Costing Methodologies Used in Telecom Regulation

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Presentation overview

- Why is “cost” important in telecom regulation?
  - Carrier profitability
  - Customer welfare
  - Competition and pricing
- What aspects of cost need to be identified?
  - Components
  - Regional and customer cost variations
- Evaluating costing methodologies:
  - Historical embedded costs (HEC)
  - Fully distributed costs (FDC)
  - Forward-looking economic cost (FLEC)

Presentation overview

- What are the benefits from using FLEC versus other methodologies in terms of:
  - Economic and competitive efficiency
  - Regulatory transparency and efficiency
- How FLEC can be modeled and computed
  - Proxy model example uses
  - HAI Model example outputs
- Summary

Importance of cost

- Traditional importance of cost has derived from regulators' need to ensure the profitability of monopoly carriers
  - Only total cost mattered (had to be less than total revenue)

$$\text{Total Cost} = \sum_i \text{cost}_i \leq \sum_i \text{revenue}_i = \text{Total Revenue}$$

  - Cost analysis could be backward-looking (because the market was a slow-moving monopoly)
  - Prices could be set arbitrarily and residually (concern was for politics and not economic efficiency)

Importance of cost

- Modern importance of cost must focus on cost's import for *prices*, which determine for:
  - Carriers
    - profitability
    - ability to compete effectively against rival carriers
  - Customers
    - what telecom services they will purchase and in what quantity
    - their overall welfare level
  - National economy
    - whether telecom services are efficiently produced and consumed
    - overall levels of efficiency

Cost components

- Measured over the long run
  - Efficient lifecycle configuration and quantity “fills”
  - All short-run fixed costs become variable
- Incremental (direct) costs
  - All variable costs specific to the costed item
  - All fixed costs specific to the costed item
  - Names commonly used:
    - for service costs: TSLRIC, LRSIC, LRIC, etc.
    - for element costs: TELRIC

Cost components

- Joint and common costs (JCCs)
  - JCCs are costs that are beneficial (incremental) to a group of items -- rather than benefical (incremental) only to an individual item
  - JCCs occur when the costed item is produced efficiently only in combination with other items
  - JCCs are *not* residual costs

    JCCs $\neq$ Total Cost – Total Revenue
- See slides in Appendix 1 for a visual demonstration of cost components

Cost components

- Rules for allocating JCCs
  - Sum of each item's allocated JCCs cannot exceed the total of all items' JCCs
  - An item's allocated JCCs may not cause that item's total cost to be above its stand-alone cost
  - Views of what is a "reasonable allocation" can vary:
    - *Ramsey:* over-allocate JCCs to less elastically demanded items
    - *Even:* allocate JCCs in proportion to direct costs
    - *Procompetitive:* under-allocate JCCs to less competitive items
  - Choice of allocation methodology is arbitrary from an economic standpoint

Cost disaggregation

- Regulators cannot focus only on the total costs of the firm across all services and regions because:
  - Costs differ across services and regions
  - Customer demand differs across services and regions
  - Competitive pressure differs
- Regulatory costing methodologies must be able to identify costs disaggregated by:
  - Region
  - Service
- Otherwise, these costs cannot guide pricing

Sources of cost data

- Traditional
  - Historical books of account
  - Fully distributed across services
- Modern
  - Forward-looking analysis
  - Explicit build-up and allocation of JCCs

Evaluating costing methodologies

- Historical embedded costs (HEC)
  - Calculates costs using historical books of account
    - accounting cost categories typically are functional categories
    - these functional categories are used by many services
    - thus, many of these costs are “joint or common”
  - Inappropriate for use in developing efficient competitive prices
    - Embodies profile of network designs, efficiency levels, costs and qualities that existed in the past
    - Burdensome or unrepresentative in a multi-carrier markets
    - Does not give business managers or regulators correct long run price signals
    - May not be competitively neutral

Evaluating costing methodologies

- HEC example 1
  - It cost $1,000,000/E1 circuit to install an undersea cable system five years ago
  - Now it costs $200,000/E1 circuit
  - How can you base your prices on a HEC of $1,000,000/circuit if a new competitor is basing its prices on $200,000/circuit?
  - A business or a regulatory decision to price based on HEC will invite customers to either:
    - use an alternative unregulated service (*e.g.*, Internet telephony)
    - forgo completely purchasing these circuits

Evaluating costing methodologies

- HEC example 2
  - It cost $800/line to install loops ten years ago
  - Because the area is now more developed and paved, it now costs $1200/line
  - Why should a carrier base its local service prices on a HEC of $800/line if the replacement cost of these loops is $1200/line?
  - A business or a regulatory decision to price based on HEC will:
    - not be competitively or profit-optimal, and will
    - incent customers to buy “too many” of these services

Evaluating costing methodologies

- Fully distributed costs (FDC)
  - Cost information may be collected by accounting classifications that differ from service classifications, thus these costs must be allocated across services
    - such costs are “joint or common”
    - while certain of these allocations may be driven by relative use, many are intrinsically arbitrary
  - Portion of costs that must be allocated arbitrarily depends on how well accounting categories match service categories
  - Because resulting FDCs are arbitrary, they may not give business managers or regulators correct price signals

Evaluating costing methodologies

- FDC example
  - A conduit is installed that carries:
    - copper and fiber loop cables
    - fiber cables that connect two local switches
    - fiber cables that connect a local switch to a toll switch
  - How should the cost of the conduit be allocated:
    - equally to each cable?
    - equally to each circuit carried on the cables?
    - disproportionately to the cable/circuits that carry high revenue traffic (*i.e.*, more to the toll cable and less to the loop cable)?
    - based on the relative diameter of each cable?
    - other?
  - Ultimate result is arbitrary

Evaluating costing methodologies

- Forward-looking economic cost (FLEC) is designed to represent the cost level experienced by a competitive carrier that supplies the market with efficient, newly constructed facilities
- FLEC is the *sum* of:
  - Forward-looking incremental costs
    - both fixed and variable costs that are specific to the product
    - computed over the complete, long-run life cycle of the product
  - A “reasonable” allocation of forward-looking JCCs
    - because there is no single “correct” way to allocate these costs, a goal should be to define services so they share minimal JCCs

Benefits from using FLEC

- FLEC provides the appropriate cost guide for decision making when:
  - Production decisions have substantial lead times and/or investments are long-lived
  - Markets are competitive -- or are intended to perform competitively (will maximize overall welfare)
- Business or regulatory decisions based on FLEC:
  - Promote efficient resource use by ensuring that the incumbent's scale and scope economies are shared with all rivals
  - Support efficient multi-carrier competition

Benefits from using FLEC

- Failing to use FLEC as the cost measure can institutionalize:
  - Inefficient or static production processes
  - Non-competitive supply
- Examples
  - FLEC would preserve efficient use of in-place resources by repricing cable circuits to $200,000/circuit
  - If fiber-fed broadband networks are the forward-looking technology, FLEC would allocate costs equally to each (assumed fiber) cable

Implications of FLEC pricing

- Single value ensures nondiscrimination in a multi-carrier market
- Administratively, it is the least burdensome on the market participants
- No other compensatory and calculable cost concept supports the development of efficient competition

Methods of computing FLEC

- Historical accounting methods, possibly projected forward
- Activity based methods based on currently used combinations of individual component costs
- Explicit modeling (or “proxying”) of the actual cost-generating processes:
  - Engineering-generated
  - Economics-generated

Advantages of proxy modeling

- Proxy modeling is the most accurate methodology for computing FLEC because:
  - Historical accounting records are often inaccurate
  - In a dynamic industry, historical accounting records cannot capture forward-looking costs
  - Rigid mathematical projections of current cost levels are also inconsistent and inaccurate
  - Proxy modeling is most capable of capturing costs consistently across the life cycles of the company's capital equipment and the products that it is used to manufacture

Advantages of proxy modeling

- Proxy modeling is also superior because:
  - It allows costs to be calculated efficiently for families of interrelated products
    - minimizes the need for repetitive data collection
    - ensures that costs that are joint or common across individual products within a family are treated consistently
  - It allows a single model to be used to determine many different firms' costs of producing the product
    - facilitates market-wide competitive cost analysis
    - helps ensure that all firms receive equal treatment from the regulator
    - the process of cost development is more transparent

Tranparency comparison

- Compare national proxy model to GTE study of its Texas switching costs
  - ~15% of GTE-TX total cost
  - ~1% of national lines
- Carrier cost studies are:
  - Special purpose in design
  - Idiosyncratically executed
  - Unintegrated
  - Nontransparent

Proxy modeling of FLEC

- Proxy modeling:
  - Minimizes data collection requirements and administrative burdens on companies
  - Is the only methodology reasonably capable of providing needed levels of component and regional disaggregation
  - Provides transparency and rigor to the costing process
    - proprietary data/confidentiality agreements not needed
    - valuable third-party intervention is possible

Proxy modeling by regulators

- Used in United States FCC and state PUC regulatory proceedings to determine the proper level of interconnection prices:
  - Local carrier to local carrier
  - Long distance carrier to local carrier
  - International carrier to international carrier
  - For prices for unbundled network elements
  - For collocation (*e.g.*, central office floor space, power)
- In proceedings to set universal service subsidies
  - To determine required amounts of subsidy
  - To determine the regions where subsidies are required

Further uses of proxy models

- Carriers and regulators using proxy models to establish costs can avoid the cost of setting up or operating an accounting system for that purpose
  - In the U.S., most new entrant carriers have no established Part 32/USOA accounting system
  - Even established carriers are looking to dispose of these accounting systems
  - Many have adopted proxy models in lieu of setting up, or to replace accounting-based cost tracking systems
- See slides in Appendix 2 for examples of proxy model cost outputs

Summary

- Regulators must know costs in order to determine efficient, competitive prices
  - This requires cost components to be understood to fine levels of disaggregation
  - Forward-looking economic costs are are the essential indicator of appropriate prices
- Proxy modeling offers an effective way for regulators to determine efficient, competitive prices