Analysis for Low Bid Deviation of Highway Pavement Projects using Construction Market Factors

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Low bid deviation is defined as the difference between the agency's estimated construction costs and the lowest bids (or winning bids) submitted by construction contractors for projects. A significant deviation between the agency's estimated construction costs and the winning bid costs can create considerable financial risks for both owners and contractors. For instance, upward deviation leads to inefficient budget allocation of public fund and project cancellation for owners. Downward deviation results in significant cost overrun because of changes and claims during construction for owners and contractors.

The main objective of this study was to explain the low bid deviation for highway pavement projects by incorporating external factors. To achieve this main objective, the sub-objectives of this research were to: (1) develop a logit model to explain the low bid deviation for highway pavement project; (2) identify factors which are related to project-specific and market conditions, and (3) analyze the relationship between the submitted unit price bids and the potential factors. To achieve this objective, this study uses several important variables with the potential to explain the deviation, for example, variables representing project characteristics and market condition factors. Historical cost information for highway construction projects let in the State of Louisiana between 2011 and 2015 are utilized to build the explanatory model.

This study utilized the binary logit regression to explain the low bid deviation and identified several important variables, including the number of bidders, number of activities in the contracts, crude oil price, and value of construction put in place of pavement projects. This study contributes to the body of knowledge through the examination of influential variables on the low bid deviation in highway pavement projects. For example, the number of bidders (less than 3 and between 3 and 5), number of activities in the contract (greater than 60), and value of construction put in place of pavement projects are positively related to the low bid deviation and the crude oil price WTI has a negative relation with the low bid deviation.

The findings indicate that the lower the degree of competition in the bidding process for pavement projects the higher the low bid deviation between the agency's estimated costs and the winning bids. In addition, the increase in the number of activities in the pavement contracts causes the increase in the low bid deviation from the agency's estimated cost. The findings of this study help transportation agencies enhance the knowledge of the deviation between engineer's estimates and the winning bids for their projects depending on project characteristics and market conditions.

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