



Munich Personal RePEc Archive

# **A Study of the Averch-Johnson Hypothesis in the Telecommunications Industry**

Mirucki, Jean

Univerité du Québec à Montréal

July 1980

Online at <https://mpra.ub.uni-muenchen.de/27727/>

MPRA Paper No. 27727, posted 31 Dec 2010 06:25 UTC

ANTHOLOGY

## A Study of the Averch-Johnson Hypothesis in the Telecommunications Industry

JEAN MIRUCKI  
*Université du Québec à Montréal*

Since the seminal article of H. Averch and L. Johnson [*American Economic Review*, December 1962], the efficiency of the rate of return regulation has been critically examined by many authors. Theoretical and econometric studies have analyzed the hypothesis of over-capitalization under various conditions: is the regulated firm always inclined to substitute capital for labor beyond the point of cost minimization when its rate of return is constrained by an external authority? Despite a lack of unanimity, especially regarding empirical findings, most of the studies tend to agree on the A-J phenomenon.

In this respect, the Averch-Johnson hypothesis has been first reexamined and then tested using Bell Canada time series data from the 1952-76 period.

The cost minimization conditions are checked by using a Cobb-Douglas production function taking into account the influence of technology over the length of that period. Three models are presented: the first features variables for labor ( $L$ ) and capital ( $K$ ) only, the second includes a composite index of technology ( $T_1$ ), while the last uses the number of directly dialed long distance calls variable as a proxy for a new index of technology ( $T_2$ ). The models are tested with both the Ordinary Least Squares and the Cochrane-Orcutt iterative methods of regression. Furthermore, the 1952-76 data sample has been segmented into sub-periods to check for the influence of the random nature of a given sample. Finally, three methods of calculating the cost of capital are proposed: a modified Jorgenson formula, the Fuss and

Waverman method, and the long term debt rate.

The main results of this study are:

a) The Cobb-Douglas production function provides a satisfactory description of the production decisions of the firm. With 36 valid tests out of 54 attempts, the production factor ( $L$ ) remains the major cause of rejection (negative marginal productivity of labor). Furthermore, the firm exhibits constant returns to scale in 83 percent of the cases.

b) A full 90 percent of the 108 Student-t tests (36 valid production functions using three different values for the cost of capital) rejects the hypothesis that the firm was minimizing its costs. In all cases, the results indicate that the bias favored the production factor ( $K$ ).

c) The use of a variable for technology improves the results only slightly, with  $T_2$  faring better overall than  $T_1$ .

d) The most dramatic variations in the results come from the use of segmented periods. For example, the 1957-76 sample supports the A-J hypothesis (by failing the cost minimization test), while the 1963-76 sample does not.

In summary, with the introduction of different options in (1) model specification, (2) choice of variables, and (3) definition of data samples, the hypothesis of the presence of an A-J effect for Bell Canada during the 1952-76 period is supported, based on statistical observations. Furthermore, it is imperative to recognize the random nature of the data sample available for testing purposes in all empirical studies on the Averch-Johnson hypothesis.