Cost Modeling

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Introduction

FCC Overview

Models

- Hatfield
- Benchmark Cost Model
- Cost Proxy Model

Conclusion(s)

Introduction

- Framework of monopolies
- Pricing of services
- Detail cost studies

FCC Goals

Used for

- as a regulatory tool
- to determine universal service support payment
- for interstate access charges
- By May 8, 1997
FCC Requirements

• Sunk or historically incurred cost not included
• Service
• Quality
• Independent - validity of model
• Flexibility

FCC Structure

• Underlying Structure of Models
• Modeling of Network Investment
• Modeling of Expenses

Underlying Structure of Models

• Existing Wire Center Approach
• Geographic Unit of Analysis
• Specification of Demand
• Specification of Network Elements

Existing Wire Center Approach

• Incumbent LEC Wire centers
• Most efficient technology
• Wireless Technologies
Geographic Unit of Analysis

- Unit base on Census Block Group (CBG)
- Grids

Specification of Demand

Based on CBG
- Business Demand
- Loop lengths
- Second residential line

Specification of Network Elements

- Service capable of providing

Modeling of Network Investment

- Loop Plant - Feeder and Distribution
- Loop Plant - Fill Factors
- Loop Plant - Cable and Structure
- Switching Investment
- Other Investment
Loop Plant - Feeder and Distribution

• Largest part of investment
• Consists of CO to customer premises
• Effect of terrain

Loop Plant - Fill Factors

• Feeder and distribution utilization
• Based on
  • Population density
  • Network reliability standards
  • Special service obligations

Loop Plant - Cable and Structure

• Cost of building or obtaining structure
• Cable consist of aerial, buried, and underground

Switching Investment

• Determine the number of lines
• Determine the size of switch
### Other Investments

- Distance between wiring centers

### Modeling of Expenses

- Capital Expenses
- Operating Expenses
- Treatment of Joint and Common Cost

### Capital Expense

- Cost of Capital
- Depreciation
- Taxes

### Operating Expenses

- Non-capital related expenses
  - Plant and non-planted related expenses
  - Maintenance expenses
Treatment of Joint and Common Cost

- Shared maintenance facilities
- Overhead cost

Hatfield Model

- Use CBG for geographic analysis
- Use both residential and business lines
- Estimates cost of network element

Hatfield Model cont

- Structure cost on a per-foot basis
- Allow input for fill-factor
- Allow sharing of structure
- Separate costs for investment in switching

Hatfield Model Cont

- Assumes flat-rated port charges
- Capital expenses computed as sum of a return on investment
- Depreciation specified by the users
- 7.7% for cost of debt
- Depreciation rate=6.56%
• User specify composition tax rate
• User specify shares of debt and equity
• User specify costs of debt and equity financing
• User annual cost factor for non-capital related expenses

• Operating expenses based on historical expenses factors calculated from balance sheet

• Assumes network is built from scratch
• No study on rural area with low density
• Not enough information about the model
• Model is proprietary
• Operating expense based on investment
Benchmark Cost Model 2

• Use CBG for geographic analysis
• Used both residential and business lines makes specail access lines through a user-specified
• Allows for terrain slope and increase in length of CBG loop plant

Benchmark Cost Model 2

• Lower fill factor
• Assigns fixed switching cost
• Operating expense based on number of lines
• Overhead expense is broken down

Benchmark Cost Model 2

• Indirect expense is tied to direct expenses
• Assumes common cost are equal to 75% of the ARMIS per-line common cost

Benchmark Cost Model 2

• No forward-looking cost estimates for unbundled elements
• Does not provide for sharing for structures
**Benchmark Cost Model 2**

- Assumes increase switch cost with number of lines served by the switch
- Adds a lump sum to loop plant and end office switching investment

**Cost Proxy Model**

- Use grid for geographic analysis
- Use estimate for business lines
- Identify cost of unbundled network elements
- Incorporates population density, terrain, soil type to estimate cost of loop plant

**Cost Proxy Model cont.**

- Switch size based on population density
- Capital expenses based on return on investment, taxes and depreciation
- Includes an adjustment for difference between book and depreciation

**Cost Proxy Model cont.**

- Depreciation rate of 8.9%
- Activity based cost for maintenance and repair
- Allow for variable overhead allocation
### Cost Proxy Model Problems

- No justification for the use of tax depreciation
- Activity base cost uses proprietary information

### Conclusion

- Can one model fit all
- Can all parties sit down and negotiate
- Most likely to end up in the courts
- The reliability and accuracy of the proxy model concept

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