# A Study of Price Differential in the Japanese Natural Gas Distribution Industry

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Overview

This study will examine the factor of price differential in natural gas utilities in Japan. In the natural gas industry, based on the principle of natural monopoly, the government licenses the permission of provision of natural gas into customers to one utility in one area. The government also gas retail price that is set equal to virtually total costs. On the other hand, because the government has never imposed any regulations in a manufacturing sector, as a result of managerial performance, there are three kinds of industrial organizational forms in the natural gas industry (Figure1).
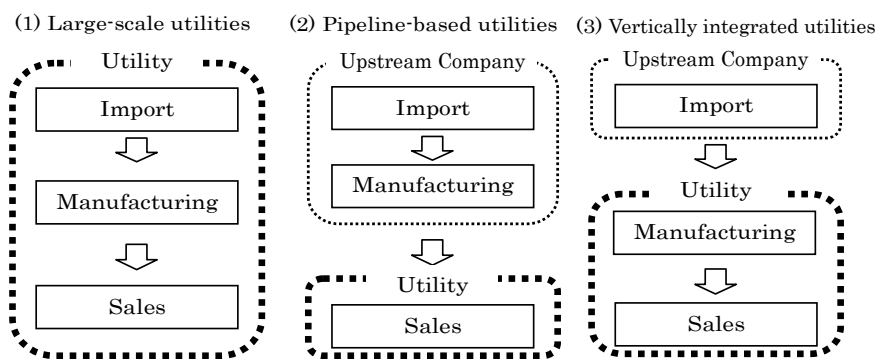
Figure 1 Organizational forms in the natural gas industry

In order to evaluate the effect of the deregulation, this study classified natural gas utilities into three types of organizational forms based on the groups of yardstick regulation: (1) large-scale utilities, (2) pipeline-based utilities, and (3) vertically integrated utilities respectively. The average retail prices of these utilities are shown in figure 2.
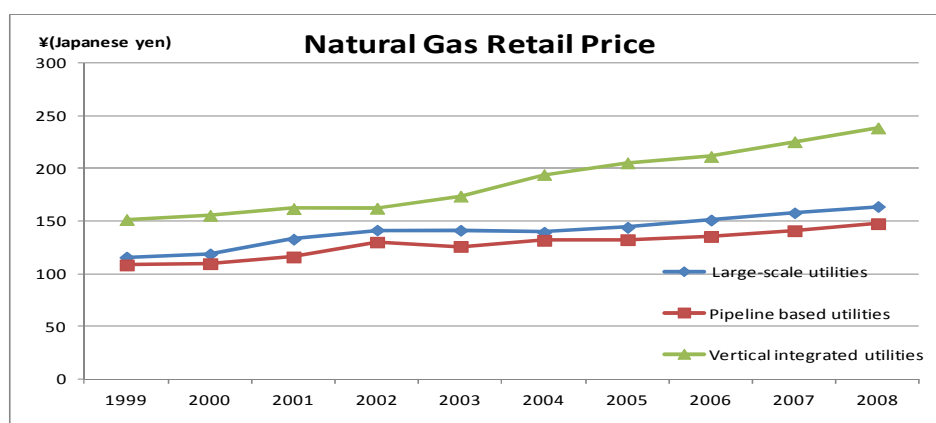
Figure 2 Natural gas retail prices (Vertical axis: Japanese yen {100yen=$1})

As can be seen in Figure 2, the price differentials are clearly existed. The average price of vertically integrated utilities is most expensive of the three.

Methods

The factors causing the price differential will be estimated by means of empirical analysis. In this paper, the ordinary least square model (OLS) with time trend and the corporate dummy variables will be used. The time trend is a time series variable, and corporate dummy indicates the characteristics of the company. In the case of OLS model, if the correlation between independent variables and error term is significant, the model is not consistent. The use of these dummy variables allows the problems caused by simultaneously and endogenously to be solved adequately. In short, in order to adjust for endogenous problems, this study adopts the OLS model with both time trend and corporate dummy variables. The number of utilities is 203, and balanced data of seven years (2003-2009) are used in this estimation.

Results

The result indicates two crucial points. When a firm size is larger, the retail price is significantly declining. Large utilities are doing business under lower retail prices, whereas small utilities are doing business under higher retail prices. The second point is that in the case where the incidental business rate is larger, the retail price also tends to rise. The TFP is not likely to influence price differential.

Conclusions

First, utilities with a higher additional business rate tend to sell natural gas at a higher prices compared to utilities with a lower additional business rate. This indicates that additional business costs might be included in the natural gas retail price. As several utilities simultaneously offer LP gas provision and refrigeration services, these utilities might unconsciously be setting a natural gas retail price that partly includes incidental business costs. This may be one of the contributing factors to the price differential. Next, although the coefficient of TFP growth rate is negative, the value is definitely small and is not significant at the 10% level, excluding model 1. The TFP growth rate should not substantially impact the gas retail price. This indicates that the importance of the means of gas procurement exceeds that of the TFP growth rate. Hence, utilities should reduce costs in gas procurement rather than by way of managerial efficiency. Third, the rise of wholesales rates has enabled the gas retail price significantly. If distribution utilities can construct pipelines to other suppliers or wholesalers in the same vicinity as well as purchase natural gas from the suppliers through the pipelines, then these distribution utilities could keep lower the gas retail prices. Furthermore, the results show that the larger scale utilities sell gas cheaper than smaller scale utilities. This means that the natural gas industry has a scale economy. Even when two pipeline-based utilities merge with each other, their gas price is likely to be kept low.

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