Principles of implementation and best practice regarding FL-LRIC cost modelling

as decided by the Independent Regulators Group

24 November 2000

National Regulatory Authorities (NRAs) implement the regulatory framework laid down in EU and national law. These principles of implementation and best practice (PIBs) have been devised by the IRG to assist in the process of harmonising implementation in IRG member states. The NRAs are committed to implement these principles wherever possible.

The Independent Regulators Group (hereafter: IRG) acknowledges the importance of co-operation between national regulatory authorities (hereafter: NRAs) in order to secure consistency in the application of European Commission Recommendations. The importance of co-operation between NRAs is confirmed by the European Commission in its recent proposals for Directives to come to a new regulatory framework for the communications sector.

In its Recommendation 98/195/EC of 8 January 1998 on interconnection in a liberalised telecommunications market (Part 1 – interconnection pricing), the European Commission has recommended the use of long run average incremental costs for the assessment of cost oriented interconnection tariffs for terminating access. This recommendation of the Commission has been confirmed in the recent study undertaken on behalf of the Commission on the adaptable bottom-up FL-LRIC costing model, as well as in the Review (Consideration 14 of the proposal for a Directive of the European Parliament and of the Council on access to, and interconnection of, electronic communications networks and associated facilities, COM(2000)384) [1].

Therefore IRG has considered the following regarding FL-LRIC cost modelling for the assessment of cost oriented interconnection tariffs:

a) IRG endorses the view of the European Commission that the FL-LRIC approach to cost allocation is the one that will lead to results that best reflect interconnection tariffs that would occur in a competitive environment;

[1] 'FL-LRIC' stands for Forward Looking Long Run Incremental Costs and is as a costing methodology generally applicable to cost allocation issues, and could therefore in principle also be applied in order to assess cost oriented tariffs for e.g. unbundled local loops or the cost of the universal service. This is without prejudice to the European Commission view with regard to the pricing of various types of interconnection services that different pricing rules may be applied (The 1999 Communications Review, COM(1999)539, p. 38 and 45).

b) IRG recognises that most IRG-members are in the process of introducing FL-LRIC, or have already done so. It is the opinion of IRG that this factual harmonisation in the system of cost allocation should imply that there is also a certain common understanding on the way FL-LRIC is defined;

c) With these principles of implementation and best practice IRG would like to provide a follow up on the work already initiated by the European Commission in developing the adaptable bottom up FL-LRIC costing model;

d) IRG recognises that IRG-members may or may not decide to migrate to a FL-LRIC-based approach to cost allocation, and that under certain circumstances and due to country specific aspects the choice for another cost allocation approach could be justified;

e) IRG recognises that the FL-LRIC approach to cost modelling is possibly open to interpretation. Developing a common understanding of principles of implementation and best practice underlying FL-LRIC cost modelling will benefit the effective introduction of this costing methodology and will create the preconditions for market parties to be able to base their European investment decisions on interconnection tariffs based on comparable cost allocation principles;

f) IRG also recognises that the actual implementation of the FL-LRIC approach to cost modelling is not uniform across Member States. A way in which NRAs are introducing or have already introduced FL-LRIC based pricing is that the 'top down' FL-LRIC costing model of their SMP-operator (in which the costing figures of the SMP are the starting point of costing activities) is evaluated using a 'bottom up' FL-LRIC model developed by the NRA. Another way is for NRAs to base the interconnection tariffs on a bottom up FL-LRIC model (in which the costs of a hypothetical efficient operator are modelled using an economic/technical costing model), developed by the NRA together with market parties. IRG is of the opinion that the fact that the actual implementation of FL-LRIC is not uniform does not rule out the possibility nor the desirability of a common understanding of principles of implementation and best practice underlying FL-LRIC cost modelling;

g) IRG recognises that generally speaking principles underlying FL-LRIC can only to a certain extent be considered to have the same modelling implications in a top down and a bottom up environment. Nevertheless, IRG assumes that the present principles of implementation and best practice are to a large degree equally applicable in both environments;

h) IRG presumes the principles of implementation and best practice on FL-LRIC principles to be valid for electronic communications networks in general (mobile as well as fixed networks, access networks as well as conveyance networks);

i) IRG considers the present principles of implementation and best practice as the results of a first effort and intends to continue the co-operation between NRAs on this subject;

j) IRG intends to review the present principles of implementation and best practice after a period of one year from now.

Bearing in mind these considerations, IRG has adopted the following principles of implementation and best practice regarding FL-LRIC cost modelling. Besides this, it should be noted that IRG has also defined principles of implementation and best practice in the field of the unbundling of the local loop.

1. Network topology

Considerations

One of the key decisions to be made in FL-LRIC cost modelling is related to the question whether to adopt a 'scorched node' or a 'scorched earth' approach. In a top down modelling environment this is a decision between whether or not to allow the incumbent to base its costs on the existing network topology (scorched node) or on a ideal network topology that would meet the demands of a fully efficient operator (scorched earth). In a bottom up modelling environment this is a decision between whether or not the bottom up model should take into account the existing network topology (scorched node), or that the costs in the model should be based on a ideal topology (scorched earth).

IRG acknowledges that designing and agreeing an optimal network topology is not a straightforward and uncontentious task. Also because of reasons of feasibility, IRG considers it appropriate and reasonable to adhere to a bounded rationality approach, and thus to take the existing network topology as the starting point for the cost allocation process. Such a scorched node approach would imply that the technology at and in between existing switching nodes is optimised to meet the demands of a forward-looking efficient operator (e.g. this could mean the replacement of an analogue tandem switch by a digital tandem switch and possibly also the replacement of a host switch by a remote concentrator).

IRG also considers that it is appropriate and reasonable to modify the scorched node approach in order to replicate a more efficient network topology than is currently in place. Such a modified scorched node approach could imply taking the existing topology as starting point, followed by an elimination of inefficiencies (e.g. this may involve attempting to simplify the switching hierarchy).

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I.	IRG considers the implementation of a modified scorched node approach to be a principle of implementation and best practice.

2. Relevant increment

Considerations

LRIC cost modelling includes only those costs that are caused by the provision of a defined increment of output (or, alternatively, those costs that are saved when the defined increment of output is no longer provided). This implies that in LRIC cost modelling a decision has to be taken concerning this relevant increment. In principle, there are an infinite number of different sized increments that could be measured, which can be grouped into an individual or collection of products, services, components or elements.

IRG considers it important that increments are defined in such a way that the resulting incremental cost data is fit for purpose, i.e. that the outputs can be used to demonstrate that charges are cost orientated. An example, in the case of regulated incumbent telecommunications companies, is that one may want to treat 'access' and 'conveyance' as two separate increments since for access the costs are driven by the number of physical lines and for conveyance the costs are largely driven by traffic.

However, defining only two increments – 'access' and 'conveyance' – could result in a high aggregation level of cost data that may not provide the information necessary to demonstrate cost orientation. Therefore it may be necessary to derive subsets of the main increments to enable LRIC data to be calculated at a lower level (such as the core components of the network). However, there are practical and methodological limitations to defining increments at a too narrow or too detailed a level. Generally, the smaller the increments being considered, the more detailed and resource intensive the cost modelling has to be.

In LRIC-modelling, cost drivers can be used to identify cost volume relationships (CVRs). A cost driver is the factor or event that causes a cost to be incurred, while a CVR describes how costs change as the volume of the cost driver changes. The aim of identifying a CVR is to be able to demonstrate how costs change as the volume of the cost driver is altered.

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II.	Incremental costs are the costs caused by the provision of the defined increment of output given that some level of output (i.e. for different increments) is already being produced. Increments can be defined in a number of ways but would typically be an individual or collection of products, services, components or elements over which all outputs are measured;
III.	A possible concept in calculating incremental costs is the cost volume relationship (CVR). A CVR describes how costs change in relation to the volume of the cost driver. A cost driver is a factor or event that causes a cost to be incurred;
IV.	When defining the increments relevant for regulatory purposes IRG considers it advisable to take, inter alia, the following factors into account: *1. What purpose will the LRIC information be used for?* For example: it is important that LRIC data can be appropriately disaggregated to a product or service level if the purpose is to demonstrate that prices are cost orientated; *2. What are the key external or independent cost drivers?* Identifying these main cost drivers will assist the process of defining increments. In the context of telecommunication networks these could be the costs driven by, say, the number of lines or volume of calls or geographic network coverage; *3. What are the modelling constraints?* LRIC models can be large and complex requiring significant expertise and computing resources to operate effectively. Generally as the number of increments increases the modelling and calculation of LRIC data will become more complex as well as create a more complicated set of common costs.
V.	IRG intends to continue the further development and elaboration of a common understanding on the definition and instrumentation of the relevant increment.

3. Common costs

Considerations

The term 'common costs' is used to describe the costs that are incurred in the supply of all or a group of products or services provided by the company and that are not incremental to any one product or service.

Depending on the approach used, LRIC cost modelling as such may not include common costs. Nevertheless, it is fairly standard practice to mark-up LRIC by an amount considered appropriate to cover a reasonable proportion of common costs. There are various methods of recovering common costs across a range of services. From an economic point of view distortion is minimised by recovery of common costs according to Ramsey Pricing. This recovers common costs from the products based on the products' relative marginal cost of production and price elasticities. However, this method of recovering common costs requires robust and detailed information on elasticities, which is often hard to find. The alternative is to recover common costs according to an accounting rule. For example, if the common input were used to produce two separate, regulated services, one simple rule would be to split the common cost equally between the two services. Another example would be to recover common costs in proportion to the incremental cost of the two services. This method of allocating costs is known as equal proportionate mark-up (EPMU).

An initial prima facie test that a FL-LRIC based price is cost orientated, is that it lies between the incremental (LRIC) floor and stand-alone ceiling (SAC) costs[2]. A price below the LRIC floor would mean that not even all incremental costs would be recovered (with no contribution to common costs); a price above SAC would mean that an amount in excess of the LRIC plus all of the relevant common costs would be recovered.

In the situation in which the price of more than one product, service, component or element is based on FL-LRIC including a mark up for common costs, this first test alone is not sufficient to demonstrate cost-orientation. For example, if all prices were set at SAC, no individual service would be deemed to be priced excessively under the first test, but taken together the services would be priced excessively since revenues are more than sufficient to recover all incremental and common costs. Therefore a further test might be considered necessary. This is the combinatorial test, whereby the aggregate revenue of services straddling the common costs is compared to the LRIC and SAC of these services measured as a single increment. Potentially, a large number of combinatorial tests may need to be carried out.

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VI.	The term 'common costs' describes those costs that are incurred in the provision of two or more increments and are not incremental to any one product or service;
VII.	A NRA will need to take account of the appropriate recovery of a reasonable proportion of common costs when using LRIC information for regulatory purposes;
VIII.	In the situation in which the price of more than one product, service, component or element is based on FL-LRIC including a mark up for common costs the use of combinatorial tests might be considered necessary.

[2] The SAC of an increment is the cost incurred in providing that increment by itself, on the basis that no other increments are provided. The difference between the LRIC and SAC of an increment is the common costs associated with the production of the increment under consideration and of any other increments.

4. Long Run and Forward Looking

Considerations

Use of LRIC requires a long run view of costs, meaning that the costing methodology should take all costs as being variable. In other words: the 'long run' is defined as the time horizon within which the operator can undertake capital investment or divestment to increase or decrease the capacity of its existing productive assets. Thus a very long time horizon is observed in which all costs, including investment capital and all costs related to network capacity, are potentially variable with no fixed element.

In applying LRIC cost modelling forward-looking costs are the appropriate cost base. Where the regulatory objective is to mimic the workings of a competitive market these forward looking costs should reflect resource costs. In a competitive environment operators may not be able to set the price for every product in order to fully recover its incurred or historic cost, since they have to respond to market prices, which can often lie well below historic costs. They cannot therefore work according to historic cost since reversing investments is, for the main part, either not possible or only possible at a loss. An operator should therefore only be able to recover costs necessary for maintaining future real-asset values in a competitive market. This implies that the basis for asset valuation is the replacement cost of an asset as derived from the application of current cost accounting (CCA) methodologies.

In practice, the concept of forward-looking costs requires that assets are valued using the cost of replacement with the modern equivalent asset (MEA). The MEA is the lowest cost asset, providing at least equivalent functionality and output as the asset being valued. The MEA will generally incorporate the latest available and proven technology, and will therefore be the asset that a new entrant might be expected to employ.

It will also be necessary, particularly with top down LRIC models, to assess what costs are relevant for and appropriate to deriving LRIC data. There may be costs currently incurred that are inconsistent with a forward looking long run view of the business and which should be excluded or adjusted in the modelled cost base. An example may be restructuring costs that arise from past decisions contradictory to best management practice.

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IX.	IRG assumes the 'long run' to be defined as the time horizon over which all costs (including all capital investment) are variable. This allows all costs, even if only in the very long term, to adjust to the change in output;
X.	IRG assumes that the forward looking principle implies the use of current cost accounting (CCA) methodologies to derive the appropriate level of input costs including asset values;
XI.	IRG assumes that, in using CCA, assets are stated at their value to the business, usually equivalent to the net replacement cost. This is generally derived from the asset's gross replacement cost and is the current purchase price of an identical asset or the cost of a modern equivalent asset (MEA) with the same service potential;
XII.	The MEA valuation of an asset should be adjusted to take account of differences in operating costs, asset lives, output and functionality between the MEA asset and the existing asset;

XIII.	IRG acknowledges that, in addition to the potential cost base adjustments under CCA methodologies, it may be necessary to exclude or adjust other operating costs that are not relevant for regulatory purposes.

5. Asset valuation: Capital maintenance

Considerations

Assuming the CCA approach for asset valuation, the issue of capital maintenance becomes important. For example: The experience of decreasing prices of assets necessary to operate a telecommunications network leads to the situation that, assuming CCA, at the end of the economic life of an asset the total sum of depreciation does not cover the historic investment in that asset. This situation can be looked at from the perspective of two basic approaches: the operating capital maintenance method (OCM), and the financial capital maintenance method (FCM). OCM assumes that capital is maintained in such a way that the production of a certain amount of goods and services is ensured. FCM assumes that capital is maintained in such a way that the initial financial investment is preserved. Both approaches have different objectives and the choice between the two will depend in part on the nature of the regulatory objectives.

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XIV.	IRG acknowledges that from different perspectives a different decision can be made regarding the choice between OCM and FCM; a NRA should select the capital maintenance concept most appropriate to the objectives to which the information will be applied.

6. Depreciation

Considerations

In a FL-LRIC modelling exercise it is necessary to calculate an annualised cost for consumption of capital assets. Consideration needs to be taken of the relevant asset life, an appropriate depreciation period (if different) and, depending on the method of calculation, the cost of capital. It is widely accepted that annualised costs should be calculated on the basis of economic depreciation which would include an appropriate allowance for the cost of capital. While conceptually not difficult, economic depreciation is in practice very difficult to calculate. The main problem is that estimating economic depreciation is very information intensive.

Because of the practical difficulties with calculating economic depreciation more simple approaches are often preferred. However, the yardstick by which these simpler approaches should be judged is how close they are likely to come, given the nature of the asset concerned, to the theoretically correct measure of depreciation.

The following are a number of commonly used surrogates for economic depreciation which can be appropriate and may be preferred: (tilted) annuity, (tilted) straight line, and 'sum of the years digits' depreciation.

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XV.	IRG acknowledges the theory that ideally economic depreciation should be modelled, but accepts that because of the many difficulties involved in gathering the data required to model economic depreciation directly, appropriate surrogates are acceptable and may be preferred. However, NRAs should judge the appropriateness of these surrogates on the basis of how close they are likely to come to the theoretically correct measure of depreciation (i.e. economic depreciation).

7. Reasonable rate of return

Considerations

In calculating the reasonable rate of return, which operators notified as having Significant Market Power are allowed to charge in their interconnection tariffs, the use of the Weighted Average Cost of Capital (WACC) formula is widely accepted. For the calculation of the relevant return on equity, IRG recognises that different methods are applied by NRAs. IRG will review the need for a preferred method.

IRG intends to continue the development of a common understanding on the more detailed aspects related to the relevant reasonable rate of return.

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XVI.	In calculating the reasonable rate of return IRG considers the application of the WACC formula to be a principle of implementation and best practice.

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