EXPERT LEVEL TRAINING ON TELECOM NETWORK COST MODELLING FOR THE HIPSSSA REGIONS

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Session 5 – Cost standards and their application
Aims and objectives for this session

1. Identifying types of cost
2. Understanding cost standards
3. Knowing when to apply them
4. Effective regulation
Identifying types of cost
How much does a pint of milk cost?

List as many types of cost as you can think of that might affect the cost (or cost-based price) of milk.
Examples of cost categories

**Production costs:**
- Land, cows, feed, fertilisers, labour

**Distribution costs:**
- Transport, packaging, refrigeration, logistics

**Processing costs:**
- Equipment and labour for milking, pasteurising, skimming

**Retail costs:**
- Shops, staffing, marketing, branding, billing
Four key types of cost

- **Fixed costs**
  - Cost which must be incurred if any non-zero quantity is supplied

- **Variable costs**
  - Cost whose magnitude changes when output changes

- **Capital costs**
  - Assets purchased for use in more than one year

- **Operating expenditure**
  - Costs consumed entirely within the current year
Categorisation of costs

Fill in examples of each cost type relevant to the cost of milk

<table>
<thead>
<tr>
<th></th>
<th>Fixed capital costs</th>
<th>Variable capital costs</th>
<th>Fixed operating expenditure</th>
<th>Variable operating expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
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<tr>
<td>Processing</td>
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<tr>
<td>Distribution</td>
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<tr>
<td>Retail</td>
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</table>
Categorisation of costs

Possible categorisation of the costs of milk supply

<table>
<thead>
<tr>
<th>Category</th>
<th>Fixed capital costs</th>
<th>Variable capital costs</th>
<th>Fixed operating expenditure</th>
<th>Variable operating expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>Land</td>
<td>Cows</td>
<td>Fertilisers</td>
<td>Labour</td>
</tr>
<tr>
<td>Processing</td>
<td>Buildings</td>
<td>Equipment</td>
<td>Rates</td>
<td>Labour</td>
</tr>
<tr>
<td>Distribution</td>
<td>Logistics</td>
<td>Vehicles</td>
<td>Insurance</td>
<td>Staff and fuel</td>
</tr>
<tr>
<td>Retail</td>
<td>Shop</td>
<td>Display shelving</td>
<td>Billing</td>
<td>Marketing</td>
</tr>
</tbody>
</table>

The extent to which costs are fixed or variable depends on the time horizon. Economists define the long run as the shortest period of time necessary for all the fixed costs to become variable.
How each cost type is treated in cost models

**Fixed costs**
- Excluded from marginal and incremental cost calculations

**Variable costs**
- Part of all cost standards, but may be treated differently

**Capital costs**
- Need to be annualised for pricing: different approaches apply

**Operating expenditure**
- May be direct or joint/common. The latter may be excluded depending on the mark-up regime.
Understanding cost standards
Four key cost standards

**Fully Allocated Costs (FAC)**
- An accounting method to distribute all costs among a firm's various products and services

**Long Run Incremental Costs (LRIC)**
- An accounting method to calculate the cost caused by the provisioning additional units (the “increment”) or by an extension of the service portfolio

**Stand Alone Costs**
- The costs of supply assuming a firm only provides one service

**Marginal Costs**
- Cost caused by the provisioning of one additional unit of service
Fully Allocated Costs (FAC)

- All costs have to be taken into account and allocated to the products and services of a company.
- The concept is neutral with regard to valuation principles, depreciation and cost of capital calculation methods.
- The art of fully allocated costs is to identify direct cost, joint (service family) cost and common cost and to find ways to properly allocate the latter two categories to services.
- Can be used with either historic costs (actual costs incurred) or current costs (revalue assets at their replacement costs).
Long Run Incremental Costs (LRIC)

- Estimates the incremental cost of providing the service under consideration.
- Defined as the total cost when the service is provided less the cost when the service is not provided.
- By measuring over the long run, infrastructure investment is variable rather than fixed and can be matched to capacity.
- If common costs are to be recovered, then a mark-up is required.
- LRIC typically uses current or forward looking costs (cost of an efficient firm using new infrastructure).
FAC v LRIC: a two product example

**Fully Allocated Costs**

- FAC of A
- FAC of B

**Long Run Incremental Costs**

- LRIC of A
- Stand-alone cost of B

This point T represents all costs / volumes of the network.
HIPSSA Cost model training workshop:
Session 5: Cost Standards and their Application

LRIC variations

- **TSLRIC**
  - Total Service LRIC

- **LRAIC**
  - Average LRIC

- **LRAIC+**
  - LRAIC plus mark-up for joint and common costs

- **Pure LRIC**
  - LRIC of a specific service (usually call termination)
The difference between Pure LRIC and LRAIC+

Source: BIPT
More costing definitions

- **Direct cost or directly attributable cost**
  - Costs are incurred as a direct result of the provision of a particular service.
  - Can be fixed or variable.

- **Joint or shared cost (indirectly attributable cost)**
  - The cost of inputs that contribute to the production of two (or more) different increments.
  - For example, the costs of mobile towers contribute to 2G and 3G services (and maybe others).
  - Costs can be allocated on the basis of identifiable cost drivers (e.g. tower space).

- **Common cost**
  - Inputs necessary to produce several services, which cannot be directly assigned to specific services.
Cost categories for Pure LRIC or Marginal Costs

In Pure LRIC the increment is a full service (e.g. terminating calls), whereas in Marginal Costs it is the smallest possible unit (e.g. a single call)

Source: RTR
Cost categories for Incremental Costs

Incremental cost

Volume sensitive costs

Fixed costs

Joint costs

Common costs

Directly attributable costs

Source: RTR
Cost categories for Stand Alone Costs

Stand alone costs (SAC)

Volume sensitive costs

Fixed costs

Joint costs

Common costs

Direct and attributable costs

Source: RTR
Cost categories for Fully Allocated Costs

- Volume sensitive costs
- Fixed costs
- Joint costs
- Common costs

Full allocated cost (FDC or FAC) of service A

Source: RTR
Another view of cost accounting concepts

**Cost accounting concepts**

**Stand-alone costs**

Service A  \( SAC_B \)  Service B

**Incremental costs**

Service A  \( LRIC_B \)  Service B

**Joint costs & common costs**

Service A  Service B

Joint costs if allocable to A and B.
Common costs if not allocable to A and B.

Source: DTAG
With LRIC the definition of the increment matters (1)

### Possible increments in a mobile network

<table>
<thead>
<tr>
<th>Service Traffic</th>
<th>Voice Traffic</th>
<th>Low Bandwidth Data Traffic</th>
<th>High Bandwidth Data Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call termination</td>
<td>Call origination</td>
<td>Check voicemail</td>
<td>Leave voicemail</td>
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</table>

Source: Europe Economics
With LRIC the definition of the increment matters (2)

The larger the increment the higher the LRIC
With LRIC the definition of the increment matters (3)

Source: OFCOM
Applying the different cost standards to regulation
The questions regulators face

- Which interconnect pricing standard?
  - Fully allocated costs?
    - Historic?
      - Actual best practice?
    - Forward looking?
      - Theoretical best practice?
  - Incremental costs?
    - Historic?
- Return on capital employed?
  - Mark-up
    - Efficient component pricing rule?
    - Ramsey pricing?
    - Constrained mark-up?
Emerging best practice

- **Constant mark-up**
  - same percentage to all services

- **Efficient Component Pricing Rule (ECPR)**
  - based on opportunity cost - considers retail prices
  - only works well if retail prices already competitively priced

- **Ramsey Pricing**
  - sets mark-ups inversely proportional to the price elasticity of demand
  - theoretically works well, but very difficult to implement

- **Floors and Ceilings**
  - allows the operator flexibility of assigning mark-ups within limits (generally defined as between MC and SAC)
The aim of cost based regulation

- Aim is to encourage economically efficient investment to promote the long term interests of end users
- Balance between:
  - efficient use of existing infrastructure
  - investment in new infrastructure by incumbents and new entrants
- Regulation of interconnect services is required where there is potential market failure
- Without infrastructure based competition - ongoing regulation will be necessary
LRIC balances competing interests

- LRIC is an economic cost concept designed to:
  - Encourage use of existing facilities where desirable
  - Encourage investment in new facilities where justified

![Diagram showing the relationship between Interconnect tariff and LRIC](image-url)
Deviating either side of LRIC has its dangers

Economic Cost

- Encourages greater investment in infrastructure
- Protects the incumbent versus potential competitors
- Encourages greater efficiency in use of existing infrastructure
- May deter otherwise appropriate market entry by facility based competitors
Emerging best practice

FAC (or benchmarks) until LRIC models in place

TSLRIC+ or LRAIC+ (for all services initially)

Pure LRIC (for call termination only)