Regulation of Electricity Transmission: The Brazilian Experience

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Propósito Central do Trabalho:
The transmission segment is of particular importance for Brazil given the country’s continental dimensions and the great distances from generation sources to electricity consumption centers. The segment currently consists of about 100,000 km of lines, operated under concession by 52 companies and with 188 users, accounting for annual revenue of around US$ 1 billion. The model for expansion of transmission infrastructure, put in place in 1999, is based on auctions for transmission concessions that are included in the planning for expansion conducted by the government authorities. This model seems to be efficient to promote investments, since the average annual growth rate of transmission infrastructure changed from 0.8% in the 1995-1998 period to 3.8% in the 1999-2008 period. In 2006 the set of rules applicable to these auctions was significantly changed, to include, in the standard long-term concession contracts, a process to review the concessionaire’s transmission revenues every five years. This article analyzes the impact of this change in the rules for transmission concession auctions on the bids offered by prospective investors in these auctions (more specifically, the difference between the bids and the ceiling price established in the auctions). The lower the bid (the greater the underbid), the smaller will be the revenue received by the concessionaire and, consequently, the lower the transmission tariff charged to users of the system, and hence to final consumers.

Marco Teórico:
The seminal works in the theoretical debate over the regulatory alternatives for natural monopolies, such as provision of electricity and telecommunications services, were those of Demsetz (1968) and Williamson (1976). Demsetz (1968) questioned whether an industry with the characteristics of a natural monopoly – where the production or delivery technology dictates that one firm can provide a product or service more efficiently than various – must have its prices regulated to avoid the creation of deadweight for society as a whole. According to the main formulator of the theory of franchise bidding, if the concession of a public service is guaranteed through a long-term contract to the investor that presents the lowest bid in an auction, and this is the price charged for the service, there is no reason to regulate this price. If there is sufficient competition in the auction, the winning bid should be near the marginal cost and the investor (operator) will only have “normal profits”. Its lower price indicates it is the most efficient among the competitors. However, Williamson (1976) argued that even though franchise (concession) auctions are competitive, the fact that the long-term agreements up for bid in these auctions are incomplete means that there is a need to use some regulation instrument to complement the bidding mechanism. This regulation instrument must be able to consider the effects of changes which were unforeseeable at the time of the auction, affecting the prices of inputs, technology, cost of capital, management models and other factors that can change the investor’s cost structure. In other words, the introduction in the concession contracts of a clause stipulating periodic review of the concessionaire’s cost structure would be necessary to ensure “normal profits”, and thus the lowest possible price to consumers over the life of the contract. Later, Zupan (1989a) and Prager (1989, 1990), supporting Williamson’s theory, published a series of empirical studies showing the main factors that make long-term contracts inadequate in practice, in the telecommunications segment and any other industry, because they are incomplete. Another alternative put forward by Williamson (1976) to mitigate the effects of incomplete long-term contracts is the use of shorter term agreements. But this alternative is not feasible for transmission infrastructure or any other industry where sunk costs are an important component of total costs. In contrast, Armstrong...
and Sappington (2003) showed that with suitable auction design and a large number of competitors ex-ante, the efficient results expected by Demsetz can be attained.

Método de investigação se pertinente:
A before-after (BA) design regression using ordinary least squares (OLS) and considering the 73 reverse auctions held between 2002 and 2008 confirms there was an impact of changing in regulation. An application of propensity score matching method to estimate the impact of regulatory change also confirm that result. All the independent variables used to estimate the equation are significant to explain the difference between bids and maximum revenue established by ANEEL (dependent variable). The signs of the coefficients of the explanatory variables show the expected relation between these and the dependent variable. Specifically, the coefficient of the dummy variable that represents the impact of the change in concession contracts is significant, indicating that the tariff review process, as a complement to the competitive auction model, can result in lower tariffs for consumers than that obtained just with the auction process. Additional evidence of the impact of the change in the rules, for transmission concession auctions, on the bids offered by prospective investors in these auctions, are the averages of the differences between the bids offered and the ceiling value established by ANEEL before (Control Group) and after 2006 (Treatment Group). These averages have increased significantly after the change in regulation for all kinds of investors. The empirical tests carried out with the data on the auctions for transmission concessions in Brazil between 2002 and 2008 confirm the theory that competitive auction mechanisms alone are not sufficient to guarantee the least possible cost to render public electricity services, under long-term contracts. Since these contracts are incomplete, the introduction of a periodic review of the cost structure, aiming to incorporate the effects of changes in technology, prices of inputs and management innovations, can reduce the final cost of these services to consumers, since investors showed that with this change in regulation they were able to reduce their bids further.

Resultados e contribuições do trabalho para a área:
The Brazilian generation and transmission system is unique in the world because of its size and other characteristics. The model for expansion of transmission infrastructure, put in place in 1999, is based on auctions for transmission concessions that are included in the planning for expansion conducted by the government authorities. This model seems to be efficient to promote investments. The outcomes from the auctions indicate that the introduction of the cost structure review mechanism has resulted, on average, in larger differences between the bids and the ceiling price established for each concession, that is, it has diminished the revenue of transmission concessionaires, and thus has reduced the cost (tariff) charged to transmission users and to end consumers. This study therefore supports the criticism by Williamson of the theory developed by Demsetz, by providing evidence that price regulation instruments utilized along with competitive auctions are more efficient in assuring that the winning bidder will only have “normal profits”. A before-after (BA) design regression using ordinary least squares (OLS) and considering the 73 reverse auctions held between 2002 and 2008 confirms there was an impact of changing in regulation. An application of propensity score matching method to estimate the impact of regulatory change also confirm that result. All the independent variables used to estimate the equation are significant to explain the difference between bids and maximum revenue established by ANEEL (dependent variable). The signs of the coefficients of the explanatory variables show the expected relation between these and the dependent variable. Specifically, the coefficient of the dummy variable that represents the impact of the change in concession contracts is significant, indicating that the tariff review process, as a complement to the competitive auction model, can result in lower
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Referências bibliográficas: