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Regulation of wholesale ISDN30

A report prepared by DotEcon Ltd for Openreach

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Content

1 Background

1. On 4 May 2010, Ofcom published a consultation document entitled "Review of retail and wholesale ISDN30 markets". Openreach has commissioned DotEcon to review the economic arguments presented by Ofcom. In particular, Openreach has asked DotEcon to consider:

   - the approach adopted by Ofcom in defining the wholesale market and determining Significant Market Power ("SMP"); and
   - the appropriateness of the remedies being proposed by Ofcom, in the context of a mature product and technology nearing the end of its life.

1.1 Decline in ISDN30

2. In recent years, BT has seen its share of the ISDN30 retail market decline significantly to the point where it now has only a 45% share. We understand from BT that this decline is driven by customers switching to alternative ISDN30 providers or to new technologies in the form of IP-based solutions. BT has lost many ISDN30 channels to providers using SIP trunking, and now considers this offering to be a real and viable alternative to ISDN30.

3. BT considers that the decline of ISDN30 channels will be rapid. [✂][1][✂].[2] Various market commentators concur with this view, for example a report by IDC in April 2009 (on UK business voice forecasts from 2008 to 2013) notes that IP-based alternative are likely to capture approximately 50% of the UK business voice market over the forecasted period.[3]

4. It is also the case that adoption rates may rapidly increase in the impending years. The availability of lower cost IP-based access options is likely to continue improving due to increasingly ubiquitous Ethernet and broadband connectivity. In addition, the barrier of switching to IP alternatives is not likely to be high, as the penetration of IP-enabled PBXs is currently quite high. [4] Further, a lower Total Cost of Ownership,[5] better features/functionality and an increase in the availability of a range of IP alternatives will drive the take up of IP alternatives as trigger events (e.g. PBX replacement and contract renewal) cause customers to reassess their voice telephony provision. One might reasonably expect bandwagon effects to come into

[1] [✂].

[2] [✂].

[3] See IDC "UK Business Voice Forecasts, 2008-13", April 2009.

[4] Forrester reports that 76% of European firms have deployed / are deploying / are piloting IP-enable PBXs; these firms are likely to consider SIP Trunking as part of their strategic network planning. See Forrester, Dec 2007, "The state of enterprise VoIP and unified communications adoption in Europe". Based on firms with 1000+ employees.

[5] See Total Cost of Ownership comparison between ISDN30 and IP-based access such as EFM, NGA and WBC in Openreach, "Review of retail and wholesale ISDN30 markets – Openreach response to Ofcom's consultation dated 4 May 2010", June 2010, Annex 4.

play as the cost and functionality advantages of IP-based replacements become more widely appreciated by customers and SIP standards solidify.

1.2 Ofcom's approach to market definition

5. Ofcom defines both the retail and the wholesale relevant markets as containing ISDN30 services only. In both cases, Ofcom concludes that IP-based solutions fall outside the boundaries of the relevant markets.

6. The difficulty with conducting a market definition exercise for ISDN30 is that there are emerging substitutes as we move from one technological generation to the next. The timing of this transition is uncertain, even though we can be reasonably sure that the transition will occur. Under these circumstances it would be dogmatic to adopt a traditional sequential approach of defining the relevant market, analysing competition within that market and imposing a remedy solely focused on conditions with that market. Even if one were to conclude that the relevant market were narrow (i.e. ISDN30 only), the situation with regard to emerging substitutes and transitioning from one technological generation to the next should be relevant to the design of the remedy.

7. Whilst we consider the general approach adopted by Ofcom in delineating the market is sound, Ofcom's ultimate conclusions in relation to the need for regulation are questionable. We consider that Ofcom has not sufficiently considered the potential for customer switching to IP-based solutions and that switching going forward may be faster than Ofcom estimates.

8. In particular, Ofcom has not considered the full range of triggers that might prompt customers to switch to IP-based services. In undertaking its survey, Ofcom considers triggers related to general upgrades and the changing of PBXs.[6] We understand from Openreach, however, that there are a number of other triggers that might instigate a consumer switching decision (such as for example moving offices). In addition, integrated communication services contracts bought by corporate customers will come up for renewal providing an opportunity for IP-based providers to offer alternative solutions to these customers.

9. Moreover, wider take-up of IP-based services may create a bandwagon effect, where take-up in later years is rapid compared with take-up in the earlier years.[7] In this context, we also understand that as international and market standards begin to develop around SIP Trunking and hosted VoIP, any reliability and quality of service concerns should further reduce.

[6] Paragraph 4.58 of the May Consultation.

[7] Ofcom considers that dual sourcing – i.e. that users are trialling IP-based solutions or purchasing IP-based solutions at the same time as ISDN30 – may suggest concerns about the reliability and quality of service of IP-based solutions and that as a result IP-based solutions may not be good enough substitute to ISDN30 (Paragraph 4.46, May Consultation). However, the Ofcom survey also finds that reliability is considered as one of the main deciding factors of customers that *have already* switched to IP-based solution in making their decision to move (Paragraph 4.57, May Consultation). This may show that at first users may simply be insufficiently aware of the features of the IP-based until they have experienced it through a trial. Once they find that the new offering is in fact reliable, then they are keen to switch on reliability grounds.

10. In effect, there currently seems to be a significant overhang of customers using ISDN30 who might easily switch to IP-based services in the future. Under these circumstances historic switching behaviour may be a very poor guide to potential switching. This alone could be sufficient to justify widening the relevant market.

11. In any case, whether such factors are sufficient to broaden the relevant market is moot. The relevant question is in relation to the need for intervention. In the case of ISDN30, any intervention predominantly needs to consider the future situation, in which substitutes are increasing available and it is important to ensure that there is an efficient transition from one technological generation to the next, rather than resources being inefficiently diverted to lengthening the life of a service in terminal decline. We discuss this further below.

1.3 Ofcom's approach to designation of SMP

12. Ofcom proposes the regulation of wholesale ISDN30, suggesting that a charge control be imposed on Openreach's offering. Ofcom concludes that the need for regulation of wholesale ISDN30 arises as Openreach enjoys SMP in the provision of wholesale ISDN30 exchange lines.

13. Even if one were to accept the argument that the market is no wider than wholesale ISDN30 exchange lines, it would be remiss to disregard the emerging competitive constraints from IP-based alternatives as a constraint on the ability of Openreach to exercise market power in the future. IP-based solutions are already substituting ISDN30 offerings at the retail level and are likely to do so increasingly over the next four or more years. Where there are few margins at the retail level, retailers would be likely to pass wholesale price increases on to customers, which in turn will lead to accelerated switching to IP-based alternative. In addition, there is a dynamic in place leading to irreversible replacement of ISDN30 services by IP-based alternatives; there may be an overhang of customers potentially ready to switch and never switch back.

14. These effects are compounded by the fact that, on the supply side, barriers to entry are low and entry by IP-based suppliers would likely prevent Openreach from exercising any market power. Openreach does not have significant control over the provision of alternative wholesale propositions.

15. In addition, Ofcom's analysis leading to its SMP designation of Openreach jumps to strong and unwarranted conclusions. For example, Ofcom considers that entry is unlikely in the market. However, this is an unsurprising finding in the context of a declining market. Upfront investment required in order to provide a wholesale ISDN30 exchange offering is considerable, and in a market that is declining, there is a very small window of opportunity for a provider to recoup the costs incurred. Indeed, a declining industry may well be one characterised by consolidation, where market participants consider alternative ways to manage excess capacity during the decline. This is not a classical entry barrier that Openreach can enjoy, as Openreach is itself facing a declining market.

16. Ofcom's profitability analysis is also deficient for the purposes at hand insofar as Ofcom has failed to consider the weaknesses of snapshot metrics in the assessment of profitability of products requiring significant upfront investment. Ofcom has sought to rely on snapshot Return on Capital Employed ("ROCE") measures at the end of the life of a product that had involved significant investment in the early years. This is inappropriate where Openreach (or BT in the earlier years) will have put in considerable sunk costs in this product in the expectation to earn a return and

where consideration of simple snapshot accounting metrics would be highly susceptible to the depreciation assumptions used. It is very often the case that accounting depreciation outstrips economic depreciation (for sound business reasons of investment risk control), but this means that accounting ratios give a misleading impression of profitability late in the life of the product.

17. We consider that Ofcom should instead have taken into account the fact that ISDN30 is but one generation of product, with a cycle of a birth, life and death as the next generation takes over. In this case, economic profitability needs to be assessed over a sufficiently long period to take into account the generational cycle, ideally the lifetime of the product. Such profitability measures – such as an internal rate of return ("IRR") method – to reflect the true economic profits earned as opposed to those arising as a result of accounting artefacts. There is considerable precedent for such an approach. See *Annex I* for a more detailed discussion on the assessment of profitability.

2 The need to regulate

18. We have briefly discussed Ofcom's assessment of the delineation of the market and its determination of SMP for Openreach in the provision of wholesale ISDN30 exchange lines.

19. Even if it were accepted that the market was no wider than ISDN30 and that Openreach benefited from SMP today, then as evidenced by the sections above, it would still not appear to be the case that this situation would persist and that returns earned by Openreach would continue at current levels into the foreseeable future. This is because even if IP-based solutions were not considered an effective constraint at present, they are expected to become increasingly so going forward. It is also likely that the decline of ISDN30 will be more rapid than that envisaged by Ofcom.

20. We consider, therefore, that Ofcom has failed to give due consideration to competitive constraints posed by alternative technologies on a forward-looking basis. We also consider that Ofcom has not given due consideration to the nature and likelihood of competitive entry. These issues are discussed in this chapter.

21. As a result, we consider that Ofcom's proposal in relation to a charge control is a disproportionate remedy. In addition, we consider that an inappropriately set price cap may have deleterious effects. These issues are discussed in the next chapters.

2.1 Forward looking assessment

22. Ofcom's review of demand has not been sufficiently forward looking in that Ofcom has failed to assess the likely levels of switching over the four-year period. Even if one were to accept on a retrospective basis that IP-based alternatives had not formed an adequate constraint to modify the market definition or the designation of SMP to date, it is clearly not appropriate that their effect should not be considered going forward.

Consumer switching

23. Notwithstanding the clear indications of decline noted above, Ofcom notes that substitution to IP services is likely to happen only gradually over time (see paragraph 3.6 of the May consultation). We do not agree with this view of likely switching. This is for a number of reasons:

- First, ISDN30 is predominantly a business product with the bulk of its revenue deriving from a subset of BT retail customers. Ofcom had noted that these were likely to switch infrequently, however we consider that there are a number of triggers that may drive switching;
- Second, the features of the products are largely substitutable, and IP-based solutions will become an even closer substitute as international and other industry standards come into force and some consumers' concerns about reliability are allayed;
- Third, switching costs are likely to be low as most users are already partly enabled (e.g. where they have IP-based PBXs);

- Fourth, customer demand is changing (with increasing convergence of data and voice needs, and as more complex features of IP-based solution begin to gain traction); and
- Finally, a tipping point may be reached where a body of SMEs switch and IP-based solutions become increasingly recognised as an attractive and cost-effective service.

Large customers and triggers to switch

24. We understand that the top few hundred ISDN30 customers account for the lion's share of ISDN30 revenue at the retail level. As a result, it is conceivable that only a small proportion of customers making such changes within the four-year period of an anticipated control could rapidly lead to the erosion of ISDN30 volumes. [✂].[8][✂].[9]

25. Ofcom notes from its consumer research that customers would be likely to switch to alternatives such as IP-based solutions when changing premises or where replacing a PBX or switch, rather than for small price changes around ISDN30. However, we understand from Openreach that that are a number of other reasons that may lead to the decision of business users to switch to alternative solutions such as a decision to operate in a more mobile centric manner.

Features of the product

26. A comparison of the main features of ISDN30 with those of SIP Trunking suggests that the latter already provides customers with all the features deemed important to customers including high quality audio and resilience.[10] The availability of these key ISDN features on IP alternatives is also supported by a White Paper published by Ingate Systems, in particular with reference to SIP Trunking having the potential to become better service than ISDN30. The Ingate White Paper suggests that SIP Trunking is likely to be a good alternative that could provide not only high quality audio but richer communications options including Instant Messaging, presence applications, virtual whiteboarding and application sharing. It could also offer more flexibility and reliability to tradition LAN or TDM with improving industry standards and technology.[11]

Changing nature of customer demand

27. Industry trends will see companies eventually converging their voice and IP communications networks in order to lower costs. IP alternatives to ISDN30 such as SIP Trunking will allow businesses to future proof their technological networks. Further, SIP solutions will increase the mobility of the business' work force. Thus

[8] [✂].

[9] [✂].

[10] See Figure 2 in Openreach, "Review of retail and wholesale ISDN30 markets – Openreach response to Ofcom's consultation dated 4 May 2010", June 2010. This submission notes that the features include cost effectiveness, high quality audio, high resilience, call centre integration and data connectivity.

[11] See page 12 of "SIP Trunking benefits and best practices – White Paper", Ingate Systems.

the evolution in trends of communication is likely to drive demand away from ISDN30 towards IP alternatives.

Tipping point

28. We are witnessing a convergence of data and voice communications as the modes of communications today driven by changing work practices evolve towards a richer set of communication options. This will be accelerated by the improving IP solutions. Such trends suggest an eventual tipping point in the near future where a bandwagon effect kicks in with a critical mass of customers switching to IP alternatives.

2.2 Competitive entry

29. We understand that a number of vendors are currently offering SIP trunking and a number of alternative access technologies in competition with ISDN30. Firms including the likes of Cisco, Cable and Wireless and Verizon Business have made a number of recent announcements in relation to competitive offerings. For example:

- Verizon Business reported that it offers multi-site IP trunking in Europe;
- Colt Telecom reported that it offers carrier VoIP services to support intelligent networking services; and
- Gamma Telecom reported that it offers new instant SIP trunking services.[12]

30. We also understand that Openreach has also received feedback from CP customers that suggests they are likely to make a complete switch from ISDN30 to alternative IP bases solutions.

[12]See IDC, "Western European Hosted VOIP Market, 2009-2013", May 2009; and Openreach, "Review of retail and wholesale ISDN30 markets – Openreach response to Ofcom's consultation dated 4 May 2010", June 2010, Annex 1.

3 Downsides of price regulation

31. Ofcom's proposed remedies - notably the charge control - have the scope to lead to serious deleterious effects.

32. We consider that the impositions of a charge control, especially one that was set at too low a level, could have the effect of artificially stimulating demand for ISDN30 at a time when ideally customers would be steadily migrated over to a new technology, such as SIP trunking. If a regulated price established by Ofcom stokes up inefficient demand in the declining product, this would in turn require considerable dead-end investment by Openreach to ensure that the demand continues to be served in the short-run, even though the product has no future in the long run. Not only would a price control that hampers the migration of customers be damaging to the market, but it would also force Openreach to incur costs that it would have difficulty recouping in an ever-shortening window of opportunity.

33. At present, Ofcom has given no indication of what price cap might ultimately be applied to ISDN30. This would appear to create perverse incentives for IP-based providers, as investing in such services now risks being undercut by lower ISDN30 prices in future.

3.1 Finite time horizons

34. If the assessment of the limited future of ISDN30 is correct, then it immediately follows that the market is not in a steady state. In particular, an investment made to provide this service now must have a shorter horizon over which to recover cost than a similar investment made previously. In effect, later investments have a narrower time window in which they can be expected to generate revenue.

35. If demand for a service declined as it approached the end of its life, new investments might not be needed and the issue of the ever-narrowing time window for recovery of investment costs might not matter. However, we understand from BT that a significant price cut would provoke a strong demand response in the short term requiring significant new investment given current capacity constraints.

36. Therefore, the situation appears to be one in which some new investment will be required or may be induced (if there is a price cut) to meet demand at the same time as there is a strong expectation that demand will shortly begin to decline sharply. It may become impossible to price services in the future on the basis of the same depreciation schedules as applied in the past as this may mean that assets are not fully depreciated by the time that the demand for the service withers.

37. This gives rise to a situation in which the *incremental* cost of meeting an increment in demand is not well approximated by the current unit cost of providing services. Under the assumptions laid out above, if BT is required to serve new demand, then the forward-looking cost of providing this option will also increase over time as the window of opportunity contracts. Because there is a significant probability of new demand, this cost needs to be taken into account in the current price if correct incentives are to be given.

3.2 Prices to guide efficient decisions

38. It is clear that if prices are to provide signals for economically efficient decisions by consumers and rival operators, it is the forward-looking, incremental cost of meeting new demand that should be considered, rather than the cost of serving current demand. Efficient price signals should not be determined by accounting costs determined retrospectively by the depreciation and amortisation policies applied to date.

39. To see this, consider a simple example of an alternative operator deciding whether to build its own infrastructure or use a wholesale ISDN30 service from BT to meet new demand. For this decision to be efficient, the wholesale price needs to reflect the forward-looking cost of BT's investment need to provide the ISDN30 service over the ever-shortening remaining lifetime of the new asset. The costs of providing services in the past are irrelevant to this specific question.

40. An analogous argument applies to the case of an alternative operator currently serving a customer by some other means, but then deciding to switch to BT's service instead. This is an incremental demand for BT. For this switching decision to be made efficiently by the alternative operator, the price of BT's service needs to reflect the ever-shortening lifetime of any new investment. If the price were set lower than this, the alternative operator would be switching inefficiently to BT's wholesale service.

41. As a matter of principle, it is perfectly possible that in a situation where sunk investments are needed to support constant or growing demand for a product with expected obsolescence, the efficient price might even *increase* over time. We provide some examples for other industries in the following subsection. Without price increases, resources would be inefficiently diverted from alternatives with a strong long-term future to a legacy product with a limited future. This would be strongly detrimental to building infrastructure-based competition in the long run.

42. Regulating and lowering the price of ISDN30 may also have the added effect of cannibalising other products' revenue streams within the existing portfolio of BT. Where the reduced prices induce increased demand, BT may find it difficult to recoup its costs in other areas leading to a further detrimental effect on its investment incentives. If legacy services are not priced correctly, there will be a form of dynamic distortion in which investment incentives are not efficient for a wide range of products, not just the legacy ones.

ACCC decision

43. This issue has been considered recently by the Australian Competition and Consumer Commission ("ACCC"), in its review of the regulation of ISDN services in Australia. The ACCC dismissed claims from alternative carriers that mandating access to Telstra's ISDN services was required in the absence of alternative technologies. The ACCC considered that a continued obligation to require access and to regulate its price was detrimental to the long-term interests of consumers in particular where it affected, or delayed, investment in future alternative technologies.

44. In its final report in June 2009, the ACCC noted that:

> *"In balancing [its] objectives... the Commission considers that the medium to long term benefit derived from efficient investment in, and/or the transition to, alternative infrastructure outweighs any short term detriment to competition*

through the loss of regulated access to these legacy services.

The Commission recognises that without additional investment in infrastructure by access seekers alternative technologies for the supply of data services may only be available from the incumbent. In addition, there are also likely to be costs incurred in switching to alternative sources of supply. However, such costs will ultimately provide benefits in terms of increased efficiency and investment in bandwidth and data transmission capabilities that will ultimately be in the long term interests of end-users."[13]

3.3 Depriving customers of benefits

45. Intervention by Ofcom at this stage could possibly deprive consumers of the benefits from superior technologies.

46. In particular, we have discussed above how the key features (cost effectiveness, audio quality, etc) of IP alternatives are comparable to that of ISDN30. Further, we understand that additional features of IP alternatives such as Instant Messaging, presence applications, virtual whiteboarding and application sharing would provide further options and potential benefit to consumers. In addition, we understand that IP alternatives will present a more attractive Total Cost of Ownership (TCO)[14] and provide improved flexibility and reliability to tradition LAN or Time Division Multiplexing with improving industry standards and technology.

47. Consumers would not enjoy or face a delay in enjoying these benefits of IP alternatives if intervention by Ofcom discourages or delays the take up of such superior technologies by distorting the price signals in the market.

3.4 Funding for future investments

48. Where prices of ISDN30 are significantly lowered by the charge control and as a result demand boosted, Openreach may be forced to divert important investment to meet this inefficient demand. This diversion may be from such areas as Superfast Broadband.

49. BT is currently committed to 40% coverage by 2012 in relation to NGA (and two-thirds by 2015), which is expected to require an investment of the order of £1.5bn (and £2.5bn correspondingly).[15] [✂].[16][✂].

3.5 Increased cost of serving additional demand

50. As noted above, we understand from Openreach that there may be substantial costs in serving any additional demand. Such costs may include those of:

[13] See "DDAS and ISDN services: An ACCC Final Report reviewing the declarations for the digital data access service and integrated services digital network"; ACCC, June 2009.

[14] See footnote 5.

[15] See BT Group PLC "Preliminary results for the fourth quarter and year to 31 March 2009" (May 2009) and "Final results for the fourth quarter and year to 31 March 2010 and announcement of future plans" (May 2010).

[16] [✂].

- Access electronics;
- Access fibre, copper and duct;
- Exchange electronics (including racks and the electronic equipments associated with ISDN30);
- Backhaul electronics; and
- Backhaul fibre and duct.

51. We understand that a number of these costs may be higher than at present in light of the fact that a number of the components are increasingly unavailable and costly to obtain. In particular, we understand that this is the case in relation to certain electronic components (e.g. racks).

4 Proportionality of the proposed intervention

52. Ofcom's current proposal is for a safeguard cap (i.e. no nominal price increase from current charges) running until 2011. At that point, a RPI-X price cap would be determined at the same time as new price caps on wholesale prices for WLR and LLU products. Ofcom's main rationale for this approach appears to be that competitive constraints from IP-based services are not yet sufficient to constrain the wholesale price of ISDN30 and it is uncertain when they might emerge.

53. Clearly the need to regulate only arises if one considers the emerging substitutes provided by SIP trunking and VOIP are insufficient constraints on Openreach and that, in the absence of the safeguard cap, Openreach would have the ability to earn excessive profits. As we have explained above, we consider that at best this case is unproven and most likely understates the role of IP-based services as a constraint. Corporate users do not change telephone systems at the drop of a hat, so there may be an overhang of potential switchers who could adopt these new technologies under the right circumstances. There is also good reason to expect bandwagon effects to come into play, as IP-based alternatives gain market traction.

54. Even though there are good reasons to expect IP-based alternatives to ultimately substitute for ISDN30 services (indeed with the potential to provide a cheaper service of higher functionality), there is uncertainty about the pace of this transition. Therefore, it is proper for Ofcom to be concerned about the potential outcome in the worst case in which these constraints are slow to emerge. However, if we accept Ofcom's premise that there is a need to regulate, the question should be how best to design the intervention in this unusual situation of emerging competitive constraints and a limited lifetime for the existing product.

4.1 Costs vs. benefits

55. As ever, intervention involves both costs and benefits that need to be traded off. The level of any price cap will affect the relative magnitude of these costs and benefits.

56. Let us start on the benefit side. For there to be benefits from the safeguard cap, it would be necessary for Openreach to have an incentive to increase its price above current levels. This begs the question of why Openreach has not *already* increased the price if it was profitable to do so. Therefore, it is difficult to see that the safeguard cap could generate material benefits other than in a high inflation scenario (so that the safeguard cap is in effect a real price cut). In the current macroeconomic environment, high inflation seems unlikely. Therefore, it is difficult to believe that the safeguard cap can generate significant benefits, even if we accept all of Ofcom's arguments at face value.

57. What about a future RPI-X cap? Clearly if Ofcom were correct that current wholesale prices are excessive, then with a sufficiently large X prices would fall and there would be a direct consumer benefit. Therefore, there is at least the potential that benefits could be generated once an operational price cap comes into force (again taking all of Ofcom's argument at face value).

58. However, if a future RPI-X price cap did bite, we need to consider the risk of adverse and unintentional consequences. There is significant uncertainty about the cost of providing ISDN30 and unavoidable risks associated with setting a price cap too tightly.

59. It will be difficult to estimate the cost of ISDN30 provision; this difficulty is implicit to Ofcom's decision to defer setting the price cap and considering it alongside other wholesale services (WLR and LLU) that share the copper access network. There are complex issues about how to value the assets involved and treat historic investments in ISDN30, as discussed when we considered the measurement of profitability. Further, we understand from BT that ISDN30 exchange equipment is increasingly unavailable, in which case any costing exercise becomes hypothetical in the extreme. A traditional forward-looking LRIC costing exercise would be of no practical value in this situation.

60. For any service reaching the end of its life and being replaced with a new generation of technology, the cost of replacement on a like-for-like basis will trend upwards and become increasingly prohibitive. At some point the most economical way of providing the service will become through the new technology. Therefore, an appropriate regulated price cannot be determined by pretending that the old technology is still being used (for example, through modeling the cost of a notional steady-state network); rather efficient pricing requires us to consider what the costs of the *new* technology are.

61. If the regulated price is set too low, the transition to the new technology will be impeded. This risk is a cost of intervention when the appropriate regulated price level is uncertain, as is the case here. Also, setting the regulated price too low risks stimulating new demand for old technology, creating new investment that will ultimately be wasted when the transition to the new technology occurs. Competitive providers of IP-based service also face having the opportunities for adoption of new services squeezed if ISDN30 prices are set too low (with the associated innovation that this might bring).

62. Therefore, we would appear to be in a situation in which an appropriate regulated price for wholesale ISDN30 services would be very difficult to determine with any precision. There would also be a highly asymmetric risk from it being set wrongly. The detriment from setting a price cap too slackly is limited, as ISDN30 is approaching the end of its life and emerging substitutes would be encouraged, along with bandwagon effects in their adoption. However, setting the price too tightly would wastefully divert investment into the legacy technology and impede the switch to the new, superior technology (along with any associated innovations in functionality). This strongly suggests that a cautious approach would need to be adopted in setting any price cap.

63. At present, we are in situation in which Ofcom has made no commitments with regard to the X it might determine in a subsequent price cap. Therefore, there is a further cost of the temporary safeguard cap period that we need to consider. Providers of alternative IP-based services are currently in a position where they do not know what price cap might be set on ISDN30 services in 2011. There is a danger that they invest in providing and promoting IP-based services now, only to find that the price of ISDN30 has been cut to a level that impedes switching to the new technology. Clearly this might not happen, but Ofcom has left the door open to such possibilities through the proposed remedy. Alternative IP-based providers have strong incentives to wait and see what happens under such circumstances, rather than actively competing for ISDN30 customers now.

4.2 Alternative remedies

64. The discussion above demonstrates that, even if we accept all of Ofcom's arguments about the current competitive position, Ofcom's proposed remedy is not well suited to address the inevitable uncertainty about the speed of the transition to IP-based alternatives and the difficulties of estimating the correct price for ISDN30 services to allow that transition to occur efficiently.

65. In order for a remedy to be proportionate, it is necessary that there are not alternative remedies that can achieve the desired benefit whilst still at the same time imposing less cost in terms of unintended or adverse consequences. In the context of a declining product soon to be replaced by a superior technology, a more appropriate remedy might be simply to set a safeguard cap for a reasonable period of time (say four years in line with the usual length of price caps set by Ofcom). This would cut off the risk that Openreach could increase prices.

66. This approach would seem to have significant advantages. First, there is little reason to expect the real cost of ISDN30 services to fall at the end of their life as there is no innovation or cost reduction pressure in supplying or deploying legacy equipment. A safeguard cap would reflect this. It would also provide much clearer incentives for alternative providers of IP-based services, as they could go ahead with investments in providing and promoting such services without the chilling effect from the risk of ISDN30 price subsequently being cut to a level where switching to IP-based services is inhibited. This would also provide Openreach with reasonable certainty that demand for ISDN30 services would not be artificially stimulated by subsequent regulatory invention with the concomitant risks that this would bring for investment planning.

67. Clearly the efficacy of a sustained safeguard cap is predicated on the decline and eventual extinction of ISDN30. If that assumption proves false, then it is at least possible that there could then be a period during which Openreach is not constrained by emerging substitutes. However, this risk does not provide an argument for simply placing an RPI-X cap on Openreach *just in case* this scenario might occur. This would risk impeding migration to IP-based services in the much more likely case that the decline of ISDN30 demand is as expected by BT and third-party analysts.

68. Is there a more refined regulatory instrument that can cope with this uncertainty over the decline of ISDN30? One simple solution might be to impose a safeguard cap for a reasonable period (say four years) on the assumption that a certain rate of decline of ISDN30 demand occurs. If that decline fails to materialise, then a review is triggered and a RPI-X price cap set because the assumption of a declining market would not have been met. This seems a much simpler mechanism than Ofcom's proposal in the May Consultation. It would provide good incentives for all parties (both Openreach and alternative providers) to migrate customers to IP-based services, whilst still providing protection of any residual ISDN30 customers who might be inert and price-inelastic. In all likelihood, this would avoid the need to determine a full RPI-X price cap as long as forecasts of the decline of the ISDN30 market would play out.

Assessment of profitability

In this annex we discuss in further detail the assessment of profitability in the context of a mature product that historically required significant upfront investment.

Cost recovery over time

69. Where an asset is sunk, the investor makes a commitment to providing a service for some time and cannot simply stop and dispose of the asset if returns are insufficient to cover the current costs of financing and maintaining the asset. When assets are sunk, competitive prices are not set by the simple profit maximising strategy. Rather, an investor has discretion over how it seeks to recover the costs of the asset over time, but this policy is itself an important aspect of the broader competitive process. Unless there is some special reason that a market will remain in a steady-state situation, there is no reason to expect that gross margins (i.e. margins excluding recovery of asset costs) or rates of return on assets will remain constant or necessarily in line with the cost of capital at any point in time. Many markets exhibit natural cycles of birth, growth and death during which these metrics will change.

70. In the case of a limited future for ISDN30, then it immediately follows that we cannot be in a steady state situation. In particular, an investment made to provide this service now must have a shorter horizon over which to recover cost than a similar investment made previously. In effect, later investments have a narrower time window in which they can be expected to generate revenue.

71. A close analogy is the production of semiconductors such as memory chips (DRAMs) used in computers and becoming ubiquitous through their use in many other electronic products. The typical dynamics of a single DRAM generation are a relatively high initial price that rapidly falls to a fairly constant floor for the majority of the product's lifetime.[17] However, as the introduction of a new generation of larger capacity DRAM approaches, prices of the older generation sometimes rise significantly above this floor. This is a natural consequence of competition given the characteristics of the sector.

Snap-shot vs. measures of profits over longer timeframes

72. Single year snapshots of a company's profitability using accounting metrics such as ROCE, are increasingly being seen by competition authorities as deficient as evidence for excessive profits. Year-on-year variations in snapshot profit measures may be pronounced where a firm is keen to encourage take-up of a platform possibly even incurring short-term losses at the outset with the hope to recoup those in subsequent years once the platform becomes more established. As a result, latter year snapshot profits may appear high, when in reality they simply reflect losses from preceding years. Instead, longer-term metrics such as an IRR, are being seen as superior profit metrics insofar as they are calculated over a reasonably long time frame, ideally over its lifetime. Such a measure is also

[17] See Douglas A. Irwin and Peter J. Klenow (1994) "Learning-by-Doing Spillovers in the Semiconductor Industry", Journal of Political Economy, 102(6), pp1200 - 1227.

unaffected by depreciation policies and other accounting artefacts. Firms already rely on metrics such as IRRs or NPVs in order to appraise investments.

73. The OFT's Economic Discussion Paper 6 *"Assessing profitability in competition policy analysis"* supported the use of IRR metrics, over and above other profitability metrics. The paper notes that:

> *"the internal rate of return (IRR) and the net present value (NPV) are the conceptually correct measures of profitability of an activity (an investment, a line of business, or a company)".*[18]

74. Still, IRR measures involve relying heavily on assumptions about the value of underlying assets, in particular where a truncated IRR is considered and assumptions about the terminal value of assets must be made. Where the asset's value is difficult to determine, then the resulting IRRs may vary widely given different assumptions. Notwithstanding this, there remain compelling reasons to employ IRR metrics, in particular where snapshot metrics can be expected to fail to capture the underlying features of the product (e.g. its highly capital nature) or the specific circumstances of the market (e.g. the finite time horizon for the recovery of asset costs or other reasons why the market cannot be in a steady state). In these cases, IRR metrics are still a preferable method.

Survivorship bias

75. A further issue that may be considered relevant in the measurement of profitability is the extent to which snapshots might be seen to reflect survivorship biases. In cases where some firms incur losses and exit the market, survivors may be seen to have higher returns than market averages, in a year simply reflecting their survival. Where competitors exit the market near the end of its lifecycle, this may be relevant. Even lifetime measures would not correct for such survivorship biases and this is a further issue to be considered.

Should bygones be bygones?

76. Ofcom notes that it is concerned about excess profits going forward, whilst also asserting that historic losses should *not* be taken into account. In particular, Ofcom says:

[18] See paragraph 1.4 of the OFT discussion paper. The paper also gives a view on the relative merits of the alternatives, including ROCE and ROS: "where the IRR estimate may be less reliable, other measures of profitability can be useful as "proxy" measures, in addition to, or instead of, the IRR. However, this is only relevant to the extent that these other measures do not significantly and systematically diverge from the IRR; and that they provide additional information about a company" (see Paragraph 1.9 of the OFT discussion paper).

> *"With reference to the likely continuing life of the service, we understand that ISDN30 is based on legacy technology and that IP-based alternatives are emerging. However, as explained in Section 4, our research shows continuing demand for ISDN30 at the retail level over the forward look period. We believe that there will be a continuing demand for ISDN30 for the foreseeable future and therefore are concerned about excessive profitability going forward, and not with lifetime profitability."*[19]

77. This statement by Ofcom is very surprising. It seems to assert that a regulated provider should not expect to recover costs already incurred but not yet recovered. It seems to imply that at any point in time, the forward-looking truncated IRR from the current date to the end of life of the product should be subject to some unspecified constraint. However, clearly this truncated IRR could not possibly be limited to the WACC, as if it was this would mean that a firm could never make a current loss in expectation of a future profit.

78. There is a further issue of regulatory commitment and hold-up. If Ofcom is really suggesting that only forward-looking profitability from the current date matters – and bygones should be bygones – then this is tantamount to hold-up of any investment made in sunk assets.

Precedent in the use of lifetime profitability measures

79. The IRR measure has been relied on by authorities in a number of recent cases. For example, the Competition Commission's ("CC") Classified Directories Advertising Services inquiry (undertaking concluded in 2007) relied on the use of IRR measures – both lifetime and truncated (over a shorter 5 year period) - for the assessment of profitability of players in the market, notably for Yell and Thomson Directories. In its final report, the CC also noted that:

> *"An IRR approach has the advantages of taking account of the time value of money and, being based solely on cash flows, it is not dependent on accounting conventions in terms of measuring profits or valuing assets. IRR methodologies are most often used in ex ante project appraisal."*[20]

80. The most recent case to reference such effects was in relation to the Competition Commission ("CC") inquiry of the Rolling Stock Leasing Market in the rail sector ("ROSCO"). In this case the CC noted that:

[19] See paragraph 7.22 of the May Consultation.

[20] See Competition Commission report of December 2006 entitled "Classified Directory Advertising Services market investigation". An additional case where similar lifetime issues were considered is that of the CC inquiry into SME Banking (2002). IRR methods were also used by the CC in its assessment of the profitability of supermarkets in 2000 (See paragraphs 8.74f, "Supermarkets: A report on the supply of groceries from multiple stores in the United Kingdom", Competition Commission, Cm4842). IRR measures were also presented by the London Stock Exchange in 2004 when the OFT was assessing LSE issuer fees. However, in this cases the OFT relied instead on ROCE measures noting that in this instance, a steady state assessment meant the differences in the time value of money would make the difference between IRR measures and ROCE over a number of years negligible.

"Normally we would use ROCE to measure profitability, based on accounting returns. However, because ROSCOs operate asset-intensive businesses, accounting returns are very sensitive to the accounting depreciation applied to those assets, which may not reflect their economic value. We also noted that as an asset ages, its NBV declines and where the rental remains constant this will leave to an increase in ROCE, which may not accurately reflect the economic profitability of the asset."[21]

81. These issues have also been considered at a European level. For example, in April 2004, the Netherlands Competition Authority (NMa) fined Interpay €30m for excessive pricing of its PIN transactions network services. The NMa ruled that Interpay had SMP after an accounting review of its profitability between 1998-2001revealed that its ROCE far exceeded the WACC .[22] Interpay challenged the NMa ruling noting that the network was set up much earlier in 1989, it was a risky investment in a new payment technology and profitability in the early years was poor as the network critical mass was not yet reached. Interpay considered that the NMa should have considered an IRR metric. Following Interpay's appeal, the NMa withdrew its SMP ruling and the fine.[23]

Excessive pricing and IRRs

82. [✂].

83. [✂][24] [✂].

[21] See appendix 6.4 "Approach to profitability analysis and results"; Competition Commission ROSCO inquiry, April 2009.

[22] See "Oxera successfully supports Interpay in Dutch excessive pricing case"; Oxera, December 2005.

[23] See footnote 22.

[24] [✂].