Econometric Analysis of Investment Behavior in Japanese Electric Power Industry

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Overview

Investment in facilities comprises an important part of nation's GDP. It is necessary for an economic growth. Such importance of the investment is extended to industries and firms because the investment influences technological innovation and competitiveness of industries and business strategy of firms. In particular, electric power companies invest in large-scale plants and equipments in generation and transmission/distribution network functions. Acknowledging the existence of such concerns, this study examines investment behavior of Japanese electric power companies from a perspective regarding whether the behavior is consistent with economic theory of investment. For the research purpose, this study utilizes firm-level annual data sets from 1990 to 2009 and estimates the Tobin's q type investment function of the industry. Furthermore, to identify specific features of the electric power industry, this study compares the industry to other leading manufacturing industries in Japan.

Methods

This study uses an econometric method to examine whether the investment behavior of electric power companies is consistent with the economic theory of investment. The economic theory of investment was initiated by Jorgenson (1963) and then further developed by many researchers to incorporate adjustment costs. Combining the investment theory of neoclassical economics with Tobin's q theory, Abel (1980) proposed the Tobin's q type investment function. Under the Tobin's q theory, firms' investment is positively influenced by the Tobin's q, which is defined by the ratio of marginal revenue of investment and capital cost. As an extension of previous studies, this study assumes a nonlinear relationship between firms' investment and the Tobin's q. Moreover, this study examines what factors influence the firms' investment other than Tobin's q. In particular, we consider impacts of various financial factors and uncertainty on firms' investment. A system GMM (generalized method of moments) method or Arellano-Bover/Blundell-Bond estimator is applied to estimate the investment function of the electric power industry. The advantage of the estimator is that it can overcome a well-known structural problem of estimation; an endogeneity problem, between independent and dependent variables.

Expected Results

As a result of estimating investment functions, this study reveals that the investment behavior of electric

power companies is partly consistent with the economic theory of investment that is based upon Tobin's q theory. Meanwhile, as expected by this study, estimation results of other manufacturing industries indicate that they are consistent with the economic theory. The slight difference of such empirical results between the electric power industry and the other manufacturing industries can be attributed to specific conditions under which electric power companies operate, that is, operational constraints of the companies such as maintaining electricity supply security. In contrast, the influences of financial factors on the electric power industry are observed like those in other manufacturing industries.

References

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