

The use of Long Run Incremental Cost (LRIC) as a costing methodology in regulation

Conceptual Issues

1. The following sources provide a useful discussion of the use of the various costing methodologies (principally Marginal Cost (MC); Long Run Incremental Cost (LRIC); Fully Allocated Cost (FAC), and Ramsey) proposed for the determination of access prices in regulated industries. This paper was produced at the request of the Competition Commission staff on 28 January 2002.

Applied

2. The following are useful sources regarding examples of the application of costing methodologies.
3. *Cost Oriented Access and Interconnection in Sweden*, Andersen Management International A/S, 30 November 2001. Focusing on LRIC, the study comprises both an examination of different theoretical methodologies for costing/pricing access and interconnection services and a survey of relevant international experience. This document is attached as Annex 1 and can be downloaded from <http://www.pts.se/dokument/getFile.asp?FileID=2542>
4. *Principles of implementation and best practice regarding FL-LRIC cost modelling*, as decided by the Independent Regulators Group, 24 November 2000. This document was written to assist national regulators by advising on best practice for implementation of European Commission Regulations and is attached as Annex 2. It can also be found at: http://www.regtp.de/imperia/md/content/internatio/PIBs_on_LRIC.pdf
5. *Interconnection in Telecommunications*, Office of Utilities Regulation (Jamaica), March 1999 contains a non-technical discussion of different cost standards and approaches to setting interconnection charges: fully allocated cost, LRIC, Efficient Component Pricing Rule and Ramsey prices (see Chapter 7 and Annex B). This document can be downloaded from www.our.org.jm/docs/interconnect.htm

European Legislation

6. *Recommendation 98/195/EC* 8 January 1998 which recommends the use of long run average incremental costs for the assessment of cost oriented interconnection tariffs for terminating access. This is attached as Annex 3 and can be found at: http://europa.eu.int/abc/off/index_en.htm
7. *Directive 97/33/EC of the European Parliament and Council*, 30 June 1997 ('The Interconnection Directive'). Recital 10 outlines that charges for interconnection should be based on a price 'closely linked' to the long-run incremental cost. This is attached as Annex 4 and is also found at: http://europa.eu.int/abc/off/index_en.htm

Theory

8. The following are useful sources regarding the theoretical underpinning of the use of different costing methodologies.
9. *The Economics of Regulation*, Alfred Kahn, MIT Press, 1970 contains a discussion of the principles and practice of setting regulated prices in general (ie not specific to telecommunications).
10. *The Theory of Access Pricing and Interconnection*, Armstrong, 2001 (forthcoming in the Handbook of Telecommunications Economics) provides a survey of the theory of interconnection pricing, including mobile termination (see the section on "Competitive Bottlenecks"). This document can be downloaded from <http://hicks.nuff.ox.ac.uk/economics/people/armstrong/acc-int-num.pdf>
11. *Competition in Telecommunications*, Laffont and Tirole, MIT Press 2000 contains an analysis of mobile termination in Chapter 5 and a critical view of LRIC and other cost-based approaches in Chapter 4 (although the extent to which the criticisms apply to OfTel's LRIC model is debatable).
12. *The Economic Analysis of Accounting Profitability*, Edwards, Kay, and Mayer, 1987, contains a discussion of the economic issues underlying accounting principles (although exact methodologies such as LRIC are not discussed explicitly).
13. OfTel papers on Incremental costs – these can be viewed on the OfTel website at http://www.oftel.gov.uk/ind_info/international/lric498.htm. Documents here deal with both theoretical and applied issues pertinent to the use of LRIC in the context of BT's fixed network.

International Experience

14. This section is divided into three areas:

- an overview of the costing methodologies used to determine the cost of mobile termination by mobile operators, NRAs, and Regulators Groups in other countries;
- an overview of the costing methodologies that have been applied in the fixed telecommunications industry; and
- a short overview of the costing methodologies that have been applied in other regulated industries.

Approaches used in the estimation of the cost of mobile termination

15. There is an increasing trend amongst NRAs, particularly (although not exclusively) in Europe, in favour of the regulation of mobile call termination charges. The following examples illustrate the means by which the cost of mobile termination has been regulated in various countries.
16. *Australia* – The Australian Competition and Consumer Commission (ACCC) considered a number of methods before opting to set mobile termination (MT) tariffs using a “retail benchmark” method. This method entails indexing MT prices charged by any mobile operator (MNO) at the wholesale level to the retail tariffs it charges at the wholesale level, thereby introducing an element of competitive discipline on MNOs.
17. *Austria* – The Austrian regulator (RTR) was one of the first authorities to impose cost based MT rates on MNOs. The costs of an efficient network operator were calculated using a bottom-up LRIC methodology. This bottom-up model was calibrated using top-down cost information submitted by the regulated MNO, Mobilkom. All operators, including new entrants, have been subject to charge controls, calculated using different parameters depending on the size of each operator.
18. *Belgium* – The Belgian regulator (BIPT) currently sets MT charges based on benchmarking information in order to proxy cost orientation, and has stated an intention to continue to do so in the foreseeable future.
19. *France* – The French regulator (ART) has chosen to cap mobile termination rates by means of the imposition of a step-by-step reduction in average termination rates, of 15% in March 2002, 15% in 2003, and 12.5% in 2004.
20. *Malaysia* – The Malaysian government regulates MT charges on a LRIC basis. Incremental costs are calculated using a bottom-up model.
21. *South Korea* – MT charges are regulated in South Korea. This is currently done on a FAC basis. A set of LRIC based charges, calculated using a bottom-up cost model, have been proposed.
22. *United States* – Sprint PCS operates a code-division multiple access (CDMA) network. CDMA is a cellular technology that is an alternative to Global System for

Mobile communication (GSM), the technology used within Europe. In the course of negotiating a new interconnect agreement for the termination of fixed to mobile calls with BellSouth, Sprint PCS asked the FCC to arbitrate regarding the level of termination charges. Sprint PCS designed and built a cost model using a LRIC approach to support its negotiations.

Costing methodologies used in fixed telephony

23. Interconnection rates in the majority of developed countries in Europe and further afield use a version of LRIC methodologies in order to determine interconnect rates for the fixed networks of dominant operators.

European operators

24. The majority of incumbent fixed network operators in Western Europe have their interconnect rates set on a LRIC basis, such charges typically being determined or informed using a bottom-up and/or top-down LRIC modelling approach. The following are examples of this:

25. *Austria* – In Austria interconnect rates have been determined via the reconciliation of a bottom-up LRIC model developed by the regulator RTR and a top-down LRIC model developed by the incumbent operator, Telekom Austria.

26. *Denmark* - The Danish regulator, Telestyrelsen, regulates the incumbent operator's (TDC) interconnection prices using a LRIC approach. This has been done by means of a consultation process between operator and regulator. This led to the development of a "hybrid" model; essentially the bottom-up model developed by the regulator was calibrated to reflect the findings of the top-down LRIC modelling process instigated by TDC.

27. *France* – The French regulator currently uses a FAC approach to determine the interconnection rates charges by France Telecom. It plans to introduce LRIC based charging in 2002.

28. *Germany* – Deutsche Telekom's interconnection charges are regulated using a LRIC approach based on the calibration of a bottom-up LRIC model developed by the regulator (RegTP) with top-down data provided by Deutsche Telekom.

29. *Ireland* – As with the above countries, interconnect rates in Ireland have been determined using a LRIC based approach. The Irish regulator (ODTR) determined interconnect rates based on its own bottom-up LRIC model and a top down model produced by the incumbent operator, *eircom*.

30. *UK* – BT's interconnect rates have been determined using a reconciliation of a bottom-up LRIC model together with BT's top-down LRIC model. For a detailed description see the papers on LRIC at http://www.oftel.gov.uk/ind_info/international/lric498.htm.

Outside Europe

31. *Australia* - The Australian Competition and Consumer Commission (ACCC) generally applies a LRIC approach to price regulation. Rates are based on the ACCC's bottom-up LRIC model, and informed by Telstra's accounting data.
32. *Canada* - The Canadian Radio-television and Telecommunications Commission (CRTC) has adopted a LRIC methodology as the basis of setting rates network interconnection. Unlike other countries, common costs are not applied as an explicitly calculated mark-up, rather a fixed mark-up of 25% has been set.
33. *Japan* – The Japanese Ministry of Posts and Telecommunications, in determining NTT's interconnection rates, uses a LRIC based approach. Rates have been determined using both the outputs of a bottom-up LRIC model and the accounting information supplied by NTT.
34. *US* - The Federal Communications Commission (FCC) has proposed a Total Element Long Run Incremental Cost (TELRIC) approach to setting interconnection rates, in which each network element is a separate increment (although the elements were chosen do as to avoid large common costs among them).

Costing methodologies used in other regulated industries in the UK

35. *Water* – OFWAT uses a Long Run Marginal Cost (LRMC) methodology in order to determine access prices in water supply. LRMC is calculated by estimating the extra cost incurred for a given expansion in demand. For further details of the approach used and of the relative merits of various approaches see the OFWAT website site (<http://www.ofwat.gov.uk/lrmc.htm>).
36. *Gas* - In the Gas industry Transco uses LRIC estimates derived by its 'Transcost' model to calculate entry and exit capacity charges for its transmission network. The model starts from a base network and considers extensions to support demand growth over time, the present value of the cost difference between the base and extended network configurations being interpreted as the LRIC of the hypothetical increment.
37. *Aviation* - In the Aviation industry, airport charges are regulated using a LRIC type approach. This entails the estimation, based on cost projections of the average incremental costs of capacity additions to meet demand projections. For details of this methodology, see the CAA website, <http://www.caaerg.co.uk/download.htm>.
38. *Rail* - In the rail industry, the Office of ORR has regulated charges using a variable (avoidable) cost framework on the basis of train miles. Avoidable/variable costs are calculated using a top-down model calculated on a Historical Cost Accounting (HCA) basis. Fixed and common costs are recovered on an equal proportionate mark-up basis per train-mile.