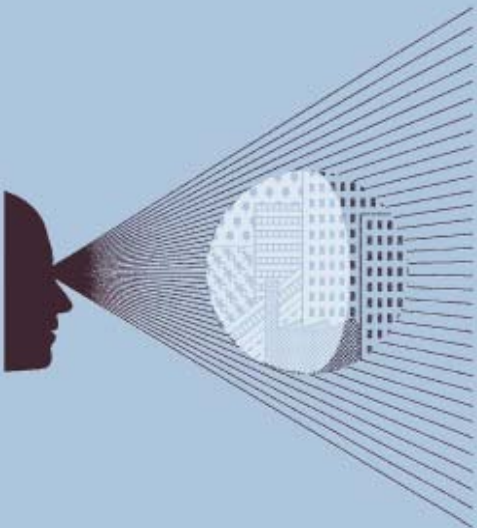


# Bundling and retail-minus regulation

## Developing an imputation test

**Prepared for  
Commission for Communications Regulation**

**December 2007**



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# 1 Introduction

In its market analysis of retail fixed narrowband access markets,<sup>1</sup> ComReg imposed an obligation on eircom not to bundle unreasonably. Specifically, ComReg required eircom to offer all retail narrowband services as stand-alone products, forbidding pure bundling.<sup>2</sup> More importantly, it imposed an obligation on eircom not to charge prices for retail bundles, including retail narrowband access and other products that might not be subject to price regulation, below the costs of the fixed wholesale regulated elements. ComReg specified that this would be enforced on an ex post basis, except for bundles including broadband, which would continue to be assessed on an ex ante basis.<sup>3</sup>

The analysis and discussion contained in this report applies to any bundle that includes retail products whose wholesale inputs are regulated on a retail-minus basis. This would therefore encompass bundles that include fixed calls, TV and/or mobile telephony, for example, if bundled together with line rental and/or broadband.

The aim of this research is to provide ComReg with an analytical tool that:

- is economically robust and stands legal challenge;
- can be used by ComReg to monitor bundles that use inputs regulated on a retail-minus basis, and, if necessary, intervene and order wholesale prices to change. Specifically, the analytical tool should allow ComReg to assess whether the prices charged by an operator with significant market power (SMP) for its retail bundles might be anti-competitively low, thereby making it difficult, if not impossible, for equally efficient entrants relying on wholesale inputs regulated on a retail-minus basis to replicate the bundles profitably and to compete with eircom. In the event of the bundle not being replicable, the framework provides a simple methodology for modifying the wholesale input prices to ensure that competition in the relevant retail markets is not hindered;
- is rooted in a careful analysis of the economic literature and case law on bundling and the issues that it raises from a regulatory and competition perspective; and
- is easy to implement by ComReg and can be clearly understood by the industry.

This report is structured as follows:

- section 2 provides a discussion of Oxera's understanding of the main issues;
- section 3 presents the analytical framework that can be employed to determine whether bundles are replicable and, if ComReg needs to intervene, how wholesale prices should be adjusted;
- building on the lessons from section 3, section 4 extends the framework of analysis to a dynamic discounted cash flow (DCF) framework;
- section 5 considers additional policy issues;
- section 6 concludes.

<sup>1</sup> ComReg (2007), 'Market Analysis: Retail Fixed Narrowband Access Markets', Document No. D07/61, August 24th.

<sup>2</sup> Pure bundling refers to the situation in which products can only be purchased in a bundle. In contrast, under mixed bundling, a consumer has a choice between purchasing the entire bundle or each product on a stand-alone basis.

<sup>3</sup> ComReg (2006), 'Retail-minus Wholesale Price Control for the WBA Market', Document No. 06/01, January 13th. In the case of ex ante intervention, any eircom product including a broadband component should be pre-notified to ComReg. In contrast, products involving narrowband access services that do not include broadband will be analysed on an ex post basis and the appropriate measures taken where required.

## 2 Background to the issue

The analytical framework for examining whether bundling might raise competition and regulatory concerns is closely related to the framework for analysing margin squeeze and/or predation. Bundling might be used by a vertically integrated operator with SMP in the input market to leverage its power into one or several downstream markets where it does not have SMP (ie, vertical leverage). This could be done by charging a price for the bundle that is so low that equally or more efficient rivals relying on regulated wholesale inputs for the provision of the retail products would be unable to earn a sufficient margin to compete in the retail markets. Similarly, the margin squeeze/predatory pricing strategy resulting from bundling could also be used to enhance the position of the vertically integrated company in the retail markets where it does not have SMP (ie, horizontal leverage).

This is not to say that bundling cannot be welfare-enhancing. Bundling generates lower prices to consumers, possibly due to efficiencies gained by the supplier; it might reduce consumers' transaction costs,<sup>4</sup> increase consumer choice and expand demand, while allowing operators to reduce price inefficiencies. However, these short-term benefits might be outweighed by the long-term negative impact on prices and consumer choice resulting from the lack of competition in a market where bundling has been used to foreclose competition.

ComReg would need to monitor the incumbent's behaviour and might have to intervene by requiring a reduction in wholesale charges for inputs regulated on a retail-minus basis that are used for the provision of a bundle if the incumbent's pricing practices are likely to have an adverse effect on competition and, ultimately, reduce consumer welfare. This would depend on the following factors.

- **The operator offering the bundle has SMP in the markets for inputs regulated on a retail-minus basis**—if this is the case, there would be a higher risk that the discounts offered in the bundle could hinder competition in downstream markets.
- **The motivation behind the bundled discount**—the bundled discount should be passed on to wholesale access prices if it is explained by wholesale efficiency gains, or demand efficiencies explained by pure business stealing.
- **Whether the 'imputation test' is passed**—an imputation test assesses whether an equally efficient entrant would be able to replicate the bundle. The test will be passed if the retail price for the bundle covers the costs of acquiring the wholesale inputs necessary for the provision of the bundle plus the relevant retail costs (net of any efficiencies resulting from bundling).

These issues are discussed in sections 2.1 to 2.3. Sections 2.4 and 2.5 consider what should be done if the imputation test is not passed. The section concludes with a summary of how bundling might hinder competition and distort market outcomes.

### 2.1 The starting point

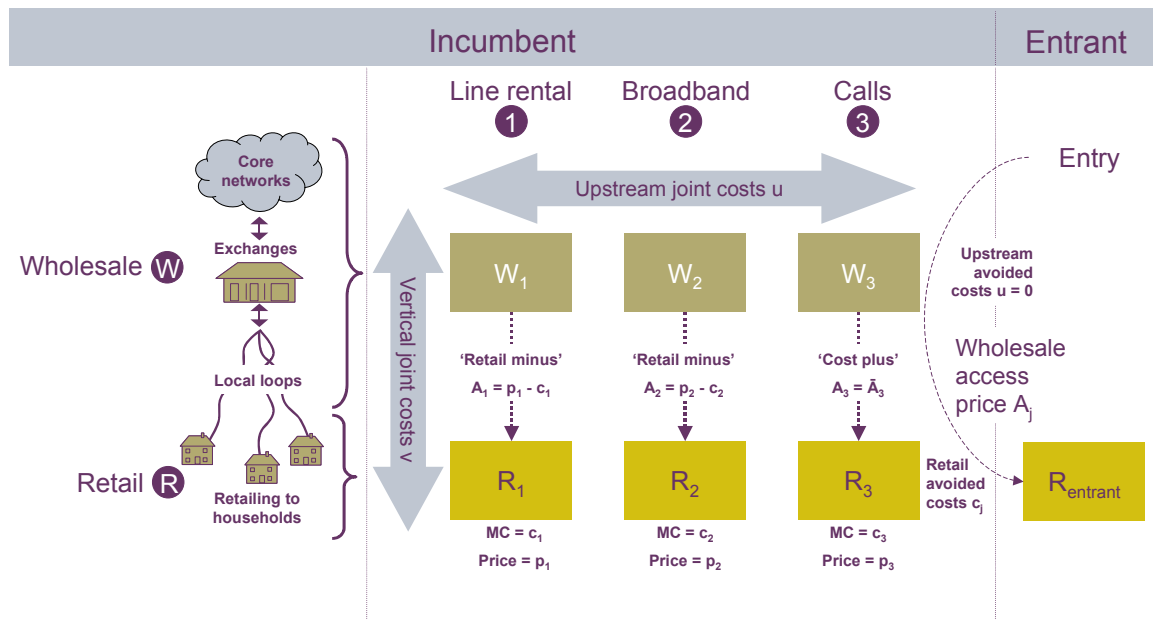
Suppose that in a market there is a vertically integrated business operating in a number of wholesale and retail markets, and several entrants that compete in the retail markets. To do

<sup>4</sup> Instead of having to look around and compare different offers for two services (eg, calls and broadband), when offered a bundle a consumer can save time and buy both services from the same provider.

so, entrants must either build their own networks, or use various parts of the vertically integrated operator's network. Although cable and other forms of network bypass are viable, in many instances the duplication of the whole network may be inefficient. Hence, entrants would invest in building parts of the network and use elements of the incumbent's network in order to provide retail services to end-consumers.

Figure 2.1 provides a simplified illustration of the supply chain of three retail products—line rental (1), broadband (2) and calls (3)—and the access pricing arrangements in place. The figure assumes that the incumbent does not undertake bundling of its retail products—that is, it is assumed that all products are sold separately.

**Figure 2.1 Simplified illustration (no bundling)**



Source: Oxera.

The far left-hand side of the figure shows how the incumbent operator provides a number of services in order to supply its end-customers. At the upstream (wholesale) level, it uses its core network, exchanges, and local loops to supply customers in the retail market. Moving along to the middle of the figure, the incumbent operates in a number of retail markets. In Figure 2.1 these are the markets for (1) line rental, (2) broadband and (3) calls.

Moving further to the right, as noted above, the incumbent is obliged to provide access to entrants to its network on fair terms. These access prices are regulated. Taking into account the measures implemented by ComReg, access prices at the wholesale level for calls are set on a cost-plus basis (ie, reflecting the direct costs of access to the network, plus some adjustments). In the case of line rental and broadband, access prices are regulated according to a retail-minus (or ECPR) rule—that is, entrants are charged the incumbent's retail price for the product, less the costs avoided by the incumbent in providing access.<sup>5</sup> In the figure, and consistent with the regulatory controls imposed on eircom, it has been assumed that these avoided costs are at the retail level only (given that entrants are assumed to require access to most of eircom's network).

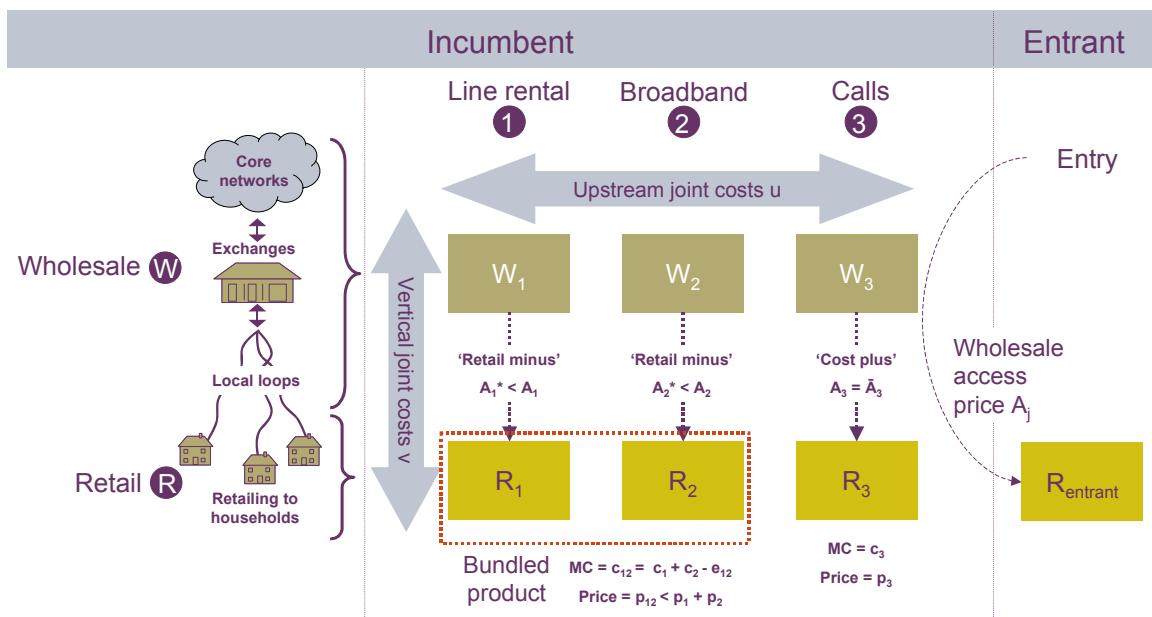
<sup>5</sup> This retail-minus rule for access prices is frequently referred to in the economic literature as the 'efficient component pricing rule' (ECPR) originally proposed by Willig, R. (1979), 'The Theory of Network Access Pricing,' in H.M. Trebing, (ed.) 'Issues in Public Regulation', Michigan State University Public Utilities Papers. Proceedings of the Institute of Public Utilities Tenth Annual Conference. ECPR was later applied to the rail industry by Baumol, W. (1983), 'Some Subtle Pricing Issues in Railroad Regulation', *International Journal of Transport Economics*, 10:1–2, August, 341–55.

Therefore, for line rental, access prices are set according to the retail line rental price ( $P_1$ ) less the avoided costs to the incumbent in allowing an entrant to serve customers rather than doing this itself ( $C_1$ ).<sup>6</sup> If retail prices are set at the competitive level, retail-minus is assumed to lead to efficient entry into retail markets. This is because it retains within the access price the economies of scope to the incumbent from vertical integration, which are lost in supplying access to an entrant. Put another way, an entrant would enter the retail market only if it had the same or lower costs than the incumbent, after taking into account these vertical scope economies ('v' in Figure 2.1). Thus, in the absence of bundling:

- the price of wholesale access to supply line rental downstream is set at  $A_1 = p_1 - c_1$ ;
- the price of wholesale access to supply line broadband downstream is set at  $A_2 = p_2 - c_2$ .

Figure 2.2 illustrates what might happen if the incumbent offers, as a retail bundle, its line rental and broadband products. Here, consistent with an economic definition of bundling, the joint retail offering is priced at  $p_{12}$ , whereby  $p_{12} < p_1 + p_2$ . The incumbent is assumed to continue to offer products 1 and 2 separately since engaging in pure bundling is prohibited.

**Figure 2.2 Simplified illustration (bundling of two products)**



Source: Oxera.

## 2.2 Motivations for bundling

An incumbent might undertake retail bundling for many reasons, including supply- and demand-side efficiencies. These are explored below.

### 2.2.1 Supply-side efficiencies

The supply-side efficiencies from bundling are related to the cost savings generated by economies of scope. For economies of scope to arise from bundling, these efficiencies would need to reflect savings that are not achieved as a result of joint supply. For example, economies of scope at the production level could exist from the supply to a customer of broadband and line access, regardless of whether the two services are sold in a bundle.

<sup>6</sup> Here, avoided costs are assumed to proxy marginal costs. There is some debate as to which 'margin' to use in proxying marginal costs, and whether this should be an increment or decrement.

Economies of scope from bundling might arise at the wholesale level ('u' in Figure 2.2) and/or the retail level ('e' in Figure 2.2).

The former may arise, for example, through sharing key parts of the network. Given that the bundle is unlikely to replace the existing network infrastructure, wholesale economies of scope are likely to be limited. However, if they were to arise, wholesale efficiencies should be passed on to access prices since it would be difficult for an entrant to replicate them. Hence, wholesale access prices for rental and broadband should also fall to new levels  $A_1^*$  and  $A_2^*$  (ie,  $A_1^* < A_1$ ;  $A_2^* < A_2$ ).

Given that bundling would not obviously give rise to significant scope economies at the wholesale level over and above the economies of joint supply, cost reductions are more likely to arise as a result of economies of scope at the retail level. The potential sources of cost savings are as follows.

- **Marketing expenditure**—advertising a bundle of line rental and broadband would reduce the need to invest in marketing each of these products separately. The incumbent should be able to provide evidence on the magnitude of any cost savings in this category.
- **Joint billing**—the incumbent would only need to send one bill for the use of both line rental and broadband. This would reduce the average costs associated with the generation and delivery of bills. However, if the incumbent retained a separate billing system for each service, it is questionable whether joint billing would lead to significant cost savings. This is because it would need to invest in a new system that handles bills for customers who purchase the bundle in addition to the current systems. Efficiency gains may therefore be more relevant to delivery costs than to savings from joint billing. Again, it should be feasible for the incumbent to provide evidence on the magnitude of any cost savings in this category.
- **Customer service**—customers may, for example, use only one hotline if they have technical or more general queries. This would enable the incumbent to combine customer service-related facilities, which may result in some cost savings.
- **Case management**—the incumbent may be able to reduce the costs associated with the management of customers' accounts as a result of bundling.

Unlike wholesale efficiencies, retail cost efficiencies should not be passed on to access prices because, in principle, they can be achieved by any entrant which is as efficient as the incumbent operator. The imputation test developed in section 3 has been designed to reflect this principle.

### 2.2.2 Demand-side efficiencies

In addition to supply-side efficiencies, bundling might generate demand-side efficiencies. Demand-side efficiencies can take the form of:

- a reduction in price inefficiencies;
- a reduction in the heterogeneity of tastes; and
- enhanced valuation.

There is a large body of economic literature on how bundling may be used as a price-discrimination tool to extract more producer surplus.<sup>7</sup> Where consumers have heterogeneous

<sup>7</sup> See, for example, Adams, W.J. and Yellen, J.L. (1976), 'Commodity Bundling and the Burden of Monopoly', *Quarterly Journal of Economics*, **90**, August, 475–98; Schmalensee, R. (1982), 'Commodity Bundling by Single-Product Monopolies', *Journal of Law and Economics*, **25**, April, 67–71; McAfee, B.Y. and Brynjolfsson, E. (2000), 'Bundling Information Goods: Pricing, Profits, and Efficiency', *Management Science*.



tastes for multiple products, a firm may be able to reduce this heterogeneity by bundling products.<sup>8</sup>

Similarly, bundling may allow firms to improve consumers' valuation of products when they offer mixed bundles, making the package worth more to the consumer than the sum of the parts. As a result, the total number of consumers prepared to buy both products would be higher. This would result in an outward shift of the demand curve.

Bundling may also benefit consumers due to the provision of a superior product, which enhances the value to the end-user. The most obvious example is lower transaction costs. In economic theory, transaction costs are commonly referred to as the costs of trading with others above and beyond the price.<sup>9</sup> From a consumer's perspective, transaction costs largely take the form of search costs—namely, the time taken to find the right product or learn how to use it.

In practice, demand-side efficiencies are the result of any output expansion effects (and, hence, increase in economies of scale) that bundling might generate. Such increases in output and revenues may be due to the following.

- **Overall market expansion**—bundling may attract new customers who were previously not purchasing any product on a stand-alone basis. In this case, consumers attach higher value to bundled products than to similar products sold on a stand-alone basis. For example, consumers would not need to have two separate accounts to subscribe to fixed access and broadband services. Alternatively, it could be argued that producers are able to extract larger surplus due to the elimination of price inefficiencies and hence increase total output.<sup>10</sup>
- **Existing customers purchasing additional products**—bundling may also attract existing customers who were previously purchasing only a subset of the products included in the bundle on a standalone basis.

At the same time, the sale of bundles may come at the expense of existing sales. In this context it is useful to distinguish between the impact on rivals' sales (business stealing) and an individual firm's own sales (cannibalisation).

- **Business stealing**—an increase in an individual firm's output may be also driven by business stealing. In this case, the incumbent's output would increase at the expense of its competitors. Clearly, the risk of potential harm to competition is greater when business-stealing effects dominate the market expansion effects described above.
- **Cannibalisation of volumes and revenues**—from an individual firm's perspective, the demand for bundles may come at the expense of demand for its own stand-alone products. If, as is likely to be the case, bundles are priced below the sum of the relevant stand-alone prices, the existence of bundles can be said to 'cannibalise' a proportion of existing stand-alone revenues.

These effects can be illustrated with the aid of Figure 2.3. In the figure, an individual consumer's willingness to pay for broadband and fixed telephony is represented by a point in the graph. The maximum valuation that any consumer has for either product is assumed to be €25. There are two pricing strategies shown: one (on the left-hand side) where there is no bundling and each product is sold at €20; and the second (on the right-hand side) where

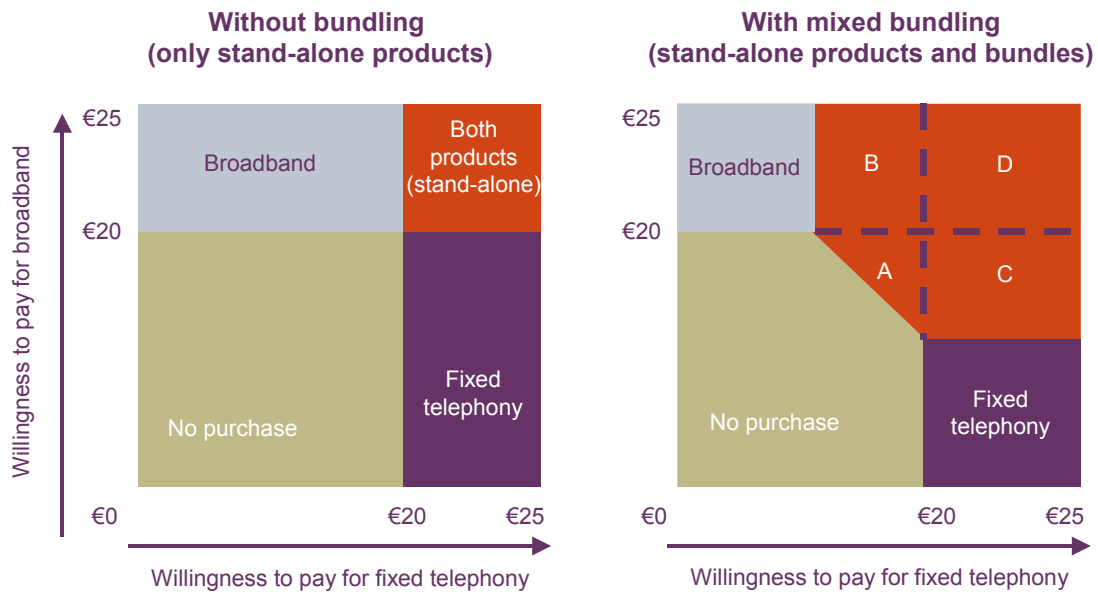
<sup>8</sup> See, for example, Crawford, G.S. (2004), 'Discriminatory Incentives to Bundle in the Cable Television Industry', University of Arizona.

<sup>9</sup> Carlton, D.W. and Perloff, J. M. (2005), *Modern Industrial Organization*, Fourth Edition, Pearson, Addison Wesley, pp. 3–5.

<sup>10</sup> Nalebuff, B. (2003), 'Bundling, Tying, and Portfolio Effects, Part 1—Conceptual Issues', DTI Economics Paper no.1, February, p. 27.

there is mixed bundling and consumers can purchase each product separately for €20 each or both products in a bundle at a discounted price (eg, €30).

**Figure 2.3 Demand-side effects arising from a mixed bundling strategy**



Source: Oxera.

The overall market expansion effect arising from bundling is represented in Figure 2.3 by area A. Before the introduction of the bundle, this group of customers was not purchasing either product on a stand-alone because their willingness to pay for each product was below the retail price of €20. However, their combined valuation for both products is above €30 and they are therefore willing to purchase the bundle of broadband and fixed telephony.

Similarly, areas B and C represent consumers who were previously purchasing only one product on a stand-alone basis and are now purchasing both products on a bundled basis. From an individual firm's perspective, this represents additional revenues of €10 per customer.

Area D, on the other hand, shows the cannibalisation effects that may arise from bundling. These consumers were spending €40 in total when purchasing products on a stand-alone basis, and are now spending €10 less by purchasing them in a bundle.

These different demand-side effects can influence the size of any potential adjustment to the wholesale access price, as will be further discussed in sections 4 and 5. The important question that would have to be addressed is how to account for bundle sales which come at the expense of existing stand-alone sales (ie, cannibalisation and purchase of additional products by existing customers), given that these stand-alone sales are currently inputs for the calculation of existing retail-minus wholesale prices.

## 2.3 Can the bundle be replicated?

From the discussion above it is clear that, if efficiencies at the wholesale level explain the bundled discount, these should feed into the access prices charged for retail-minus inputs. If they do not, access prices would be too high, which could make it difficult (if not impossible) for alternative equally efficient operators to replicate the bundle and compete with the incumbent in the retail markets. Hence, bundling might facilitate vertical leverage of the market power of the incumbent operator from the input market, where it has SMP, into one or

several downstream markets, where it does not have SMP. In addition, bundling may allow the operator to strengthen its position in retail markets where it already has SMP.

In contrast, if retail efficiencies fully explain the bundled discount, no adjustment to the retail-minus formula would be required. Section 3 develops an imputation test intended to establish whether the incumbent's bundles would in effect be replicable by equally efficient entrants.

## **2.4 If the bundle cannot be replicated using retail-minus inputs, should access prices be adjusted?**

In the event of the imputation test not being passed, the question that arises is, should  $A_1$  and  $A_2$  be adjusted?

$A_1$  and  $A_2$  would need to be modified only if an equally efficient entrant is not able to find an alternative (viable) entry strategy. In other words, it would be necessary to assess whether an inability to compete on the basis of supplying the bundle using retail-minus wholesale inputs is affecting competition, or is likely to affect competition during the current regulatory period by, for example, affecting the economic viability of entrants.

In practice, this will come down to an assessment of the relative merits of local-loop unbundling (LLU)-based entry versus wholesale-based entry, and therefore the extent of any true natural monopoly in access. If there were sufficient access via LLU, an inability to replicate the bundle using retail-minus wholesale inputs would not be expected to affect competition. Hence, there would be few grounds for intervention. For LLU to provide an alternative means for replicating the bundle, penetration levels of LLU operators would need to be significantly higher than they currently are in Ireland, and LLU would need to be a successful strategy on a national basis.<sup>11</sup> Nevertheless, this (currently theoretical) alternative is included in this analysis and in Figure 3.1 for completeness.

This indicates that, if the imputation test is not passed,  $A_1$  and  $A_2$  should be adjusted. However, reducing the prices of retail-minus inputs might dampen the incentives that alternative operators have to invest in LLU, which would reduce the possibilities of facilities-based competition. If this were the case, ComReg would have to consider the possibility of not adjusting the prices of retail-minus-regulated inputs. In assessing whether no adjustment would be made, ComReg would need to consider the relative importance of a number of other factors (not related to pricing regulation) that might negatively affect LLU entry, including, for example, the investment hurdles, and the degree of development of next-generation networks. If these barriers to entry are important, relying on LLU entry will not deliver the same degree of effective competition between the incumbent and rivals. Hence, the fact that the bundle is not replicable by entrants would give rise to competition concerns.

## **2.5 If retail-minus access prices need to be adjusted, how much should they be reduced by?**

If ComReg decides to adjust  $A_1$  and  $A_2$ , the question that arises is by how much they should be reduced. In theory, access prices should fall by an amount that should enable an entrant as efficient as the incumbent to enter the retail market, after taking into account the further cost savings to the incumbent in offering the retail bundle. This requires the determination of both the appropriate discount on the wholesale access prices, and a method for allocating these discounts to  $W_1$  and  $W_2$ .

<sup>11</sup> By December 2006, the number of fully unbundled lines represented less than 1% of all access lines. ComReg (2007), 'Market Analysis: Retail Fixed Narrowband Access Markets—Response to Consultation 06/39 and Consultation on Draft Decision', Document No. 07/26, May 4th, 66.

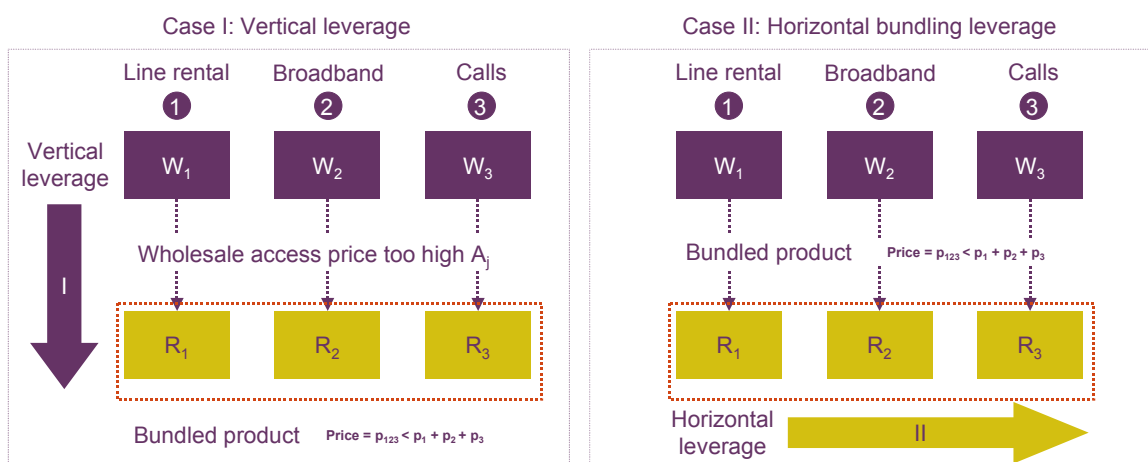
This two-product analysis can be extended to the case in which there is retail bundling of calls (3) with line rental (1) and broadband (2). Since access to  $W_3$  is determined on a cost-plus basis, the link between end retail prices and the access price  $A_3$  is severed. Thus, if calls were bundled with the other two products shown,  $A_3$  would remain fixed, and any reduction in access prices would apply only to  $A_1$  and  $A_2$ .

Section 3 develops an imputation test for determining by how much  $A_1$  and  $A_2$  should fall when products 1 and 2, or 1, 2 and 3 are bundled. Competition concerns may arise if access prices are not set at the correct level.

## 2.6 Competition concerns arising from bundling: a summary

As discussed in the introduction and illustrated by the analysis above, bundling might result in two types of competition concern: vertical leverage and horizontal leverage, as illustrated in Figure 2.4.

**Figure 2.4 Potential competition concerns arising from bundling**



Source: Oxera.

### Case 1: Vertical leverage

If the imputation test is not passed, access prices may be set too high. A concern here may be that the incumbent is using its SMP position in the wholesale access markets to leverage it into the downstream markets (in which it may, or may not, have market power). In this case, there is little difference between this conduct and the more traditional scenario of one product being offered downstream, and the incumbent engaging in a margin squeeze or vertical leverage. Bundling is used by the incumbent as a means to an end to charge a low retail price overall, while not translating this into lower access prices. As a result, efficient entrants in the retail market may not be able to earn a sufficient margin between the access price they need to pay and the lower retail price they would receive to compete with the incumbent (including on a bundle-to-bundle basis). This 'margin squeeze' places entrants at a disadvantage, and could lead to foreclosure of the market, depending on how important other means of access might be (eg, LLU).

### Case 2: Horizontal leverage

Even if the imputation test is passed, there may still be concerns about leverage, but only at the horizontal retail level. The incumbent may be pricing the bundle in order to leverage market power from one retail market (eg, line rental) into another (eg, calls). In this sense, the combined retail price obscures the excessively high pricing of the SMP product (that captive consumers need) and the excessively low price being offered for the product that entrants are keen to offer. For example, the SMP product (line rental) may be offered at a

certain price, with the non-SMP product offered for free. Given that there is mixed (and not pure) bundling, such concerns may be mitigated. However, given the economies of scope, network effects, strong complementarity of product offerings and fast-moving market, there is still the potential for leverage to be a credible strategy by an incumbent, even under mixed bundling.

## 3 Analytical framework for regulatory intervention against bundling

Taking into account the discussion in section 2, a framework that might be used to decide whether to intervene in the markets for wholesale inputs regulated on a retail-minus basis is presented in section 3.1. This section discusses the imputation test that should be used for assessing whether an equally efficient operator would be able to replicate the incumbent's bundle at the prices charged for the wholesale inputs regulated on a retail-minus basis (section 3.2). It also discusses whether and how to make adjustments to the wholesale access prices if necessary (section 3.3 and 3.4) and provides some examples illustrating the proposed methodology (section 3.5).

### 3.1 Decision framework

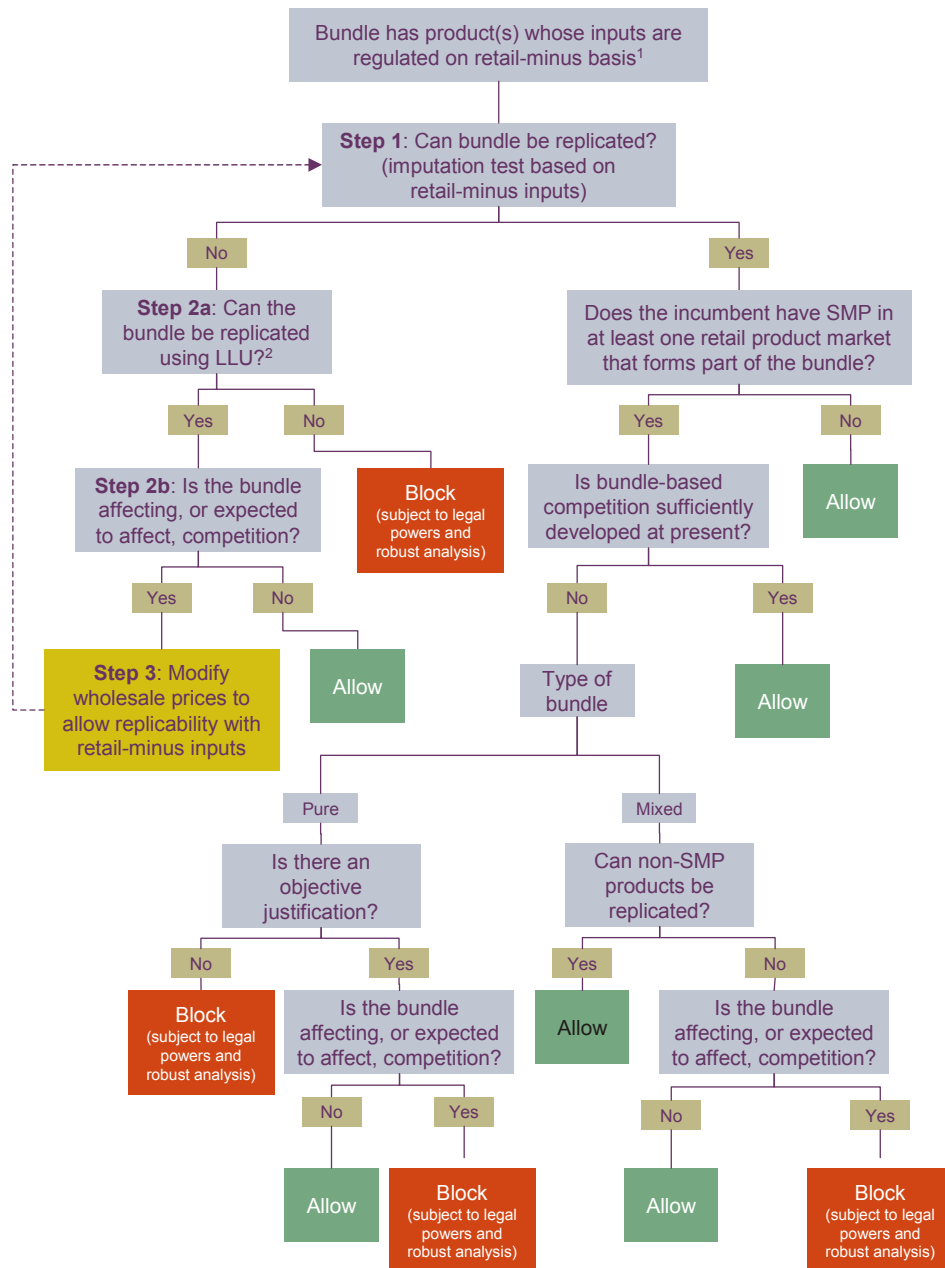
The starting point for the analysis is the launch by an SMP operator of a two-product bundle. One retail product (product 1) uses a wholesale input regulated on a retail-minus basis—eg, fixed narrowband access (SB-WLR) or broadband Internet (WBA). The other product in the bundle uses inputs that are regulated on a cost-plus basis (product 2)—eg, calls.

In addition:

- $P_{12}$  is the retail price of the incumbent for the bundle of products 1 and 2. Hence,  $P_{12} \leq P_1 + P_2 - d_{12}$ , where  $d_{12}$  represents the bundled discount;
- $A_1$  is the input price to provide product 1 (when supplied on an unbundled basis) paid by an entrant. In the case of line rental and retail broadband, it is assumed that their corresponding input prices are regulated on a retail-minus basis (SB-WLR and WBA, respectively);
- $A_2$  is the input price to provide product 2 (when supplied on an unbundled basis) paid by an entrant. The access price is regulated on a cost-plus basis (ie, FL-LRIC);
- $C_{12}$  is the retail cost of providing a bundle with products 1 and 2. This may also include investment in some network elements (eg, Internet gateway) and/or billing systems.  $C_{12}$  would be calculated as the sum of retail costs of products 1 and 2 on an unbundled basis minus the efficiency gains of selling them together in a bundle ( $C_{12} = C_1 + C_2 - e_{12}$ ).

The decision framework is presented in Figure 3.1.

**Figure 3.1 Decision framework to regulate mixed bundles with retail-minus wholesale inputs**



Notes: <sup>1</sup> It is assumed that the bundle has product(s) with inputs that are regulated on a retail-minus and a cost-plus basis. <sup>2</sup> As discussed in section 2.4, the scope for replication of the bundle via LLU is included for theoretical completeness. Given the current rates of LLU penetration in Ireland, this does not, and will not, represent a viable alternative for replicating a bundle in the near future.

Source: Oxera.

The framework follows a three-step approach, where the following questions would need to be answered.

- **Step 1.** Can the bundle be replicated using retail-minus inputs by an entrant which is as efficient as the incumbent? To answer this question, it would be necessary to undertake an imputation test for the bundle in which the following condition must hold:  $P_{12} \geq A_1 + A_2 + C_{12}$ . (See Inequality 1 in section 3.2 below.) Algebraically, with  $P_{12} = P_1 + P_2 - d_{12}$  and retail costs  $C_{12} = C_1 + C_2 - e_{12}$ , it can be shown that this imputation test is equivalent to asking whether  $d_{12} \leq e_{12} + m_2$  (where  $m_2$  is the profit margin earned on product 2—see section 3.2)?

- **Step 2.** If the imputation test is not passed, would it be necessary to adjust  $A_1$ ? This would require asking two further questions to be addressed:
  - a) would an equally efficient entrant be able to find a (viable) alternative entry strategy which does not require using the retail-minus-regulated inputs (eg, using LLU)? If the answer is ‘No’, the launch of the bundle should be blocked, subject to legal powers and robust analysis;
  - b) even if LLU entry is possible (ie, the answer to 2a is ‘Yes’), is it still likely that the non-replicability of the bundle using retail-minus inputs will affect competition in the market?
- **Step 3.** If Inequality 1 does not hold, and it is established that  $A_1$  would need to be adjusted, it would be necessary to establish the size of this adjustment. In particular, the ‘correct access’ price for product 1,  $A_1^*$ , would need to be such that:  $A_1^* \leq P_{12} - A_2 - C_{12}$  (see Inequality 2 in section 3.4). This condition would give an access price that enables the bundle to be replicated by a similarly efficient operator.

The remainder of this section explains each of these steps in more detail.

### 3.2 The imputation test: a static version (Step 1)

To establish whether an equally efficient entrant would be able to replicate the bundle, the following imputation test would need to be developed for the entire bundle:

$$P_{12} \geq A_1 + A_2 + C_{12} \quad \text{Inequality 1}$$

This test implies that the retail price for the bundle ( $P_{12}$ ) should cover the costs incurred by the entrant for accessing the retail-minus inputs for the provision of product 1 ( $A_1$ ) and the cost-plus inputs necessary for the provision of product 2 ( $A_2$ ), plus the retail costs net of any efficiencies resulting from bundling ( $C_{12}$ ).

Algebraically, with  $P_{12} = P_1 + P_2 - d_{12}$  and retail costs  $C_{12} = C_1 + C_2 - e_{12}$ , Inequality 1 can be rearranged as  $d_{12} \leq (P_1 - A_1 - C_1) + (P_2 - A_2 - C_2) + e_{12}$ . Furthermore, because  $A_1 = P_1 - C_1$  (due to retail-minus regulation of this wholesale input), Inequality 1 can be expressed as:

$$d_{12} \leq e_{12} + m_2 \quad \text{Inequality 1a}$$

In other words, the imputation test boils down to a question of whether the discount in the bundle’s price can be fully explained by retail efficiencies ( $e_{12}$ ) and/or the profit margin made in the product whose wholesale input is not regulated on a retail-minus basis ( $m_2$ ). If not, it would be necessary to proceed to Step 2 to assess the need to modify the price of retail-minus wholesale inputs.

### 3.3 Should $A_1$ be adjusted if the imputation test is not passed? (Step 2)

As discussed above, if the imputation test in Inequality 1 is not passed (in Figure 3.1 this corresponds to a ‘No’ answer in Step 1), ComReg would need to consider the possibility of modifying the price of wholesale inputs regulated on a retail-minus basis.

Before doing so, however, in the hypothetical scenario that LLU penetration could become significant in the near future in Ireland, it would be necessary to perform an additional



imputation test on the bundle (Step 2a). For this test it would be assumed that the hypothetical entrant is using LLU inputs instead of retail-minus inputs.<sup>12</sup>

From the incumbent's perspective, this is an easier test to pass if there are significant scope economies at the wholesale level, which are not being picked up under an imputation test that uses retail-minus wholesale inputs. By definition, retail-minus input prices do not use information on the network (wholesale) costs; instead, they rely on setting an appropriate margin for the entrant to recover retail (downstream) costs.

Therefore, if the LLU-based imputation test is not passed, it would mean that the discount in the price of the bundle compared with the sum of unbundled prices cannot be explained by retail and/or wholesale efficiencies. The incumbent may be engaging in predatory pricing with the intention of leveraging its market power from the wholesale market, where it has SMP, to the downstream markets that are (potentially) competitive. ComReg should therefore block the launch of this bundle, subject to legal powers and robust analysis.

On the other hand, if the test is passed using LLU inputs, this would suggest that there is a viable entry strategy for an 'as-efficient' entrant using this route. As discussed in section 2.4, ComReg would then need to establish whether there would be sufficient entry through LLU (Step 2b). If this is the case, even if the bundle cannot be replicated with retail-minus inputs, competition would not be foreclosed. More importantly, if the same market outcomes for consumers could be achieved with LLU entry (in terms of price, quality of services, and innovation), there would be a strong case for the incumbent's bundle to be allowed by ComReg.

If the inability to replicate the bundle using retail-minus inputs is likely to affect market outcomes, the case for ComReg to intervene to modify the price of wholesale inputs regulated on a retail-minus basis is stronger. Such an intervention would allow entrants to replicate the incumbent's bundle offer and alleviate the competition and consumer welfare concern. The remainder of this report focuses on the various forms that this intervention may take.

### 3.4 How can retail-minus wholesale input prices be modified to allow bundle replicability? (Step 3)

If the retail-minus imputation test (Step 1) is not passed, and the LLU imputation test is passed but ComReg has determined that the presence of the incumbent's bundle could distort market outcomes (Step 2), it would be necessary to determine the level of wholesale prices for the regulated products in the bundle that would ensure that the bundle was replicable (this corresponds to Step 3 in the decision tree in Figure 3.1).

As mentioned in section 3.1, where product 1 is the product with wholesale input that is regulated on a retail-minus basis, Inequality 1 can be rearranged to give:

$$A_1^* \leq P_{12} - A_2 - C_{12} \quad \text{Inequality 2}$$

It is important to stress that  $A_1^*$  is a unique value and must always be set such that it satisfies Inequality 2 if the bundle is to be replicated by an equally efficient entrant. Inequality 2 can be further disaggregated into:

$$A_1^* \leq (P_1 - C_1) - (d_{12} - e_{12}) + (P_2 - A_2 - C_2) \quad \text{Inequality 3}$$

or:

<sup>12</sup> Given current levels of penetration of LLU in Ireland, this stage of the test would not be required.

$$A_1^* \leq A_1 - (d_{12} - e_{12}) + m_2 \quad \text{Inequality 4}$$

or:

$$A_1^* \leq A_1 - (d_{12} - e_{12} - m_2) \quad \text{Inequality 5}$$

Equivalently:

$$A_1 - A_1^* \geq d_{12} - e_{12} - m_2 \quad \text{Inequality 6}$$

where  $m_2$  is the profit margin for product 2 (this margin could be zero if the market for product 2 is competitive).

Under Inequality 6, the wholesale input price of product 1 ( $A_1$ ) should be lowered by a proportion  $d_{12} - e_{12} - m_2/d_{12}$  of the discount. In other words, the reduction in the wholesale price should be equal to the wholesale efficiencies, if any (ie,  $d_{12} - e_{12}$ ), minus the profit margin earned by the incumbent on product 2 ( $m_2$ ).

Given that this approach addresses the question of whether an equally efficient entrant would be able to replicate the bundle, it also assumes that entrants would be able to achieve the margins obtained by eircom, controlling for the scale of operation. If this were not the case, and eircom were able to achieve higher margins than entrants (ie,  $m_2^{\text{eircom}} > m_2^{\text{entrant}}$ ), then the reduction in the access price predicted by Inequality 6 would not enable entrants to replicate the bundle. Applying the inequality with entrants' (lower) margins indicates that a greater reduction in the access price would be required to enable replication of the bundle.

### 3.4.1 Economic intuition behind this result

To understand the above result, it is useful to recall how  $A_1$ —the retail-minus wholesale price of product 1 (on an unbundled basis) charged by the incumbent to entrants—is calculated.

By construction, this wholesale charge is capturing not only the 'true' costs of providing wholesale access, but also the margin (over and above competitive levels) that the incumbent enjoys when selling product 1. To see this, notice that  $P_1 - A_1^t - C_1 = m_1$ , where  $A_1^t$  is the true cost of providing the input and  $m_1$  is the 'excess' profits enjoyed by the incumbent. Hence,  $A_1 = P_1 - C_1 = A_1^t + m_1$ .<sup>13</sup>

Therefore, ComReg's concern might be that the reduction in the retail price of the bundle relative to the unbundled prices is a signal that the 'true' costs of  $A_1$  are in fact much lower, and that a reduction in this input price would be warranted. Ideally, this reduction would be equal to  $m_1$ , but the regulator has no way of knowing what  $m_1$  really is since otherwise it would have all the information required to set  $A_1$  equal to its true costs.

In that sense, the discount in the bundle ( $d_{12}$ ) can be seen as an opportunity for the regulator to 'discover' what  $m_1$  really is. The crucial question is therefore how much of this discount should be allocated to product 1?<sup>14</sup>

Inequality 6 provides an answer. In essence, it implies that a proportion  $(d_{12} - e_{12} - m_2)/d_{12}$  of the discount should be allocated to product 1. The numerator represents all (or part) of the unobserved margin ( $m_1$ ) that a regulator would arguably like to see competed away. It is worth noting, however, that a regulator might not want to reduce  $A_1$  for the full amount  $m_1$ . This is because this could distort incentives for entrants considering seeking access through alternative means (eg, by purchasing LLU), which may be more efficient or pro-competitive than wholesale entry.

<sup>13</sup> Therefore, to the extent that  $P_1$  is not set at its competitive level,  $A_1$  will be biased upwards by an amount equal to the profit margin  $m_1$ .

<sup>14</sup> This is equivalent to answering the question: what is the implicit price of product 1 in the bundle?

For completeness:

- a proportion  $m_2/d_{12}$  should be recoverable by retailing product 2 as part of the bundle (and therefore no adjustment to access prices is required). Anything below this would be signalling a margin squeeze/predation in product 2; and
- a proportion  $e_{12}/d_{12}$  should not be allocated to any product (since this corresponds to the retail efficiencies which could be replicated by an as-efficient entrant).

### 3.4.2 Extension to the case of a triple-play bundle of access (line rental), broadband and calls

Assuming that the retail-minus imputation test has not been passed, and the regulator has decided that it is necessary to modify the retail-minus inputs to make the bundle replicable by an as-efficient entrant, the imputation test can be rearranged in a similar way as above:

$$(A_a + A_b)^* \leq A_a + A_b - (d_{abc} - e_{abc} - m_c) \quad \text{Inequality 7}$$

where  $a$  refers to access,  $b$  refers to broadband and  $c$  refers to calls.

As above, the implicit allocation of the bundle's retail discount in Inequality 6 is as follows:

- a proportion  $m_c/d_{abc}$  is allocated to calls;
- a proportion  $e_{abc}/d_{abc}$  is not allocated to any product;
- the remainder (a proportion  $(d_{abc} - e_{abc} - m_c)/d_{abc}$ ) is allocated to access *and* broadband.

In this case, a further reallocation of the discount to access and broadband, respectively, would be required. If  $m_a$  and  $m_b$  are known, the discount could be allocated in proportion to these profit margins. Since these margins are unknown, it is necessary to use proxies.

- **Option 1**—assume that these margins are proportional to elasticities of demand (the Ramsey approach). This option is difficult to implement in practice.
- **Option 2**—assume that these margins are proportional to the retail-minus access prices. This would be similar to an **equi-proportional mark-up** approach—ie, a proportion  $A_a/(A_a + A_b)$  would go to access and a proportion  $A_b/(A_a + A_b)$  would go to broadband. This option is easier to implement and, since  $A_a$  and  $A_b$  contain information on these margins, it is arguably a good proxy (recall  $A_1 = A_1^t + m_1$ , see section 3.4.1).

### 3.4.3 An example

It is useful to illustrate how the framework set out above would work with a hypothetical example of a triple-play bundle of line rental, broadband and calls sold at €55.

Suppose that eircom's retail prices for access, broadband and calls when sold separately are flat rates of €25, €25 and €10, respectively, which gives a total of €60. If the bundle is assumed to be sold at €55, it would be priced at a discount of €5 relative to the sum of unbundled prices (ie,  $d_{abc} = €5$ ).

Suppose further that the wholesale input cost is €20 for access (SB-WLR), €20 for broadband (WBA). The retail cost is therefore €2.5 for access and €7.5 for broadband.<sup>15</sup>

In addition, it would be necessary to estimate the wholesale costs (origination, transit and termination), the retail costs of providing this package of calls and the profit margin. Table 3.1 shows three scenarios for the profit margin (30%, 40% and 50% for scenarios 1, 2 and 3 respectively). In all three scenarios retail costs are assumed to be 20% of the retail price

<sup>15</sup> This implies a minus factor of 10% in the case of SB-WLR and 30% in the case of WBA—ie, retail costs are 2.5 for access and 7.5 for broadband.

(€2). Wholesale input costs are estimated as the difference between the call package price and the sum of retail costs and the profit margin.

The final element required to apply the framework described above would be the value of the retail efficiency that eircom is able to achieve from the sale of the bundle. In this numerical example, it is assumed to be €0 per customer (ie,  $e_{abc} = €0$ ).

**Table 3.1 Numerical example**

	Line rental (a)	Broadband (b)	Calls (c)		
			Scenario 1 (30%)	Scenario 2 (40%)	Scenario 3 (50%)
Retail prices (P)	25.00	25.00	10.00	10.00	10.00
Retail cost (C)	2.50	7.50	2.00	2.00	2.00
Wholesale input cost (A) for stand-alone products	22.50	17.50	5.00	4.00	3.00
Profit margin on calls			3.00	4.00	5.00

Source: Oxera.

**Step 1** of the framework requires an assessment of whether this bundle passes an imputation test. For scenario 1, the test would be:

$$P_{abc} \geq (A_a + A_b + A_c) + (C_a + C_b + C_c - e_{abc})$$

$$55.00 \geq (22.50 + 17.50 + 5.00) + (2.50 + 7.50 + 2.00 - 0.00)$$

$$55.00 \geq 57.00$$

As noted above, this imputation test can also be expressed as in Inequality 1a as follows.

$$d_{abc} \leq e_{abc} + m_c$$

$$5.00 \leq 0.00 + 3.00$$

$$5.00 \leq 3.00$$

These two ways of undertaking the test are equivalent.<sup>16</sup> The advantage of using the latter form of the test (Inequality 1a) is that it focuses the analysis on  $d_{abc}$ ,  $e_{abc}$  and  $m_c$ , which are critical factors for the adjustment of retail-minus wholesale inputs if the test is not passed, as in this example.

Since the imputation test is not passed, the retail-minus wholesale input prices need to be modified (this assumes that Steps 2a and 2b of the framework have been assessed). **Step 3** requires the following inequality to be used to determine by how much input prices need to be modified:

$$(A_a + A_b)^* \leq A_a + A_b - (d_{abc} - e_{abc} - m_c)$$

$$= A_a + A_b - (5.00 - 0.00 - 3.00)$$

$$= A_a + A_b - 2.00$$

In other words, the retail discount of €5.00 has been allocated as follows:

<sup>16</sup> This can be checked by noting that the difference between the left- and right-hand sides of the inequalities is the same (and equal to 2 in this example).

- €2.00 to calls, which corresponds to the profit margin made in the calls market (see Table 3.1);
- €0.00 remains unallocated since this corresponds to the retail efficiency arising from selling bundles (which an as-efficient competitor could also achieve);
- the remaining €2.00 is allocated to line rental and broadband wholesale prices.

Furthermore, the €2.00 would be allocated between line rental and broadband in relation to the existing retail-minus wholesale prices,  $A_a$  and  $A_b$ . This implies that €1.13<sup>17</sup> should be allocated to  $A_a$ , and €0.88<sup>18</sup> should be allocated to  $A_b$ . This would reduce the wholesale price for line rental to €21.38, and the wholesale price for broadband to €16.63. As such, the imputation test is now passed as:

$$P_{abc} \geq (A_a + A_b + A_c) + (C_a + C_b + C_c - e_{abc})$$

$$55.00 \geq (21.38 + 16.63 + 5.00) + (2.50 + 7.50 + 2.00 - 0.00)$$

$$55.00 \geq 55.00$$

A similar exercise would need to be undertaken under scenario 2, although the size of the adjustment of retail-minus wholesale prices would be smaller (€1.00 in total, compared with €2.00 under scenario 1). Under scenario 3, however, no adjustment to the retail-minus wholesale prices would be necessary given that the imputation test for the bundle would be passed.

<sup>17</sup>  $1.00 * (A_a / (A_a + A_b)) = 0.56$ .

<sup>18</sup>  $1.00 * (A_b / (A_a + A_b)) = 0.44$ .

## 4 Extension of the test to a DCF framework

The discussion above focuses on an imputation test that is applied at one point in time. However, a single-year analysis may be inappropriate. In the case of a new bundle, if a margin squeeze analysis is performed for the year the package is introduced into the market, it is likely that the test will not be passed since the (retail) costs (including marketing and advertising, and sales costs) are likely to be abnormally high. Under these circumstances, a dynamic approach that conducts the analysis over a number of years can provide a more accurate measure of the relevant revenues and costs, and, therefore, of the likelihood that a bundle offer might lead to margin squeeze.

ComReg has previously adopted a forward-looking approach, such as discounted cash flow (DCF) when assessing the margins of an equally efficient operator. The DCF analysis calculates the costs and revenues incurred by the relevant entity (eg, the incumbent) in each year of a reference time period. These costs and revenues are then discounted back to the start date to obtain a net present value (NPV) for the project. If the NPV calculation is zero or positive, costs have been covered over the timeframe of analysis.

The DCF method has been used for regulatory purposes by a number of national regulatory authorities. For instance, in D01/06, ComReg proposed using a DCF methodology to determine whether the prices charged by eircom for WBA would squeeze the margins of similarly efficient operators.<sup>19</sup> This methodology has also been used by the Spanish Comisión del Mercado de las Telecomunicaciones (CMT) in the same market.

The DCF method exhibits some positive features in the case of an ex ante evaluation of margin squeeze. In new and developing markets, historical data might be a poor reflection of what might happen in the future. As ComReg notes, if such data is used, it might:

suggest that the ex ante retail-minus test would require that the vertically integrated firm's downstream unit cost is less than or equal to the retail price minus the wholesale price. This margin could be large and may overstate current and future downstream costs and as a result would impose an unfair burden on the regulated firm. Alternatively, by using the costs of the regulated firm the value of the vertically integrated firm's downstream unit cost may be low (as this firm may already enjoy substantial economies of scale due to first mover advantages). In this case the margin could be too small and would impose an unfair burden on entrants.<sup>20</sup>

In addition, a forward-looking approach allows the impact that learning effects and economies of scale might have on the net revenues received by an operator to be incorporated into the analysis. Again, these effects might be significant for new, high-growth products.

### 4.1 A DCF imputation test

This section extends the analytical framework developed in section 3 to a DCF framework. The first step in the analytical framework—the imputation test for the bundle (Inequality 1) can now be expressed as follows:

<sup>19</sup> ComReg (2006), 'Retail Minus Wholesale Price Control for the WBA Market', January 13th, p. 10.

<sup>20</sup> ComReg (2007), 'Response to Consultation and Draft Direction on Retail-minus Wholesale Price Control for the WBA Market', p. 11.

$$\sum_{t=1}^T \frac{(P_{12t} \cdot Q_{12t})}{(1+r)^t} \geq \sum_{t=1}^T \frac{(A_{1t} \cdot Q_{12t})}{(1+r)^t} + \sum_{t=1}^T \frac{(A_{2t} \cdot Q_{12t})}{(1+r)^t} + \sum_{t=1}^T \frac{C_{12t} \cdot Q_{12t}}{(1+r)^t} + F_b \quad \text{Inequality 8}$$

where:

- $P_{12t}$  is the retail price of a bundle of products 1 and 2 in period  $t$ ;
- $Q_{12t}$  is the demand for the bundle in period  $t$ ;
- $A_{1t}$  is the wholesale input price paid by the entrant to provide product 1 in period  $t$ . In the case of line rental and broadband, this input price is assumed to be regulated as a retail-minus price;
- $A_{2t}$  is the wholesale input price paid by the entrant to provide product 2 in period  $t$ . This may be a cost-orientated regulated input (eg, in the case of calls) or an unregulated input price;
- $C_{12t}$  is the retail variable cost of selling the bundle in period  $t$ . As explained previously,  $C_{12t}$  can be expressed as the sum of the variable cost of selling products 1 and 2 separately, minus an efficiency gain  $e_{12t}$  from selling them together in a bundle;
- $F_b$  is the NPV of the fixed costs that need to be incurred to provide the bundle. This may include the costs of reconfiguring the billing system, and marketing and advertising expenditure, among other cost categories; and
- $r$  is the discount rate (weighted average cost of capital).

When the DCF imputation test is not passed, requiring a modification of the retail-minus input price, this adjusted input price can be expressed as:

$$\sum_{t=1}^T \frac{(A_{1t}^* \cdot Q_{12t})}{(1+r)^t} \leq \sum_{t=1}^T \frac{(A_{1t} \cdot Q_{12t})}{(1+r)^t} - \sum_{t=1}^T \frac{(d_{12} - e_{12} - m_{12}) Q_{12t}}{(1+r)^t} - F_b \quad \text{Inequality 9}$$

This result is equivalent to that obtained in section 3, with the exception that Inequality 8 accounts for the possibility that there may be fixed costs when launching the bundle.

## 4.2 Practical issues arising from the implementation of a DCF approach

For simplicity, Inequalities 8 and 9 assume that there is a single retail cost category and that the variable cost efficiency of selling the products in a bundle can easily be identified. In practice, however, there are multiple retail cost categories and identifying the cost savings from selling the bundle is not as straightforward.

The burden of proof would fall on the incumbent operator to provide information of where retail cost savings arise when providing the bundle. These would have to be closely monitored by ComReg to ensure that they are reasonable and consistent with the incumbent operator's prior submissions.

## 5 Additional policy issues

If ComReg needed to modify  $A_1$  every time eircom launched a bundle containing product 1, this would mean that, in addition to the  $A_1$  on an unbundled basis, entrants would face 'n' wholesale prices for each of the 'n' retail bundles that eircom has launched that include product 1.

One possible solution is to set a single wholesale input price equal to the lowest value obtained when performing the imputation tests described above. This would allow for replicability of the bundle (and of course the unbundled product); however, the implications of this approach for efficiency would need to be considered—eg, efficient entry via LLU, investment incentives for the incumbent, and protecting consumers versus protecting competitors.

### 5.1 Weighted average access price or minimum revealed price

If the methodology described above leads to the conclusion that there is scope for revising the wholesale access prices of the inputs required for the bundle, a further issue arises. This is whether to charge a single access price that is some form of blended rate between the stand-alone access price and the discounted bundled access price, or to charge one access price for the product sold in a bundle and one access price for the product sold on a stand-alone basis.

Assuming for the moment that there is just one bundle, and that the products are also sold separately, the options available to the regulator are as follows.

**Option 1** This would involve setting different wholesale prices depending on whether an entrant is selling products on a stand-alone basis or in bundles.

However, given the non-discrimination obligation on eircom, it would not be possible to apply this option in practice.

**Option 2** This would involve estimating a blended rate based on the weights of stand-alone versus bundled sales. This option can be implemented in two ways. Option 2a would use the product mix sold by the incumbent, while Option 2b would use the product mix of the market as a whole.

**Option 3** This would involve using the lowest of the access prices that are revealed through the imputation test.

Furthermore, it should be noted that, in reality, there are likely to be a number of bundles offered by the incumbent, which could lead to a proliferation of access rates if different access rates are calculated from each different bundle. Charging different rates according to each bundle (Option 1) would not only breach the non-discrimination obligations, but would soon become a complicated approach, which could be avoided by adopting Option 2 or 3.

If Option 2(a) were pursued, and a weighted average price were charged, taking account of the proportions of bundles and stand-alone products sold by the incumbent, this could constrain the ability of entrants to compete on a bundles-only basis, as their input costs would be higher than the incumbent's costs on an equivalent basis.

An alternative approach, and one that would be less subject to potential manipulation by an incumbent operator, would be to charge a blended (ie, a weighted average) rate, depending



on the mix of bundles and stand-alone products sold in the market as a whole (**Option 2b**). However, the downside to this approach would be the potential complexity in establishing the appropriate weights to adopt. Moreover, the weights in the market as a whole when the bundle has recently been launched by the incumbent would be precisely those of the incumbent and Option 2b would be equivalent to Option 2a.

An approach that would be less information-intensive, but which would reflect a tougher regulatory stance, would be Option 3, according to which ComReg would ensure that the incumbent charges a single access price, set at the level of the lowest price revealed through the imputation test. This would be justified as a result of the bundled pricing revealing greater information about the true wholesale costs.

In this context, the regulation of these wholesale inputs represents one means of providing competing services. An alternative, as noted in the decision framework above, is to engage in facilities-based competition by investing in LLU. Clearly an operator's decision about which strategy to pursue would depend not only on the costs and revenues that could be earned through LLU, but also on the profits to be earned through non-facilities-based means of competing, such as the purchase of SB-WLR and the relevant bitstream products required for supplying broadband services.

In determining the appropriate policy, ComReg would have to reach a judgement on the risks for facilities-based competition resulting from the regulatory stance taken on the adjustments to the access prices that would result from the imputation tests described in this report. This may lead ComReg to avoid pursuing Option 3 in its pure form.

## 5.2 Practical implications of the demand-side effects of bundling

In section 2.2, the demand-side effects of bundling were discussed, and it was noted that the presence of retail bundles could have three main effects.

- **An overall market expansion effect arising from the sale of bundles to new customers who were not previously purchasing any product**—this would lead to an increase in revenues for the total value of the retail price of the bundle.
- **Existing customers purchasing additional products**—this would lead to an increase in revenues equal to the total value of the price of the bundle net of the price of the product that was previously purchased on a stand-alone basis.
- **Cannibalisation of revenues due to customers switching from purchasing stand-alone products to the same products in a bundle at a lower price**—this would lead to a net decrease in revenues equal to the difference between the sum of stand-alone prices and the retail price of the bundle.

By estimating the price (and revenues) for the bundle without making an adjustment for the possibility that demand is coming from existing customers, the imputation test described in section 3, and the extension to a DCF framework developed in section 4, implicitly assume that the bundle's demand is driven entirely by a market expansion effect. In practice, however, a relatively large proportion of the bundle's demand is likely to come from existing customers migrating from stand-alone purchases.

However, there would appear to be no need to make adjustments because the imputation tests described in this report are concerned with whether the bundle can be replicated by an entrant which is as efficient as the incumbent. Whether demand for the bundle is entirely driven by market expansion effects or cannibalisation is therefore not directly relevant to the imputation test.

The source of the demand for the bundle is particularly relevant when assessing the level at which the new adjusted access price should be set, particularly in relation to Option 2. Under this option, the access price would be set as a blended rate between the stand-alone retail-minus access price and the access price revealed by the bundle imputation test.

In the previous section it was assumed that the stand-alone access price used to estimate the blended rate remained unchanged with the presence of the bundle. However, if the bundle's demand is largely driven by existing customers who were previously purchasing stand-alone products, this could have an impact on the retail-minus model used to estimate the stand-alone access price.

In particular, revenues for stand-alone products would fall, leading to a reduction in the stand-alone retail-minus access price.<sup>21</sup> The blended rate would also have to fall to reflect this adjustment. However, to the extent that overall demand for bundles remains low compared with the size of the market and/or the proportion of the bundle's demand explained by pure cannibalisation is also small, then the required adjustment to the stand-alone access price for the purposes of implementing Option 2 would be limited.

<sup>21</sup> Recall that under a DCF framework, if revenues fall, this would directly feed in as a reduction in the retail-minus access price

## 6 Conclusions

In this report, a methodology has been developed that enables ComReg, when regulating wholesale prices set on a retail-minus basis, to make appropriate adjustments to these wholesale prices that reflect bundled discounts at the retail level.

The methodology developed ensures that bundles offered by an incumbent operator with SMP at the wholesale level can be replicated by competitors, and that the incumbent will not be penalised for bundling retail products in a way that achieves retail efficiencies. The methodology should therefore ensure that competition is not distorted as a result of anti-competitive bundling by the incumbent.

There are a number of policy issues that a regulator such as ComReg would need to consider prior to implementing the approach set out in this report. The first is whether to charge a different access price for each bundle sold, or to charge a single rate. Given the non-discrimination obligation faced by eircom, the latter option would seem preferable.

This leads to a second policy issue. If a single access price is to be charged, at what level should this price be set? One option would be to set the access price as a blended rate (Option 2). The main challenge with this approach would be that ascertaining the appropriate weights to use in calculating the blend could also represent a complex and data-intensive task—particularly if weights are based on the selling practices of all suppliers in the market and not just the incumbent operator.

A more stringent regulatory stance in relation to the access prices for bundled products would be to set the access price at the level of the lowest revealed price through the imputation tests (Option 3). This approach would be justified if ComReg can be sufficiently confident that the bundle's price reveals more information about the true wholesale costs of the incumbent. Moreover, under this approach, ComReg may also need to consider the potential effects on the promotion of facilities-based competition, particularly in relation to the incentives for alternative operators to invest in LLU. For LLU to provide an effective alternative for operators seeking to replicate a bundle, LLU penetration would need to be significantly greater than it is at present, and it would need to be successful on a national scale.

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