricing, CRA’s claim that a wholesaler *always* has an incentive to supply retailers is a strong one and we are not yet persuaded that the basis for this claim is entirely clear. In particular, the interplay between pricing structures, downstream competition and incentives to wholesale is sensitive to a wide range of assumptions and we are not at this stage convinced that CRA’s conclusion applies under all reasonable sets of assumptions.

2.19 We also note that the conclusions we draw in section 6 are strongly reflective of observed outcomes – namely that Sky does not currently supply a range of third party retailers – and we recognise that there may be competing explanations for those outcomes. However, we are not aware of any detailed discussions of non-linear tariffs between Sky and those third party retailers. In addition, we note that while there can be static efficiency benefits to non-linear tariffs, some tariff structures can create significant barriers to entry and thereby undermine dynamic efficiency benefits.

¹¹ See October 2007 CRA Report, paragraph 51 (including footnote 12) and April 2008 CRA Report, paragraph 16.

¹² Four Parties’ August 2008 Submission, paragraph 3.6. While the Four Parties go on to criticise the Harbord-Ottaviani paper (in paragraphs 3.6-3.16), we consider that CRA was not relying on this particular paper to support its claims about the consequences of non-linear pricing.

¹³ March 2008 LECG Report, pages 19-20 citing *A Primer on Foreclosure*, Rey P and Tirole J in *Handbook of Industrial Organisation*, vol 3 (2007), Armstrong M and Porter R (eds.)

¹⁴ July 2008 CRA Report, paragraph 44.

¹⁵ March 2008 LECG Report, pages 19-20.

¹⁶ April 2008 CRA Report, paragraph 56.

Linear wholesale pricing

- 2.20 CRA referred to an academic paper (the “Harbord-Ottaviani paper”) in which a wholesale supplier always has an incentive to license its content to downstream retailers, even when it charges linear (per subscriber) prices¹⁷. Essentially such fees allow the wholesaler to benefit from the wide distribution that comes from supplying multiple retailers while still recouping the incremental value of the premium content. CRA considered that this shows that there is a “fairly broad” set of conditions under which a vertically integrated firm has no incentive to foreclose downstream rivals¹⁸.
- 2.21 The Four Parties advanced two main arguments in response:
- First, they asserted that the Harbord-Ottaviani paper is not robust but did not explain further¹⁹.
 - Second, they stated that the Harbord-Ottaviani paper’s result effectively rests upon the reduction or elimination of downstream competition through “excessive” wholesale prices. They argued that such wholesale pricing is detrimental to consumers, increases retail prices and decreases retail competition²⁰.
- 2.22 We recognise that economic models are always simplifications of the ‘real world’ and that, while even simple models can generate powerful conclusions, it is important to consider carefully whether the logic underlying economic results is plausible given the facts of a particular case.
- 2.23 The Harbord-Ottaviani paper assumes that premium content has the same value to all final consumers, say £100 per annum²¹. If the wholesaler of that premium content supplies all retailers then it sets an annual wholesale charge of £100 per subscriber for that content; each retailer then passes that wholesale fee on through higher retail prices²². In other words, the wholesaler charges a price that fully extracts consumers’ willingness to pay for premium content.
- 2.24 Following a refusal to supply, imagine that the firm with premium content continues to charge consumers £100 extra for that content compared to the rival retailer that only supplies basic content. In these circumstances, the assumptions made in the Harbord-Ottaviani paper imply that *no* consumers will switch²³. This is because the extra benefit consumers receive from switching to the firm with premium content (which they value at £100) is precisely outweighed by the higher price that they have to pay (an extra £100). Consumers thus do not switch since it does not make them better off²⁴.

¹⁷ October 2007 CRA Report, paragraph 51. This cites *Contracts and Competition in the Pay-TV market*, Harbord D and Ottaviani (2001), mimeo. Also April 2008 CRA Report, paragraphs 16, 27 and 56.

¹⁸ April 2008 CRA Report, paragraph 57.

¹⁹ Four Parties’ August 2008 Submission, footnote 15. Although the Four Parties criticise the Harbord-Ottaviani paper for omitting dynamic factors (e.g. at paragraph 3.12), it is unclear why they consider that its analysis of static factors is unsound.

²⁰ Four Parties’ August 2008 Submission, paragraphs 3 (executive summary) and 3.7-3.8.

²¹ Offering premium content is assumed to increase the attractiveness of a retailer’s service from the perspective of all consumers by an amount ‘ α ’. Harbord-Ottaviani paper, page 4.

²² Harbord-Ottaviani paper, Proposition 2 on page 9.

²³ This reflects the Hotelling model underlying the Harbord-Ottaviani paper.

²⁴ In fact, in the Harbord-Ottaviani paper, the retailer which *exclusively* supplies premium content chooses to increase its retail price by less than £100 (say, £60) in order to capture some extra

- 2.25 As noted above, an implicit assumption in the Harbord-Ottaviani paper, is that the wholesale price for Core Premium channels is so high as fully to extract consumers' willingness to pay for those channels. We do not consider that this assumption is plausible, and CRA has advanced no evidence to show that this assumption holds. Moreover, in practice consumers' preferences for Core Premium channels are heterogeneous. To fully extract such heterogeneous values would potentially require a fine degree of price discrimination. In contrast, the Harbord-Ottaviani paper assumes consumers' preferences for premium content are completely homogeneous – they all value that content at £100, so full extraction of this value is simple. We consider this highly unlikely to occur in practice. Indeed Sky has referred to the "paucity of information on underlying channel demands"²⁵ and "evolution of [consumer] demands over time"²⁶. Accordingly, we do not accept that the theoretical result in the Harbord-Ottaviani paper, namely that a wholesale supplier always has an incentive to license its content to downstream retailers, applies in this case.
- 2.26 However we do recognise the linkages between this result in the Harbord-Ottaviani paper and the issues discussed in section 6 of this document. We agree that a higher wholesale price will tend to increase the likelihood that a wholesaler makes its content available to multiple retailers. Indeed this is consistent with the results of our indicative assessment of the financial effect on Sky of not supplying / ceasing supply. We also recognise the importance of consumer's propensity to switch and agree that this will be influenced by the retail price that a consumer must pay for Core Premium channels.
- 2.27 The Four Parties' second argument relates to whether wholesale prices are "excessive". Regardless of its level, a positive per subscriber wholesale price *always* acts as a floor for retail prices. While this prevents retailers from (profitably) cutting retail prices below that level, we do not accept the apparent implication of the Four Parties' argument that it necessarily reduces the intensity of retail competition. Rather, we consider that the appropriate question is whether upstream suppliers (wholesalers, rights holders etc.) are earning excessive profits, taking into account the costs that they incur. We address this issue in section 6 and consider that the evidence in relation to wholesale prices is less clear-cut due to a variety of practical difficulties associated with an analysis of wholesale prices for content, although we do conclude that Sky appears to be making an operating margin of up to 25% (see paragraph 6.3 of the main document).

Overview of submissions on the dynamic incentives to wholesale Core Premium channels to third parties

- 2.28 The Four Parties cited another academic paper by Helen Weeds (the "Weeds paper"). In the model described by this paper, each firm receives a future benefit that increases as its retail market share today rises²⁷. Under certain conditions this can

customers from the rival retailer (see page 7). In these circumstances, a degree of switching does take place. This explains why exclusive distribution is unprofitable for firms. Essentially a retailer that exclusively supplies premium content earns an extra £60 from *some* subscribers (this amount can then be shared with the wholesale channel provider in some way). In contrast, by supplying premium content to *both* retailers the wholesaler can earn an extra £100 from *every* subscriber.

²⁵ Sky April 2008 Submission, part 2 paragraph 9.4 and part 3 paragraph 17.4.

²⁶ Sky April 2008 Submission, part 3 paragraph 7.7.

²⁷ Four Parties' August 2008 Submission, paragraphs 3.10-3.12. This cited *TV Wars: Exclusive Content and Platform Competition in Television Broadcasting*, Weeds H (2007) mimeo. Note that this paper assumes that the relationship between current market share and future profits has particular characteristics, namely that the benefits from increasing market share are convex (see page 23). In

create an incentive to refuse to supply key content to retail competitors. LECG asserted that these dynamic benefits mean that a refusal to supply is highly likely to be profitable in the long term²⁸. LECG did not provide any evidence quantifying either the short-run or long-run effects.

- 2.29 In response, CRA argued that LECG had not explained how the Weeds paper fits into the Four Parties' "vicious circle" argument or identified evidence that it is relevant to the particular circumstances of the pay TV industry²⁹. However CRA accepted that, in principle, dynamic leveraging could justify foreclosure concerns that do not arise in a static framework³⁰. CRA has repeatedly argued that it is important to identify and evidence mechanisms which link short-run conduct with longer-term ability to compete. CRA considered that the Four Parties and the December Consultation have failed to articulate and evidence such an argument³¹.
- 2.30 We recognise that such dynamic effects can strengthen the incentives for a vertically integrated firm to refuse to supply Core Premium channels. However, we do not presume that dynamic effects automatically mean that a vertically integrated firm finds such a refusal to supply profitable. We also agree with CRA that it is important to explain carefully the relevant dynamic effects and consider whether those effects are plausible, in light of the available evidence.
- 2.31 CRA and the Four Parties discussed the European Commission's 24 May 2004 *Microsoft* decision which they considered relied on dynamic arguments³². In particular, they discussed whether the features of that case are present in the pay TV industry³³. We have not considered the *Microsoft* decision in detail in the context of this investigation and do not consider that it is directly relevant to this case. Rather, we think that the focus should be on the specific dynamic mechanisms suggested in this case and whether they are consistent with the factual circumstances of the pay TV industry.
- 2.32 Four possible dynamic mechanisms emerge from the consultation responses. These are discussed in turn below:
- Impact on the price of content rights.
 - Impact on Sky's dominant position in the wholesale supply of Core Premium channels.
 - Impact on competition for basic-tier only subscribers.
 - Impact on Sky's buyer power when purchasing basic-tier channels from third party wholesaler channel providers.

other words, the benefits of a 5% increase in market share from 40% to 45% are lower than the benefits of a 5% increase in market share from 60% to 65%.

²⁸ For example, March 2008 LECG Report, page 8.

²⁹ July 2008 CRA Report, paragraphs 46-47 and 51.

³⁰ For example, July 2008 CRA Report, paragraph 46.

³¹ For example, October 2007 CRA Report, paragraphs 9 and 120-121, April 2008 CRA Report, paragraphs 12, 91-92, 116, 121 and 138 and July 2008 CRA Report, paragraphs 19, 46-47 and 51.

³² OJ [2007] L032-0023.

³³ For example, October 2007 CRA Report, paragraphs 115-120, April 2008 CRA Report, paragraphs 28-29, 93 and 103-120 and the Four Parties' August 2008 Submission, paragraphs 5.2-5.6.

Impact on the price of content rights

- 2.33 The December Consultation noted that weakening or eliminating a rival retailer that is also active at the content acquisition level may reduce the degree of competition between buyers of content rights. Refusing to supply rival retailers might allow the vertically integrated firm to acquire content for a lower price in the future (paragraph 5.127). The Four Parties referred to this argument in their February 2008 submission³⁴. More specifically, LECG argued that Sky's position as a downstream retailer gives it an advantage when bidding for content. Strengthening this downstream position, in turn, reduces the likelihood that rivals will bid for content (because they incur costs when bidding for rights but do not believe that they can win), and/or reduces the amount that they are likely to bid. This depresses rights prices³⁵.
- 2.34 CRA recognised that, in principle, such effects could increase Sky's incentives to engage in foreclosure. However CRA argued that these effects were likely to be quite small and hence the overall incentive to foreclose remains small³⁶. CRA's reasons for considering that the downstream advantages are likely to have a fairly small impact upstream are addressed in Annex 7 on market power in pay TV.
- 2.35 Moreover, CRA argued that it was crucial to provide evidence to support such a dynamic argument and criticised LECG for failing to do so. In particular, CRA considered that, if LECG's argument were correct then, first, Sky's upstream advantage should be increasing over time and, second, this would suggest that rights prices should be declining over time. CRA stated this was not occurring³⁷.
- 2.36 We consider that this is a long-term strategic reason why Sky is likely to have an interest in keeping rival retailers suppressed. A bidder that is vertically integrated with the leading retailer on the platform with the greatest number of likely subscribers to a Core Premium channel is able to access those subscribers more efficiently; it is thus in a stronger position than vertically integrated bidders on other platforms or independent bidders (see paragraphs 2.118 to 2.122 of Annex 7 on market power in pay TV). We also consider that rights prices are likely to be lower where competition between bidders is weaker³⁸. CRA's observation that rights prices are not declining over time does not undermine this line of reasoning; rather the price of rights is likely to have been affected by a number of other factors. In particular, the degree of competition for Live FAPL Rights in 2006 (and thus the price of those rights) was likely to have been increased by regulatory intervention, namely the FAPL's Commitments to the European Commission.

³⁴ Four Parties' February 2008 Submission, paragraphs 8.24-8.25.

³⁵ For example, March 2008 LECG Report, pages 7-8.

³⁶ July 2008 CRA Report, paragraph 38.

³⁷ July 2008 CRA Report, paragraph 48.

³⁸ As explained in paragraph 2.71 of Annex 7, the low amounts bid for Live FAPL Rights in 2003 appear to reflect weak competition between bidders following the collapse of ITV Digital in May 2002. In contrast, the larger amounts bid for these rights in 2006 is likely to reflect fiercer competition between bidders and is consistent with the view expressed in the Commitments Decision that the Commitments facilitate greater competition.

Impact on Sky's dominant position in the wholesale supply of Core Premium channels

- 2.37 The Four Parties argued that by weakening other bidders' abilities to acquire attractive content, a refusal to supply inhibits third parties' abilities to develop premium channels in competition to Sky's premium channels³⁹.
- 2.38 We understand the distinction between this effect and the dynamic impact on rights prices (discussed in paragraphs 2.33 to 2.36 above) to be as follows: if bidders for rights are more evenly matched then there is a greater possibility that a material proportion of those rights will be won by a firm other than Sky. If this were to occur, we agree that there could then be significant competition between wholesale suppliers of Core Premium channels. Such competition would be likely to lead to lower wholesale prices and, as a result of competition at the retail level, we would expect these to be passed on to final consumers in the form of lower retail prices.
- 2.39 [redacted]⁴⁰. These statements appear to us likely to reflect both the impact of a reduction in the volume of content available from Sky (which would reduce its overall attractiveness and therefore suggest that prices would fall regardless of changes in competitive conditions) *and* the impact on competition. The latter is most particularly evidenced by the discussion of [redacted].
- 2.40 We consider that if more viable bidders build up retail subscriber bases in premium content then this is likely to reduce the barriers to them being able to bid successfully for content at the wholesale channel provider level. This could reduce the extent of one of the barriers to entry that we identified in our market power assessment, thereby eroding market power to some extent. That market power is the foundation for the issues which cause us concern in pay TV.

Impact on competition for basic-tier only subscribers

- 2.41 LECG argued that competition for basic-tier only subscribers is adversely affected by Sky's terms of supply for Core Premium channels. Refusing to supply premium content to rival retail platforms diminishes the total size of those platforms' subscriber bases⁴¹. As a result, those platforms lose economies of scope between retailing basic-tier and premium packages i.e. their average costs increase. This argument was also raised in the December Consultation (paragraph 6.71).
- 2.42 In paragraphs 3.87 to 3.91 of the main document we state that it is possible that premium content is important for retailers who want to be able to compete successfully in the market for basic-tier only pay TV content and identified the argument advanced by LECG as a potential reason for this. We thus consider that LECG's argument is plausible.

Impact on Sky's buyer power when purchasing basic-tier channels from third party wholesaler channel providers

- 2.43 LECG argued that increasing the size of Sky's subscriber base increases the buyer power of Sky's retail arm when dealing with basic-tier channel wholesalers. This in

³⁹ Four Parties' August 2008 Submission, paragraph 3.4.

⁴⁰ [redacted]. Provided from [redacted] information request response of [redacted].

⁴¹ For example, March 2008 LECG Report, page 16.

turn depresses the per subscriber prices charged by those wholesalers to Sky (in absolute terms and relative to other retailers)⁴².

- 2.44 Given that a number of plausible dynamic mechanisms have been identified (as explained above) we have not considered this particular mechanism in detail, particularly as LECG provided no evidence to support its assertion or to explain why it leads to detrimental effects, particularly for consumers.

Final consumers' propensity to switch

Consultation responses

- 2.45 As discussed above, and as highlighted by the vertical arithmetic exercises, a key determinant of whether refusing to supply a third party retailer is profitable is final consumers' propensity to switch from that retailer to Sky's own retail operations. Differing views on the extent of switching costs appear to be a key reason why CRA and the Four Parties have very differing opinions about the profitability of a refusal to supply Core Premium channels.
- 2.46 CRA noted that some households may be unable to access certain platforms. For example⁴³:
- Certain households may not be able to install a satellite dish, for example households in multi-dwelling units, with planning restrictions or where obstructions block signals to the dish.
 - Around 50% of households are not passed by cable.
 - In October 2007, only 70% of households could receive DTT.
- 2.47 In addition, CRA considered that consumers' preferences for other bundled services (e.g. telephony and broadband) and platforms' different characteristics may limit the degree of switching. CRA also specifically identified the installation and reactivation of a BT line as an inter-platform switching cost facing cable subscribers switching to DSat⁴⁴. [redacted]⁴⁵. CRA considered that these factors provide an incentive for Sky to distribute its channels on other platforms. CRA later added that the size of switching costs was an empirical matter and that, in the absence of robust evidence, it was unsure about the magnitude of switching costs⁴⁶.
- 2.48 BT considered that Ofcom's analysis of switching costs in the December Consultation was too general. BT suggested that the hassle of switching supplier may be less significant where consumers are considering switching to obtain important content⁴⁷. Similarly, LECG asserted that consumers would be very likely to switch to a retailer with more attractive content⁴⁸. LECG and BT presented no evidence to support their views.
- 2.49 The December Consultation stated that "rivalry between Sky and Virgin Media is limited by a number of factors including high customer switching costs ..." (Annex 13,

⁴² For example, March 2008 LECG Report, page 16.

⁴³ October 2007 CRA Report, paragraph 37.

⁴⁴ For example, October 2007 CRA Report, paragraphs 37-39 and 64.

⁴⁵ [redacted] This document was provided in [redacted]'s response to Ofcom's information request of [redacted].

⁴⁶ July 2008 CRA Report, paragraph 76.

⁴⁷ BT March 2008 Response, paragraphs 114.

⁴⁸ March 2008 LECG Report, footnote 17.

paragraph 5.67). In response, CRA noted that this proposition was unevidenced and contradicted by LECG's position⁴⁹.

Ofcom's position

2.50 We recognise the importance of assessing consumers' propensity to switch and agree with CRA that this is an empirical issue. As part of Phase 2 of Ofcom's programme of research into consumer preferences for television services, we asked current premium cable subscribers how they would react to the permanent loss of Sky Sports or Sky Movies from their packages. In order to evaluate those responses, it is necessary to have a view on the extent of switching that is required for a refusal to supply to be profitable and we thus fed those survey results into our vertical arithmetic analysis. This survey is discussed further in the final section of this annex. In addition, we discuss switching costs at paragraphs 6.57 to 6.66 of the main document.

Distribution of Core Premium channels on new platforms

2.51 The December Consultation noted that a vertically integrated wholesaler's incentives to supply a new entrant may differ compared to those for an established retailer (paragraphs 6.70 to 6.71).

Consultation responses

2.52 CRA argued that simply because a downstream competitor is smaller (for example, because it is a recent entrant) does not make a refusal to supply more or less likely. Rather, both the costs and benefits of foreclosure increase as the downstream competitor's size increases⁵⁰. NERA, in a report prepared for BT (the 'March 2008 NERA Report') made a similar point. It noted that the decision to supply either a new or an established entrant depends upon the same core mechanisms, namely a trade-off between the foregone upstream profit and the additional retail profit⁵¹.

2.53 The December Consultation noted that the relevant switching costs may differ in the case of a new platform. BT and NERA agreed with this argument and considered that it applied to BT's pay TV business. BT and NERA also drew an analogy with incentives to supply multiple retailers on the same platform (this issue is discussed below)⁵². CRA agreed with BT and NERA that where substitutability is high then content is less likely to be widely licensed downstream. However CRA considered that this argument is best characterised as being about platform heterogeneity, rather than new / potential entrants. CRA also added that, in the absence of clear evidence, it could not address whether the degree of substitutability between BT and Sky's platforms made a refusal to supply that platform likely⁵³.

2.54 In addition, BT and NERA argued that new entrants may engage in commercial strategies that challenge the incumbent's business model, such as making premium content available on a standalone basis (rather than operating a buy-through). BT and NERA argued that an incumbent is likely to be risk averse in the face of such

⁴⁹ July 2008 CRA Report, footnote 12.

⁵⁰ April 2008 CRA Report, paragraphs 11, 15 and 53-54.

⁵¹ March 2008 NERA Report, paragraphs 41-42.

⁵² BT March 2008 Response, paragraphs 118-120. March 2008 NERA Report, paragraph 43.

⁵³ July 2008 CRA Report, paragraphs 83-84.

“strategic issues”, which discourages it from supplying new entrants. Rather the incumbent prefers to control events by developing new platforms itself⁵⁴.

Ofcom’s position

- 2.55 We agree in principle that Sky’s incentives to wholesale to new platforms may not differ systematically from those for existing platforms. However, our view is that new platforms may possess characteristics that make a refusal to supply more likely. For example, recent pay TV retail entrants have tended to be based on the DTT and DSL distribution technologies, which have large bases of installed equipment. Therefore, switching costs incurred by consumers in relation to these platforms are lower. We discuss this in paragraph 6.62 in the main document.
- 2.56 BT and NERA cited particular strategies as being disruptive to Sky’s current business model. Our view is that such strategies are not necessarily particular to entrant platforms, and may be as likely to emerge from existing sources (for example, following a strategic review). It is also apparent that Sky need not refuse to supply outright in order to prevent disruptive strategies emerging. Sky could impose contractual clauses (similar to existing buy through obligations) restricting retailers’ abilities to package its Core Premium channels in ways that are strongly differentiated from Sky’s own retail packages.
- 2.57 In paragraphs 6.74 to 6.87 of the main document we set out our view on how Sky’s Core Premium channels can enable alternative retailers to strengthen their competitive position both in the retail market and in other related markets, and how this may affect Sky’s incentives to initiate wholesale supply.

Distribution of Core Premium channels to multiple retailers on the same platform

- 2.58 The December Consultation noted that there are very few examples of third party channels being licensed to multiple retailers on the same platform, and observed that this is consistent with the fact that intra-platform switching costs are likely to be lower than inter-platform switching costs (paragraphs 6.35 to 6.36).

Consultation responses

- 2.59 CRA agreed that, if there was a reason why a vertically integrated firm could not implement “efficient contracts”, then low intra-platform switching costs would reduce the likelihood that content is licensed to multiple retailers on the same platform⁵⁵.
- 2.60 However, CRA considered it inappropriate to draw strong conclusions from the observation that content is typically not licensed to more than one retailer on the same platform⁵⁶. It suggested that licensing to multiple retailers on the same platform may not be in the interests of upstream rights holders, retailers or final consumers (regardless of whether or not the supply chain is vertically integrated):
- Upstream rights holders: CRA stated that if competition between retailers on the same platform was fierce then it would reduce the overall profits received from

⁵⁴ BT March 2008 Response, paragraphs 121-122. March 2008 NERA Report, paragraphs 45-46.

⁵⁵ April 2008 CRA Report, paragraph 21. July 2008 CRA Report, paragraph 36.

⁵⁶ April 2008 CRA Report, paragraph 87.

holding the rights to premium content. This would, in turn, undermine the value of the underlying rights and thus incentives for content generation⁵⁷.

- Retailers: CRA stated that retailers may wish to differentiate their offerings, to lessen the extent of competition between them⁵⁸.
- Final consumers: CRA noted that consumers enjoy variety and asserted that differentiation between retailers' content offerings may best meet this need (rather than retailers offering a variety of different products)⁵⁹. CRA presented no evidence in support of this claim apart from a reference to a 1999 Restrictive Practices Court judgment⁶⁰.

2.61 CRA also noted that there is a widespread reluctance to license to multiple retailers on the same platform and specifically noted that Setanta does not do so⁶¹.

Ofcom's position

2.62 In relation to CRA's argument regarding **upstream rights holders**, we consider that concerns about overly fierce competition destroying the value of rights have only limited foundation. Such problems could be overcome by, for example, wholesaling channels for a per-subscriber fee. Through this mechanism, prices downstream would tend towards this (positive, significant) per-subscriber charge rather than towards zero. This would protect the value of rights and incentives for content generation. (We do though accept that there may be downsides to per-subscriber wholesale channel prices.)

2.63 In relation to **retailers**, we agree that product differentiation is an important aspect of competition between pay TV services. However, services containing Core Premium content can still be strongly differentiated from one another on dimensions other than that content, such as basic-tier pay TV content. We see no evidence from the pay TV sector that retailers consider it against their interests to compete using packages containing Sky Sports and Sky Movies. Indeed, the active engagement of several retailers (albeit on other platforms) with Sky to secure this content on a wholesale basis suggests the contrary. This also counters CRA's suggestion that **final consumers** are necessarily best served by retailers with completely differentiated offerings.

2.64 We recognise that there may be (static) benefits to having a single retailer on each platform – for example, avoidance of cost duplication – but these upsides should be considered against the benefits of the alternative scenario of vigorous competition among multiple providers.

2.65 CRA identified that Setanta did not license its channels to other parties on platforms where Setanta itself retailed. While this was correct at the time of submission, Setanta now wholesales its channels to Top Up TV as well as retailing direct to consumers using Top Up TV's conditional access technology.

⁵⁷ April 2008 CRA Report, paragraph 21 and 87.

⁵⁸ April 2008 CRA Report, paragraph 21 and 87.

⁵⁹ April 2008 CRA Report, footnote 23.

⁶⁰ *Football Association Premier League Limited and Football Association Limited and Football League Limited* [1999] UKCLR 258, paragraphs 268-271.

⁶¹ April 2008 CRA Report, paragraph 88.

The relative merits of Sky retailing its Core Premium channels via other platforms versus wholesaling those channels to other retailers

Consultation responses

- 2.66 CRA and Sky argued that direct retail by a wholesale channel provider can better align retail and wholesale incentives. Absent vertical integration, per subscriber wholesale fees can lead to double marginalisation and discourage subscriber acquisition and marketing⁶². Accordingly, CRA and Sky argued that vertical integration between the channel wholesaler and retailer is likely to be efficient.
- 2.67 LECG denied that double marginalisation occurs, since retailers on other platforms do not have appreciable market power. In support of this position, LECG cited the finding in the December Consultation that only Sky was likely to be dominant in the retailing of packages containing premium sports and movies. LECG also noted that the incremental retail price of Sky Movies and Sky Sports to subscribers to Virgin's XL package was only 4% higher than the incremental price of those channels to Sky's basic subscribers⁶³. However LECG did argue that Sky would not have an incentive to promote third party channels in competition to its own⁶⁴.
- 2.68 LECG argued that Sky prefers to retail its channels in order to preserve its "retail advantage" which, in turn, generates dynamic benefits (see above)⁶⁵. Similarly, the Four Parties argued that Sky has used its position as a retailer on Tiscali's pay TV platform to inhibit the success of that platform and restrict competition with Sky's DSat platform. In support of this view, they estimated that relatively few (15%) of Tiscali's pay TV subscribers subscribe to Sky's premium channels. This implies that Sky has attracted only 5,500 subscribers on that platform since August 2004, whereas it has acquired more than 1 million additional premium subscribers on its DSat platform⁶⁶.

Ofcom's position

- 2.69 We accept that certain benefits arise from the vertical integration of wholesale and retail activities. For example, integration with an upstream provider may improve the efficiency of retail operations. However, we also believe that there are benefits from competition that can only arise when operators other than Sky retail services on other platforms. These benefits, which we describe in detail in paragraphs 6.117 to 6.132 of the main document, include greater pressure on retail costs, heightened competition between alternative retailers and a reduction in barriers to entry at the wholesale channel provider level.
- 2.70 We address LECG's arguments with respect to double marginalisation in Annex 7 ('Market power in pay TV'). In short summary, while we do not conclude that Virgin Media is dominant at the retail level, we nonetheless consider it plausible that double marginalisation may exist as a possible concern.

⁶² October 2007 CRA Report, paragraphs 54-55.

⁶³ March 2008 LECG Report, page 10.

⁶⁴ March 2008 LECG Report, footnote 7.

⁶⁵ March 2008 LECG Report, page 20.

⁶⁶ Four Parties' February 2008 Submission, paragraphs 8.21-8.22. Note that we present alternative figures for Tiscali's subscriber numbers at paragraph 6.127 of the main document.

Section 3

Vertical arithmetic

Introduction

3.1 This section examines the views presented by CRA and LECG on the use of vertical arithmetic in the analysis of Sky's incentives to make available its premium channels. It then proceeds to describe in more detail the analysis carried out by Ofcom in respect of Sky's incentives. The description of our analysis presented here concentrates on Sky's incentives with respect to its existing wholesale relationship with Virgin Media. (We take a considerably simplified approach to modelling Sky's incentives on DTT, as described in paragraphs 6.107 to 6.113 of the main document, so do not elaborate on our calculations here.)

3.2 This section is structured as follows:

- **CRA's assessment of the financial effect on Sky of ceasing to supply Virgin Media** – CRA first presented a "vertical arithmetic" calculation in October 2007; since then both CRA and LECG have made further representations on the subject. We address these here.
- **Limitations of the Ofcom model** – describes the drawbacks of our approach and how these temper the conclusions we draw.
- **Mechanics of the model** – sets out how our model works, introducing a 'Base Case' (the status quo, where Sky continues to wholesale its premium channels to Virgin Media) and an 'Alternative Case' (where this wholesale relationship no longer exists).
- **Inputs to the model** – describes the data we have used in our model, in particular our consumer survey data and the inputs to our calculations of Sky's revenues and costs.
- **Indicative results** – presents the outputs of our model, showing how subscriber numbers vary between our Base Case and Alternative Case, and illustrating the period over which it may be profitable for Sky to withhold wholesale supply of its premium channels.

CRA's assessment of the financial effect on Sky of ceasing to supply Virgin Media

The "vertical arithmetic" approach

3.3 In order to shed light on whether Sky has an incentive to engage in foreclosure, CRA presented a "vertical arithmetic calculation". CRA estimated the retail and [redacted] margins earned by Sky when supplying Virgin Media. CRA then calculated the proportion of Virgin Media's subscribers that would have to switch to Sky for a refusal to supply Sky Sports and Sky Movies to be profitable (the "critical diversion ratio"). This analysis took into account [redacted]. CRA's estimated critical diversion ratio varied between [redacted] % and [redacted] %⁶⁷.

⁶⁷ October 2007 CRA Report, Appendix 2.

- 3.4 CRA recognised that this is a “highly stylised exercise” with a number of limitations and was thus only likely to indicate the order of magnitude of various effects⁶⁸. Nonetheless CRA considered that it confirmed that refusing to supply premium sports and movies channels was likely to be unprofitable for Sky given obstacles to switching⁶⁹.
- 3.5 BT stated that Ofcom’s illustrative example of vertical arithmetic (as presented in the December Consultation, paragraphs 6.31 to 6.36) provides a useful framework, and noted factors relevant to such analysis⁷⁰. However BT and others have levelled a number of criticisms against CRA’s vertical arithmetic and CRA’s interpretation of its results.
- 3.6 We believe that CRA’s vertical arithmetic introduced a useful framework for the analysis of incentives. In paragraphs 6.92 to 6.113 of the main document and the remainder of this annex we present some similar analysis of our own. Our vertical arithmetic expands on the framework originally set out by CRA. For example, our calculations draw upon similar financial data to that examined by CRA, but differ in other respects.
- We use data from an Ofcom consumer survey to estimate the likely level of immediate switching in response to the loss of Sky’s premium channels from the cable platform.
 - Our analysis takes into account a number of additional factors that are not considered in CRA’s simpler analysis. We attempt to reflect switching activity that takes place in future periods; for example, we model the future service choices of current Sky and Virgin Media subscribers and households joining pay TV markets, and how these will be affected by the availability of Sky’s premium channels.
 - CRA only analysed Virgin Media whereas we have also examined Sky’s incentive to wholesale to pay TV retailers on the DTT distribution technology, and how this may be affected by Sky’s intention to launch its own DTT retail service. This analysis is set out in paragraphs 6.107 to 6.113 of the main document.

Criticisms of CRA’s “vertical arithmetic”

- 3.7 As noted above, consultation respondents criticised CRA’s vertical arithmetic and CRA’s interpretation of its results. We address these criticisms in turn below.
- 3.8 First, the Four Parties argued that if refusing to wholesale its channels to third parties was truly unprofitable then Sky’s past conduct would have been different⁷¹.
- 3.9 On this point, we are mindful that CRA’s analysis specifically focused on Sky’s relationship with Virgin Media. CRA considered that its analysis, which is based on current wholesale and retail prices, shows that it is highly unlikely that Sky would find it profitable to withdraw supplies of Sky Sports and Sky Movies from Virgin Media⁷². We note that Sky’s wholesale relationship with Virgin Media for its premium channels

⁶⁸ October 2007 CRA Report, paragraphs 46, 59. July 2008 CRA Report, paragraph 20. July 2008 CRA Report, paragraph 85 and footnote 4.

⁶⁹ October 2007 CRA Report, paragraphs 46 and 64.

⁷⁰ BT March 2008 Response, paragraphs 109-112.

⁷¹ Four Parties’ February 2008 Submission, paragraph 8.8.

⁷² October 2007 CRA Report, paragraph 64.

is ongoing, but we agree that it is important to consider carefully Sky's actual conduct with respect to a range of retailers, and do so in paragraphs 6.22 to 6.42 of the main document⁷³. Moreover, as acknowledged above, CRA's vertical arithmetic only considers Sky's incentives with respect to cable; in our analysis in the main document, we have also considered whether Sky's incentives may differ with respect to DTT.

- 3.10 Second, LECG criticised CRA's vertical arithmetic for only considering whether a refusal to supply is profitable, rather than considering whether charging "supra-competitive" wholesale prices or engaging in quality degradation is profitable⁷⁴. CRA acknowledged this criticism but considered that a refusal to supply was a useful benchmark⁷⁵.
- 3.11 We agree that this is a limitation of CRA's vertical arithmetic. Similarly, we are aware that the conclusions of our analysis are highly sensitive to the wholesale price that is the starting point of the analysis. However we also agree with CRA that considering the profitability of a refusal to supply is informative.
- 3.12 Third, BT, NERA and LECG challenged CRA's interpretation of its vertical arithmetic. They considered that CRA's conclusion is flawed by an error akin to the cellophane fallacy. CRA's analysis used Sky's current wholesale prices. Since current prices are presumed to be at the profit maximising level, BT, NERA and LECG argued that a finding that a further wholesale price rise above the current level is unprofitable is unsurprising – it does not shed light on whether wholesale prices have already been increased above the level that would prevail absent vertical integration. It therefore does not rebut or support claims about foreclosure⁷⁶. In response, CRA accepted this is a limitation of a vertical arithmetic approach⁷⁷.
- 3.13 We agree with the logic of this criticism. Both CRA's and our own analysis are affected by the wholesale price assumed.
- 3.14 Fourth, BT and NERA argued that at the optimal level of foreclosure a very slight increase (or decrease) in wholesale prices has little or no impact on profits. Insofar as CRA's analysis shows that such a slight change has a material impact on profits, it implies that there are other factors at work. NERA suggested that those factors could either be methodological errors with the vertical arithmetic or dynamic benefits to engaging in foreclosure⁷⁸. In response, CRA stated that BT and NERA's reasoning is based on a factually incorrect premise: CRA's analysis did not analyse the impact of a slight change in wholesale prices; rather it looked at the impact of complete withdrawal of supply⁷⁹.
- 3.15 We agree with CRA. Since CRA's analysis did not consider the impact of a slight change in wholesale prices, we do not consider that this is a reasonable criticism of CRA's approach.

⁷³ We are mindful that the Four Parties have criticised the terms on which Sky supplies Virgin Media; this factor was not explicitly modelled in CRA's vertical arithmetic.

⁷⁴ March 2008 LECG Report, pages 16-17.

⁷⁵ July 2008 CRA Report, footnote 4.

⁷⁶ March 2008 NERA Report, paragraph 50. BT March 2008 Response, paragraph 126. March 2008 LECG Report, pages 17-18.

⁷⁷ July 2008 CRA Report, paragraphs 21 and 88.

⁷⁸ March 2008 NERA Report, paragraphs 51 and 53-54. BT March 2008 Response, paragraph 126.

⁷⁹ July 2008 CRA Report, paragraphs 23 and 86-90.

- 3.16 Fifth, LECG noted that CRA’s vertical arithmetic uses Sky’s current retail prices. LECG asserted that this is an error since a refusal to supply would allow Sky to increase its retail prices⁸⁰.
- 3.17 The Harbord-Ottaviani paper and the Weeds paper show that, under certain assumptions, a refusal to supply may actually reduce retail prices⁸¹. We believe that LECG has not fully explained why these assumptions do not hold in practice. At this point we are not persuaded as to whether retail prices would be higher or lower as a result of changes to retail competition for premium packages.
- 3.18 To summarise, we are mindful of the objections to the vertical arithmetic framework put forward by both NERA and CRA. The discussions at paragraphs 6.92 to 6.113 and in the rest of this section highlight other limitations of this approach (for example, it cannot capture the longer-term, strategic incentives to do with the competitive landscape) and some key sensitivities. While we believe that CRA’s vertical arithmetic introduced a useful framework for the analysis of incentives, we take care in the conclusions we draw from our own analysis. We have also taken into account other evidence, including the current distribution of Sky’s channels that we observe in the marketplace (see paragraphs 6.22 to 6.42).

Limitations of the Ofcom model

- 3.19 We recognise that a vertical arithmetic exercise such as ours can only ever approximate the likely market outcome if Sky ceased its wholesale relationship with Virgin Media. In addition, the model has been simplified in a number of ways, including that:
- We do not model the effect of Sky’s greater strength at the retail level resulting in increased strength at the wholesale level – as explained in section 5 of the main document, on the subject of market power, we believe that there is a relationship between retail subscribers and wholesale market power. Therefore, if Sky expands its retail base, it will strengthen its advantage in content rights acquisition and the wholesale of Core Premium channels.
 - We do not attempt to model the competitive response of Virgin Media to the loss of Sky’s premium channels, which may include (for example) more aggressive marketing of Setanta Sports and FilmFlex.
 - We do not attempt to capture the possible dynamic effects on retail prices from potentially less intense retail competition.
- 3.20 Our model can only provide a very rough indication of Sky’s incentives. We therefore weight it accordingly in reaching our overall conclusions in the main document.

Mechanics of the model

- 3.21 This section sets out how our simplified model operates in practice. Our objective is to model the impact on Sky’s profitability if its premium channels are no longer

⁸⁰ March 2008 LECG Report, page 17.

⁸¹ Four Parties’ August 2008 Submission, paragraph 3.9 quotes from the Weeds paper: “... consumers are worse off [where the wholesaler provides premium content] than under exclusive distribution: the softening of downstream competition results in higher prices ...” The economic model presented in the Harbord-Ottaviani paper also exhibits this feature. See footnote 24 of this annex for an explanation.

available through Virgin Media. Our approach is to construct a simplified ‘Base Case’ and an ‘Alternative Case’.

- In the **Base Case**, Sky wholesales its premium channels to Virgin Media – this is in essence the status quo. We model the current pattern of connection and disconnection to and from Sky’s premium packages.
- In the **Alternative Case**, Sky does not wholesale its premium channels to Virgin Media – here we model the pattern of connection and disconnection to and from Sky’s premium packages if Virgin Media no longer offers Sky’s premium channels.

3.22 The difference between the Base Case and the Alternative Case is the impact of Sky’s premium channels no longer being available through Virgin Media. Our method is to estimate the difference in the number of subscribers to Sky’s packages between the two cases, and then to quantify the value of these subscribers to estimate the financial impact on Sky of a decision not to wholesale.

Modelling connections and disconnections

3.23 Each year, for various reasons, many customers disconnect from their pay TV service. When they disconnect, they may switch to an alternative pay TV retailer or to a FTA service. At the same time, many customers connect (or re-connect) to pay TV services, arriving either from another pay TV retailer or from a free-to-air service⁸². For the purpose of this model, we simplify this process of connection and disconnection to one involving Sky’s premium packages, Virgin Media’s premium packages and other services (including both basic-tier packages and FTA services)⁸³. This simplified process is illustrated in Figure 1 below.

Figure 1 Simplified illustration of operator churn



3.24 As we have indicated elsewhere, the service choice of customers is highly affected by the availability of Core Premium content. A service that includes Core Premium content is likely to attract more customers than one that does not. Therefore, we would expect, all else being equal, the following consumer responses if Sky Sports and Sky Movies are no longer available on Virgin Media (but remains available in Sky’s retail packages):

⁸² We refer to this process elsewhere as “churn”, but in the interests of precision, we refer here to connection and disconnection.

⁸³ For the purpose of this model, premium packages are defined as those including Sky Sports and / or Sky Movies, packages which may or may not also include the Setanta Sports channels.

- (i) the number of households switching from Virgin Media to Sky increases (*Sky's connections increase*)⁸⁴;
- (ii) the number of households switching from other services to Sky increases, at the expense of Virgin Media (*Sky's connections increase*);
- (iii) the number of households switching from Sky to Virgin Media decreases (*Sky's disconnections decrease*).

3.25 These effects will be felt in our Alternative Case. Our task is to estimate the size of the effects and their impact on Sky as compared to its position in the Base Case.

3.26 Sky has wholesaled its premium channels to Virgin Media (and its predecessor companies) over a long period. As such, there is no recent empirical evidence regarding the response of UK households to the loss of Sky Sports and Sky Movies from cable packages, and quantification of households' responses must be done through estimation. As we explain in paragraphs 3.47 to 3.48, we have used consumer survey evidence to estimate the number of households *immediately* switching from Virgin Media to Sky (the first element of response (i) above). For *delayed* switching from Virgin Media to Sky (the second element of response (i) above), and for responses (ii) and (iii), we have based our central assumptions on our view of how consumers may react. We have then tested the sensitivity of our final results to these assumptions. Our approach to each factor is summarised in Figure 2 below, together with the values of our estimates.

Figure 2 Estimation of consumer responses to loss of Sky's premium channels

Response	Method for quantification of response	Value(s) of estimate for central assumption
<i>Immediate</i> increased switching from Virgin Media to Sky	Ofcom Phase 2 consumer research into reaction of premium cable customers to loss of Sky's premium channels	% of premium cable customers who churn: Sky Movies only: 42% Sky Sports only: 53% Sky Movies & Sky Sports: 53%
<i>Delayed</i> increased switching from Virgin Media to Sky	Our estimate of consumer responses (tested for sensitivity)	% of remaining ex-premium cable cohort who churn, over and above normal churn: Year 1: 20%; Year 2: 15%; Year 3: 10%; Year 4: 5%; Year 5 onwards: 0%
Increased switching from other services to Sky (instead of to Virgin Media)	Our estimate of consumer responses (tested for sensitivity)	% of other households who would have switched to Virgin Media's premium packages who now switch to Sky: 90%
Reduced switching from Sky to Virgin Media	Our estimate of consumer responses (tested for sensitivity)	% of Sky premium customers who would have switched to Virgin Media but who now remain with Sky: 90%

Note 1: We adjust these values for the effects of stated preference bias, as we believe that survey respondents may have exaggerated the likelihood of switching to an alternative service. The derivation of these values is explained in more depth in the following section.

⁸⁴ This response has two elements: an *immediate* element, where subscribers immediately react by switching service, and a *delayed* element, where subscribers react in subsequent periods by switching service.

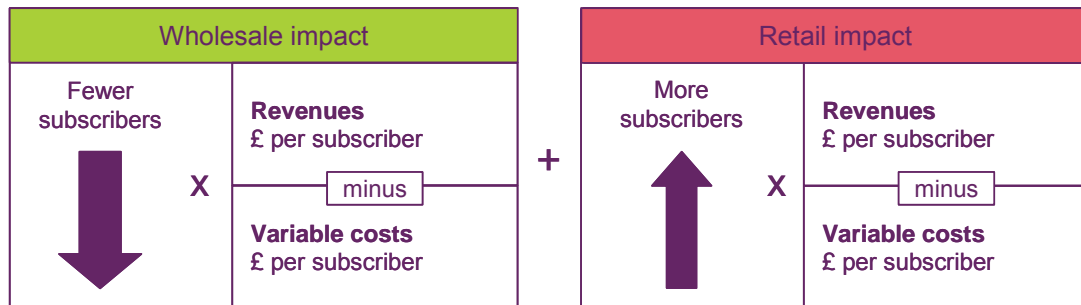
Note 2: We assume that not all these customers will switch to Sky; instead, the same proportion chooses Sky (rather than an alternative service) as was implied by our consumer research into the immediate reaction of Virgin Media customers.

Quantifying the financial impact

3.27 The above sub-section has explained how we have modelled the difference in subscriber numbers we would expect if Sky no longer wholesaled its premium channels to Virgin Media. We then use these figures to assess the financial impact of a decision not to wholesale. The other important inputs to the calculation are the per subscriber revenues and costs for Sky associated with its wholesale and retail operations. These are described below, where we examine how each figure varies with the number of wholesale and retail subscribers.

3.28 Where revenues or costs do not vary with subscriber numbers, we would not expect Sky’s profits to be different in the Alternative Case from those in the Base Case. However, where revenues or costs scale with subscriber numbers, we would expect Sky’s wholesale revenues and costs to be lower, and its retail revenues and costs higher, in the Alternative Case than in the Base Case. (This is because the switching effects outlined above reduce Sky’s wholesale customer numbers and increase its retail customer numbers⁸⁵.) The mechanics of the calculation are that we multiply the net change in subscriber numbers by our per-subscriber revenue and cost figures, to derive the financial impact on Sky. This calculation is illustrated in Figure 3 below.

Figure 3 Illustration of calculation of financial impact on Sky



3.29 In the next section, we describe the figures we have used to input to this calculation. Then, in paragraphs 3.56 to 3.57, we present some indicative results.

Inputs to the model

3.30 Figure 3 in the previous section has set out the calculation at the centre of our vertical arithmetic model. We now turn to the inputs to this calculation. For this purpose, Figure 4 below describes Sky’s revenues and costs in general terms, and summarises how they would change if Sky no longer wholesaled its premium channels to Virgin Media.

⁸⁵ For the purpose of this exercise, we think of Sky’s ‘wholesale’ revenues and costs as being those specifically associated with Sky’s relationship with Virgin Media for the wholesale of its channels. Some of these categories of revenues and costs are also relevant to Sky’s retail customers (for example, revenues from advertising impacts and costs for movie rights). We identify in the text where this is the case.

Figure 4 Sky's wholesale and retail revenues and costs

Input	Examples of input	Variability with subscriber numbers
Sky's wholesale revenues from supplying premium channels to Virgin Media	Include both subscription and advertising revenues associated with Virgin Media subscribers	Increase approximately linearly with number of wholesale subscribers
Sky's wholesale costs of supplying premium channels	Principally fees payable to sports rights owners and movie studios; also include cost of clean broadcast feed	Mix of costs that increase approximately linearly with number of wholesale subscribers (e.g. movie rights fees) and those that are fixed (e.g. sports rights fees)
Sky's retail revenues from supplying premium pay TV packages to households	Include revenues from premium channel packages, and additional services such as PPV, HD and Multiroom	Mainly revenues that increase approximately linearly with number of retail subscribers; also include one-off set-up fees
Sky's retail costs of supplying premium pay TV packages to households	Include costs associated with customer equipment, installation, marketing, customer management and retail overheads	Mix of costs that increase approximately linearly with retail subscribers (e.g. third party channel costs), those that are incurred once when a customer joins (e.g. installation), and those that are approximately fixed (e.g. marketing)

3.31 Our objective now is to identify those of Sky's revenues and costs that vary with its customer numbers. In the paragraphs below, we set out how we have derived Sky's variable wholesale and retail revenues and costs, as well as some other important inputs to our calculation⁸⁶.

Sky's wholesale revenues

3.32 Sky derives revenues from wholesaling its premium channels to Virgin Media through (a) wholesale carriage fees to Virgin Media for each subscriber, and (b) charges to advertisers for viewer impacts.

Wholesale carriage fees

3.33 In respect of wholesale carriage fees to Virgin Media, Sky levies a monthly charge that varies with the premium package taken by cable subscribers. We take the set of wholesale charges for each service, applicable from September 2008, and multiply each package fee by the average number of cable subscribers to that package from July 2007 to June 2008⁸⁷. For simplification, we then reclassify Virgin Media customers into three groups: 'Sky Movies Mix', 'Sky Sports Mix' and 'Sky Movies Mix and Sky Sports Mix'⁸⁸. (The average wholesale fee for each group is weighted to

⁸⁶ The split between fixed and variable costs set out here is likely to be appropriate for relatively small changes in Sky's total number of subscribers (up to perhaps 20%) and is therefore reasonable for this analysis. We would not necessarily expect this relationship to hold for more substantial changes in subscriber numbers.

⁸⁷ We acknowledge that any future changes to Virgin Media's premium subscriber numbers stemming from recent changes to Sky's wholesale charges will not be reflected in these historical subscriber figures.

⁸⁸ For this purpose, customers taking just a single Sky Sports channel are reclassified as 'Sky Sports Mix'; customers taking just a single Sky Movies channel package are reclassified as 'Sky Movies Mix',

reflect the actual package taken by subscribers in the group.) Through this process we derive a monthly figure for Sky’s wholesale fees, which we then multiply by 12 to obtain an annual figure. The subscriber numbers, annual wholesale fees and annual wholesale revenues for each group are presented in Figure 5 below.

Figure 5 Summary of Sky’s wholesale carriage fee income

Package	Number of Virgin Media subscribers	Sky’s wholesale fee per subscriber (£ pa)	Sky’s wholesale revenues (£ pa)
Sky Movies Mix	[<]	[<]	[<]
Sky Sports Mix	[<]	[<]	[<]
Sky Movies Mix & Sky Sports Mix	[<]	[<]	[<]
Total	[<]		[<]

Sources: Data provided by Sky and Virgin Media

Advertising impact revenues

- 3.34 Sky obtains advertising and sponsorship revenues through its premium channels. Such revenues typically scale with the number of viewers to a channel, as advertisers generally pay for each impact a channel provides. We believe linearity to be a reasonable approximation for this relationship⁸⁹. We then take Sky’s annual advertising and sponsorship revenues for each premium channel, from Sky’s annual ‘qualifying revenues’ report to Ofcom for 2007, and divide this figure by the number of subscribers able to view each channel. For each of our three customer groups, we then calculate the total advertising and sponsorship revenues associated with these subscribers⁹⁰. (Here we assume that viewership of a particular channel is equally likely between all the subscribers able to view that channel, regardless of the customer’s platform or other available channels.)
- 3.35 The calculation of advertising revenues by customer group is summarised in Figure 6 below. Note that this calculation is also relevant to the revenues from Sky’s retail customers, as set out in paragraph 3.42 below.

Figure 6 Summary of Sky’s advertising and sponsorship income

Package	Total subscribers	Total revenues (£ pa)	Revenues per customer (£ pa)
Sky Movies Mix	[<]	[<]	[<]
Sky Sports Mix	[<]	[<]	[<]
Sky Movies Mix & Sky Sports Mix	[<]	[<]	[<]

Source: Data provided by Sky

and all customers taking a combination of sports and movies are classified as ‘Sky Movies Mix & Sky Sports Mix’.

⁸⁹ Channels often benefit from a ‘mass market premium’ in their charges to advertisers, so the relationship between viewers and revenues is unlikely to be perfectly linear. In addition, sponsorship revenues may not automatically scale with the number of viewers, but in the long term are likely to be closely related. We therefore consider linearity to be a reasonable approximation of this relationship.

⁹⁰ For example, for each Sky Sports Mix customer, we sum the per-subscriber advertising and sponsorship income associated with each Sky Sports channel.

Sky's wholesale costs

3.36 Sky incurs certain costs in wholesaling its premium channels to Virgin Media. For our purposes, we are interested in those costs that vary with the number of customers Sky serves (and which will therefore be avoided if Sky no longer wholesales its channels). We model two of the costs that are likely to be significant for Sky: variable fees payable to movie studios in respect of Sky Movies, and the cost of providing a clean broadcast feed of each premium channel. The October 2007 CRA Report estimated the variable element of Sky's movie rights costs to be [£] per subscriber per annum, an estimate we use in our calculations⁹¹. We consider that Sky's cost of providing a clean feed does not scale with the number of subscribers to its wholesale product, but would be avoided completely if Sky no longer supplied its channels to third parties.

Sky's retail revenues

3.37 We seek to calculate the average revenue per subscriber for Sky's premium packages. Sky derives revenues from its retail customers through (a) retail charges and (b) charges to advertisers for viewer impacts in relation to channels owned by Sky.

Retail subscription revenues

- 3.38 In relation to Sky's retail subscription revenues, Sky has provided us with a breakdown of its customer numbers by package type for May 2008. We use this breakdown, and a corresponding breakdown of Sky's ex-VAT monthly prices from September 2008, to calculate Sky's monthly subscription revenues in relation to premium packages. For simplification, we then reclassify Sky's customers into three groups: 'Sky Movies Mix', 'Sky Sports Mix' and 'Sky Movies Mix and Sky Sports Mix', as described for Virgin Media customers in paragraph 3.33 above. (The average retail price for each group is weighted to reflect the actual package taken by subscribers in the group.) We then convert to an annual revenue figure for customers in each group.
- 3.39 Sky offers numerous services in addition to its standard television channel packages. We have estimated Sky's additional revenues from High Definition, Multiroom and PPV services⁹². For High Definition and Multiroom, we take the ex-VAT retail price per annum. We then multiply this by the proportion of Sky's premium subscribers that receives each service ([%] % for high definition and [%] % for Multiroom) to derive a figure for average revenue per premium subscriber. For PPV, we take Sky's pay-per-view revenues for 2006/07, net of revenue share payments to rights holders ([%]), as provided by Sky to Ofcom. We divide this figure by Sky's retail customer base, to derive a figure for revenue per subscriber.
- 3.40 We then sum Sky's revenue for channel packages and additional services to derive a total subscription revenue figure per premium customer, for each customer group. A summary is presented in Figure 7 below.

⁹¹ This cost will still be incurred for those customers that switch to Sky's retail packages. We take account of this in the 'Sky's retail costs' paragraphs below.

⁹² We also quantify the additional costs associated with these services – see paragraph 3.46 below. We do not model Sky's revenues and costs in relation to telephony and broadband, due principally to complexity in the calculation of avoidable costs.

Figure 7 Summary of Sky's average retail revenue per premium subscriber

Channel package	ARPU (£ pa)
Sky Movies Mix	[<]
Sky Sports Mix	[<]
Sky Movies Mix & Sky Sports Mix	[<]

Source: Ofcom calculation based on data from Sky, Virgin Media, Ofcom

Sky's retail discount

3.41 Not all of Sky's retail customers pay the prices publicly advertised by Sky for the package they receive. In common with other pay TV operators, Sky offers some customers temporary discounts, for example in the interests of customer retention. Sky has informed us that around [<] % of its customers receive a discount of some sort. We do not have a figure for the size of this discount, but we assume it is 50% off advertised retail prices. Therefore, across Sky's customer base, we have assumed an average discount of [<] % (50% of [<] %) from advertised retail prices. This discount is reflected in the ARPU figures in Figure 7 above.

Advertising impact revenues

3.42 In relation to advertising and sponsorship revenues, we obtain the revenues Sky earns from its retail customers using a similar calculation to that set out in paragraphs 3.34 to 3.35 above. We do not model the effects of higher advertising revenues in relation to basic-tier channels Sky wholly or partly owns⁹³.

Sky's retail costs

3.43 Sky incurs certain costs in its retail operation that scale with the number of subscribers to its retail packages. Sky's retail costs would therefore increase if its subscriber numbers increase following the loss of Sky's premium channels from cable packages. These costs can be categorised as ongoing retail costs and one-off retail costs.

Ongoing retail costs

3.44 Sky's ongoing variable retail costs are incurred in each period customers receive Sky's retail packages. Sky has provided us with retail cost data for 2006/07 broken down its retail costs by function and by the fixed or variable nature of the cost⁹⁴. For Sky's ongoing variable costs, which are driven largely by subscriber numbers, we have divided variable costs by Sky's subscriber numbers to derive a figure for variable cost per subscriber. In addition to the figures summarised in Figure 8 below,

⁹³ As Sky's wholly-owned basic-tier channels are not currently available through Virgin Media, but are available through Sky's retail packages, this underestimates the upside to Sky of customers switching from cable to Sky, and hence also Sky's incentive to cease to wholesale to Virgin Media.

⁹⁴ In respect of NDS Access Card charges, these costs relate to 2005/06 and were provided in the context of the Ofcom review of wholesale digital television broadcasting platforms.

we have also included for Sky Movies customers the variable rights costs payable to movie studios⁹⁵.

Figure 8 Summary of Sky's average retail revenue per premium subscriber

Cost Category	Fixed or variable cost	Variable cost (£ per subscriber per annum)
Third party channels/ on demand content	Mainly variable	[X]
Customer management and billing	Mainly fixed	[X]
Marketing	Mainly fixed	[X]
NDS Access Card charges	[X]	[X]
Total variable costs per subscriber		[X]

Source: Data provided by Sky

One-off retail costs

- 3.45 Sky also incurs one-off costs when a customer subscribes to a retail package. These costs are dominated by the cost of equipment (such as a satellite dish and set-top box) and the cost of installation. Costs are incurred when a customer joins Sky, but are not recouped if that customer subsequently leaves the service. Therefore, we model these costs as being incurred in entirety at the time a customer joins Sky.
- 3.46 Sky currently makes a one-off set-up charge to new customers, but this charge may not be enough to cover Sky's costs⁹⁶. We therefore attempt to quantify the net one-off cost to Sky. The October 2007 CRA Report estimated Sky's net acquisition cost to be [X], which we use in our calculations. For High Definition and Multiroom services, we estimate the one-off cost to Sky of additional customer equipment and deduct the one-off charge to customers, to obtain a net cost per subscriber taking these services. We then multiply this figure by the proportion of Sky's premium subscribers that receives each service to derive a figure for average one-off cost per premium subscriber. These figures are summarised in Figure 9 below.

Figure 9 Summary of Sky's average net one-off cost per subscriber

Service	Net cost (£ per subscriber per annum)
Standard Package	[X]
High definition	[X]
Multiroom	[X]
Total cost per subscriber	[X]

Sources: Data provided by Sky, October 2007 CRA Report and Ofcom cost estimates

⁹⁵ See paragraph 3.36 for an explanation of these rights costs.

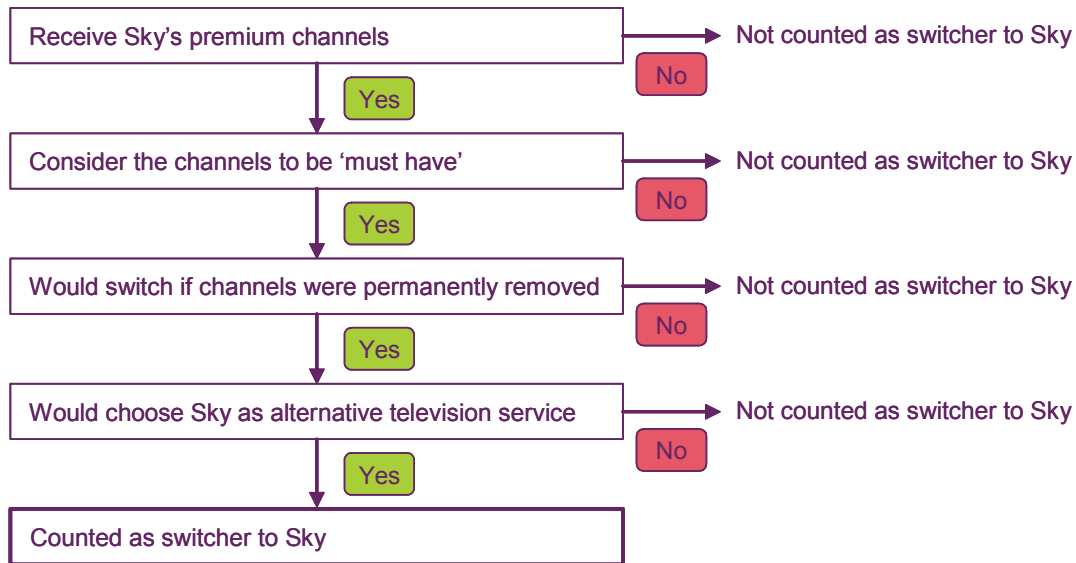
⁹⁶ Rather, in effect Sky recoups these one-off costs through ongoing subscription charges.

Subscriber patterns

Consumer survey results

- 3.47 An important input to our model is the immediate response of Virgin Media customers to the loss of Sky’s premium channels from their packages. We have already outlined some of our consumer switching assumptions in Figure 2 above. We now provide some more detail as to the consumer survey questions referred to in respect of ‘immediate increased switching from Virgin Media to Sky’. These questions are from Phase 2 of Ofcom’s programme of research into consumer preferences for television services⁹⁷.
- 3.48 We asked current premium cable subscribers how they would react to the permanent loss of Sky Sports or Sky Movies from their packages. See Figure 10 below for a schematic of our question structure, and how we have used consumers’ responses. For example, we questioned a total of 80 people taking Sky Sports, 60 of whom viewed it as ‘must have’⁹⁸. Of these, 50 would leave cable if it no longer carried Sky Sports, and of these 42 would switch to Sky⁹⁹. This figure of 42 people out of the 80 people questioned equals the 53% switching rate stated in the first row of Figure 2 above. We test our results for alternative values implied by the 95% confidence intervals around these responses.

Figure 10 Consumer survey schematic with simplified routing



⁹⁷ For background to this research, including methodology and sample details, see Annex 14 ('Summary of quantitative consumer research') to our December Consultation, in particular Table 1. The survey’s fieldwork was undertaken in November 2006, so its findings may not be completely representative of present day responses.

⁹⁸ Not all 60 people who considered the channels to be ‘must have’ were asked for their reaction to the loss of these channels; we have therefore scaled up the responses of the 49 people who were asked, assuming in the process that these respondents are representative of all 60 people.

⁹⁹ The figure of 42 switchers to Sky includes a pro-rata allocation of consumers who did not know which operator they would switch to.

Adjustment for stated preference bias

3.49 Our consumer survey responses may be subject to stated preference bias, in that respondents may have exaggerated the likelihood of switching to alternative providers following the loss of Sky's premium channels. To adjust for this possibility, we therefore reduce the number of customers stating a likelihood of switching away by 10%, and increase the number of customers stating a likelihood of remaining with Virgin Media by a corresponding amount. We then test the sensitivity of our analysis to the value of this estimate.

Rates of disconnection

3.50 In our Base Case (the status quo), we model disconnections and connections from and to Sky and Virgin Media. For this purpose, we use recent disconnection rates for each operator. For Sky, we use a figure of 9.8%, the quarterly annualised churn rate published by Sky in its most recent results update. For Virgin Media, we calculate an annual churn rate, 17.1%, based on its four most recent quarterly updates. For each operator, these churn rates include non-premium customers, and for Virgin Media they include non-television customers; however, they are the best figures available to us, and we do not believe any imprecision substantially impacts our results.

Market growth

3.51 In our Base Case, we model growth in the number of subscribers to Sky's premium channels for both Sky and Virgin Media. We assume the following patterns of growth:

- **for Sky:** 4.2% per annum for first six years, and 2.1% per annum thereafter; and
- **for Virgin Media:** 0% per annum for the whole period.

3.52 Sky's projected growth rate for the first six years is based on a forecast by Analysys Mason for market growth for 2008 to 2013¹⁰⁰. We assume that all growth in premium packages will go to Sky, which is consistent with recent trends. We then assume that growth will slow as the market moves towards maturity. We test the sensitivity of our analysis to the values of these estimates.

Other adjustments

Discounting and inflation

3.53 Our model looks not just at immediate effects but also at effects over future periods. It is therefore necessary to discount financial impacts felt in the future to their present value. We have carried out some indicative calculations, which suggest that Sky's company-wide pre-tax nominal cost of capital is in the range 10% to 11.5%. For simplicity we have used the mid-point of this range (10.75%) as our central assumption, but this is not to indicate that we prefer this to any other figure in the range, nor that the most appropriate figure must be within this range.

3.54 The discount rate we have used in relation to Sky's future income is a nominal one. It has therefore been necessary to adjust Sky's revenues and costs for the effects of inflation. It is likely that revenues and costs will vary at different rates, which may be higher or lower than the retail price index rate of inflation. However, to simplify, we

¹⁰⁰ Source: Analysys Mason, 'Pay TV in Western Europe: market sizings and forecasts 2008–2013'.

have assumed that Sky’s revenues and costs both increase at 2.5%, broadly in line with recent experience of retail price inflation¹⁰¹.

Indicative results

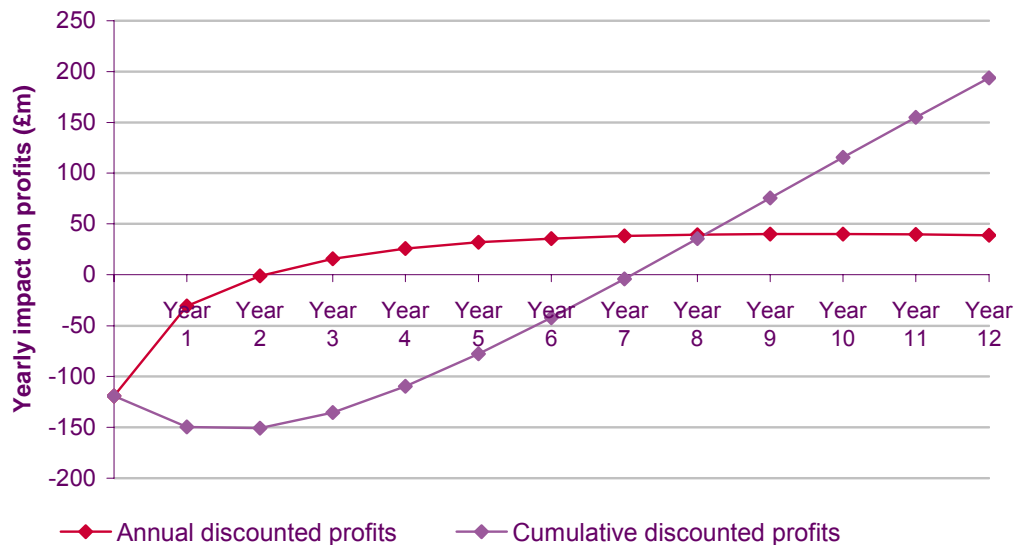
3.55 As we state earlier in this annex, a vertical arithmetic framework of this type can only ever provide approximate results. In addition, we have taken numerous simplifying steps in our modelling process, and there are several factors that our model does not attempt to take into account. Therefore, we recognise that our results are only indicative, and cannot on their own support firm conclusions.

Summary of indicative results

3.56 The profitability of a decision not to wholesale depends critically on Sky’s retail margin, its wholesale margin, and the number of retail customers it would gain and retain at the expense of Virgin Media. Our calculations suggest that, while Sky’s retail margin is substantially higher than its wholesale margin (and is likely to grow as take-up of additional services increases), only around one-half of Virgin Media’s premium customers can be expected to switch to Sky immediately following the loss of Sky’s premium channels.

3.57 Our analysis suggests that a decision to stop wholesaling to Virgin Media would be unprofitable to Sky in the near term, but subsequently profitable. This is because in the near term Sky only benefits from immediate switching from Virgin Media, whereas in the longer term, delayed switching from Virgin Media, increased switching from other services, and reduced switching to Virgin Media come into play. As a result, the decision not to wholesale would be profitable when considered over a period of seven or eight years. This is illustrated in Figure 11 below.

Figure 11 Profitability for Sky of decision to cease wholesale supply of premium channels to Virgin Media



¹⁰¹ We recognise that this may be unrealistic in the near term, given the current high rate of RPI inflation. However, our model looks at the long term, so we consider this rate to be a valid estimate of price trends.

Key sensitivities

3.58 The results of our model are inevitably sensitive to the input assumptions, several of which are presented in Figure 12 below. Here, for alternative assumption values, we indicate the ‘payback’ period over which the cumulative discounted profits from withdrawing supply to Virgin Media pass through break-even. These payback periods should be compared with the payback period of the eighth year for our central assumptions. The assumptions are considered here independently of one another.

Figure 12 Sensitivities to payback period of decision not to wholesale

Assumption	Current value for assumption	Alternative value for assumption	Payback period given alternative value
Responses to consumer survey: level of stated preference bias (see Note 1)	10%	0	7 years
		20%	9 years
Responses to consumer survey: confidence intervals (at 95% confidence level)	As per consumer responses	High case: maximum switching to Sky (implied by limit of confidence interval)	4 years
		Low case: minimum switching to Sky (implied by limit of confidence interval)	13 years
Growth rate in premium cable subscribers in Base Case (where Sky continues to wholesale)	For Sky: 4.2% for Y1 to Y6, 2.1% thereafter. For VM: 0% throughout	For Sky: 5.3% for Y1 to Y6, 2.7% thereafter. For VM: -4.1% for Y1 to Y6, -2.1% thereafter.	8 years
		For Sky: 0% throughout For VM: -4.1% throughout	8 years
In Alternative Case, proportion of cable ex-premium cohort who churn each year, over and above Base Case churn (see Note 2)	Y1: 20% Y2: 15% Y3: 10% Y4: 5% Y5 onwards: 0%	Half these values for Y1 to Y4, and 0% thereafter	9 years
		0%	10 years
Proportion of people who, in the Base Case, would switch to cable to take premium channels, and still do switch to cable in the Alternative Case despite absence of premium channels (see Note 3)	10%	0%	7 years
		20%	10 years
Discount rate (nominal, pre-tax) applied to Sky's future profits	10.75%	10%	8 years
		11.5%	8 years
Inflation rate applied to Sky's future revenues and costs	2.5%	0.0%	8 years
		5.0%	7 years
Sky's wholesale charges to Virgin Media for Sky Sports and Sky Movies	As per current cable rate-card	5% lower than cable rate-card	6 years
		10% lower than cable rate-card	5 years

Note: For a further explanation of these sensitivities, see both the notes to this table in the main document and the explanation of our modelling approach in section 2 of this annex.