



Determinants of the number of bidders in the competitive procurement of electricity supply contracts in the Japanese public sector

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ABSTRACT

Since the electricity retail market in Japan was partially opened to competition in 2000, many government entities have sought to solicit competing bids for the electricity supply to their office buildings or facilities, encouraging competition between the incumbents and new entrants. However, in many cases, only the incumbent utility bids for the contract and the competitive effects are limited. This paper presents a statistical analysis of bidders' participation in competitive procurement. We employ several count data regression models to explain the number of bidders other than the local electric utility. Our results suggest that the number of bidders would decrease in response to an increase in the load factor, perhaps because the new entrants are less competitive in serving customers with high load factors as they do not operate low-cost base-load power plants such as nuclear power plants; It would increase along with the voltage level and contract demand. The results also indicate that new entrants are more likely to participate in the bidding process in large city areas.

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1. Introduction

The Japanese electricity industry has been dominated by 10 privately-owned, vertically-integrated electric utilities. They had been regulated as regional monopolies in the retail electricity market until the market was partially opened to competition in March 2000. It was the so-called "partial liberalization" scheme that allowed large-scale customers (connected to an extra-high voltage system of not less than 20 kV and with a maximum contract demand of 2000 kW or more) to choose their suppliers, as well as third-party access to the utilities' transmission network, subject to negotiated tariffs. Under this scheme, those who wished to supply electricity to large-scale customers were able to do so as power producers and suppliers (PPSs) by using transmission (wheeling) services provided by the electric utilities. Initially, the eligibility of retail access was restricted to large-scale customers; however, the government decided to extend retail access gradually. Since April 2005, all customers with a maximum contract demand of 50 kW or more have been allowed to choose their suppliers.¹

The partial liberalization, however, did not immediately result in prosperity among newly-registered PPSs (new entrants), and their share of sales in the newly-opened retail market (i.e., the share based on sales to eligible customers) had been no greater than 1% for the first three years of the partial liberalization. It has increased since

2003; however, it still seems very small (less than 3% of the total demand of eligible customers). The effectiveness of retail competition in electricity supply is an issue of considerable policy interest.²

² Thus far, there have been few cases of direct retail competition among the incumbent utilities; there was only one case in which a utility supplied a customer in the private sector in another utility's area. This lack of direct competition among the incumbent utilities is a controversial issue in the Japanese electric restructuring. Though it is difficult to verify with concrete evidence, this can be seen as an indication of tacit collusion among the incumbent utilities. Yet, the incumbents may be indirectly competing with each other, since the retail price differentials among them have become even smaller. Using the average revenue per kWh from commercial and industrial customers, the Report by the Subcommittee to Evaluate System Reforms (2006) shows that the price differential between the utilities (the difference between the highest price and the lowest) was reduced from 3.55 yen per kWh in 1994 to 1.41 yen per kWh in 2005. The Report then concluded that judging from the fact that the electricity price disparity among the incumbent utilities had decreased after liberalization in the mid 1990s, it could be assumed that potential competitive pressure from neighboring utilities effectively promoted indirect competition. A closer investigation of price changes in the liberalized sector shows that utilities lower their prices at approximately the same time, indicating some amount of competitive behavior among the incumbents. We can also point out that the incumbent utilities shift their resources to engage in a different type of competition, that is, in inter-energy competition with gas utilities. This mode of competition has intensified in recent years in the residential sector that is still under regulation in both the electricity and gas industries. The electric utilities are actively promoting "all-electric" homes equipped with induction heating cookers and CO₂ refrigerant heat pumps, inducing the customers to substitute their demand for gas with that for electricity. Policy makers are committed to retain a vertical integration of the incumbent utilities in restructuring the industry and, at the moment, do not consider divestiture of the incumbents as a possible instrument to facilitate competition, perhaps because the retail prices have decreased in real terms. Instead, they took further action to reform the market, especially to facilitate competition in the wholesale market, where these utilities indirectly compete with one another. Although JEPX was established in 2005, the trading volume is still very small and there are concerns about market liquidity.

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¹ In 2007, the government postponed the decision to extend retail access to all the customers. It was scheduled to reconsider this option in 2013.

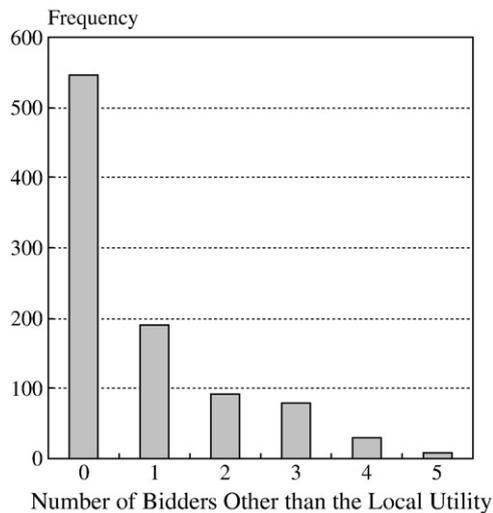


Fig. 1. Frequency distribution of the number of bidders in the competitive procurement of electricity supply contracts of government entities during the Years 2004–2006.

One of the factors that have encouraged competition in the Japanese electricity retail market is competitive procurement in the public sector. Since partial liberalization started, as eligible customers, many of the central and local government entities (including municipal water companies, universities, and hospitals) have sought competing bids for supplying electricity to their office buildings or facilities in compliance with the WTO Agreement on Government Procurement.³ Such competitive procurement has indeed facilitated competition between the incumbents and new entrants for electricity supply in the public sector, resulting in lower prices when there are multiple bidders. The number of competitive procurement biddings has increased, and PPSs have increasingly relied on such procurement in order to acquire new customers; in fact, they accounted for 25% of the additional sales by PPSs during FY2006.

However, in many cases, only the local incumbent utility bids for a contract and the overall effects of competition on bid prices seem to be limited. As shown in Fig. 1, there are no new entrants in about 60% of the cases of procurement held from 2004 to 2006. Capacity constraints make it difficult for new entrants to bid for all the competitive procurements. They also enter into contracts with customers in the private sector. Competitive procurement in the public sector is not the only means by which new entrants can increase their sales; the burden of administrative costs associated with public procurements has induced new entrants to prefer contracting with customers in the private sector instead of those in the public sector. It seems that new entrants participate in the bidding only when they can be competitive. When one or more new entrants participated in the bidding, competing with the incumbent as well as with each other, at least one new entrant won 81% of the contracts. When only one new entrant participated in the bidding, competing with the incumbent, it won 69% of the contracts. These figures suggest that the new entrants are in fact relatively efficient in the procurement they actually decide to participate in, and they may be very conservative in estimating their relative competitiveness as indicated by the rather high ratios of the contracts they win.

Although, in general, competitive procurement is desirable for efficiency, this may lead to an undesirable situation for the market given the large share of the incumbents. As they were aware that the

³ Basically, the facilities paying more than ¥32 million for their annual electricity consumption are required to attempt to procure the contract through open competitive bidding, while those paying more than ¥16 million are also recommended to do so.

new entrants were unlikely to participate in the bidding process, the local utilities do not lower the bid prices as much as they would have in case the new entrants had participated. It is important, therefore, to understand the reason the new entrants do not participate in bidding in many cases and to reform competitive procurement in order to induce competition by multiple bidders. Nevertheless, the determinants of the degree of competition or the number of bidders in these cases of competitive procurement have not been investigated thus far.

The purpose of this paper is to empirically identify the determinants of the degree of competition in the competitive procurement of the electricity supply contracts of government entities in Japan. In particular, we estimate the effect of several attributes of the electricity supply contracts on the number of bidders among the new entrants. By revealing the attributes of contracts that are likely to attract many bidders, the results of our analysis would provide useful information with regard to key factors for effective competition in the retail electricity market. We will particularly examine how different technologies for electricity supply between the incumbent and new entrants affect the competition in the market. Our results can also be used by government entities to reconsider their procurement policy in order to facilitate competition in electricity demand in the public sector.

This paper is organized as follows: Section 2 discusses our empirical model for analyzing the number of bidders in competitive procurement. Section 3 explains the method of estimation for our model and the data set we use. Section 4 presents the results, and Section 5 concludes our analysis and briefly discusses future issues.

2. The model

There have been several studies that analyzed the behavior of the incumbent utilities in liberalized electricity retail market.⁴ In this study we focus on the behavior of new entrants and analyze the determinants of the number of bidders in the competitive procurement of the electricity supply contracts of government entities.⁵ The strategic behavior of incumbents is obviously important; yet, the number of bidders is also important. The auction literature suggests that the number of bidders affects the outcome of the competition: the larger the number of bidders, the lower the price. If the number of bidders continues to be small, it would lead to problems in the future. As we mentioned in the Introduction, if the incumbent utilities learn that the new entrants are unlikely to participate in certain bidding processes, they do not lower the bid prices as much as they would have in case the new entrants had participated. The importance of attracting enough entrants to conduct a competitive auction is discussed and illustrated through some case studies in Klemperer (2004). Thus, we believe that the number of bidders is important to evaluate the competition; yet, the behavior of the new entrants in the newly liberalized market has not been studied extensively. The present paper sheds some light on this aspect.

We assume that the expected number of bidders (other than the local incumbent electric utility⁶) in the competitive procurement of electricity supply contracts, *NBIDDERS*, reflects the new entrants' (perceived) competitiveness relative to the incumbent utilities for different types of customers. In case of the competitive procurements

⁴ See, for example, Otero and Waddams Price (2001) and Sailes and Waddams Price (2004).

⁵ Although there have been many studies on the bidding procedures or design of auctions to lower the resulting price, the expected number of bidders has rarely been studied. There have only been a few papers that empirically study the number of bidders. One such study is Jaggi and Thosar (1993), who analyzed the number of bids received by U.S. firms that became targets of tender offers. Our analysis may also be related to literatures on the decisions of new entrants, such as Chappell et al. (1990) and Mayer and Chappell (1992), who studied the determinants of entry in the U.S. industry by modeling the frequency of new entry.

⁶ Although it is not necessary, the incumbent utilities always bid for contracts in their former service areas. Yet, they do not bid for procurements outside their service areas.

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