The Forecasting Implications of Telecommunications Cost Models

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Abstract - The Federal Communications Commission and state regulators have relied on models of long-run forward looking costs when establishing prices for the services and facilities provided by incumbent local exchange carriers. These models produce results that are fundamentally complicated long-run forecasts: what constant price(s) can the incumbent charge for the output it produces that will just recover its expenses and allow it to earn a reasonable return on and of its capital investments. This paper discusses the underlying assumptions of these forecasts and identifies methods for properly representing their inherent uncertainty in the estimates produced by cost models.

The Federal Communications Commission and numerous state regulators have required the use of forward looking economic cost models to establish prices for network components that must be sold to the competitors of incumbent local exchange carriers (ILECs) and to establish the subsidy levels required for universal service. While forecasting is typically associated with the demand, rather than the cost, side of a company's business operations, there are a number of implicit forecasting issues involved in proper cost calculations that are often either not recognized or ignored in practical applications.

When one looks at economic costs, in general, and those associated with assets with long lives, in particular, the essential role of forecasting becomes apparent. The economic definition of cost deals with the question of the expenditure of resources that will be incurred as the result of a decision to offer a product or service. Clearly, the answer to this question depends on how resources will be used in the future, i.e., a forecast is necessary. In the case of investments with short economic lives, such forecasts can be straightforward – what you recently paid for a quickly used-up resource is likely to apply in the near future. For assets with long lives, the forecasting becomes more complicated.
Consider the case of a telecommunications investment, such as a central office switch. Determining the economic cost of that asset is equivalent to how a business determines whether it is economic to invest at all. In addition to the purchase price of the switch, the business must consider: 1) how long the switch will last (economic life), 2) the volume of products produced by the switch that will be sold (demand forecast), 3) the price at which switches will be sold, 4) how the purchase price of new switches will change in the future (economic depreciation), and 5) uncertainty in the “forecasts” just enumerated. A sound investment decision considers all of these factors, and so should a properly conducted cost study.

This paper elaborates on how forecasting impinges on the development of correct economic costs. Section 1 describes the typical approach to cost models and compares it to the conceptually equivalent approach to investment decisions. Section 2 identifies how the consideration of specific items subject to forecasting affects the development of correct costs. The last section concludes the paper.

1. **TYPICAL COST MODELS AND INVESTMENT DECISION MODELS**

Turning first to cost models, the analysis in models that have been recently adopted or are being considered by regulators consists of the following steps: 1) estimate the investment in new equipment necessary to serve a predetermined level of demand, 2) estimate the operating expenses required to operate the new equipment, and 3) convert these costs, which are forecasted to occur over the life of the investment, into annual (or monthly) costs.

A simplified view of this process can be represented by the following equation:

\[ PV \text{ asset} = \text{Value of Investment} + PV(\text{operating costs, life, discount rate}) \]

In the equation above, PV denotes present value and the value of the investment accounts for tax considerations, i.e., depreciation is tax-deductible and equity earnings are taxed. Operating expenses are typically assumed to be constant over the life of the asset, so that their present value is determined by applying a present value formula found in spreadsheet software for a constant annuity over a period equal to the life of the project, discounted at a rate approved by the regulator.

The present value calculated above is then annualized, again applying standard financial formulas. Note that the step of annualizing the present value of the investment creates a peculiar depreciation pattern that is quite different from any used in regulation, let alone the actual economic depreciation of telecommunication-