

Uncertainty and the Bidding for Incentive Contracts

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Summary:

In many procurement contracts, the monetary reward for the winning bidder is a function of the bid and of the *ex post* production cost. Therefore contract incentives can affect the strategic relationship between a firm's bid and its estimates of production expenses. In the existing literature on incentive contract bidding, the effects of contract incentives on a firm's bidding strategy are analyzed with the assumption that expectations about rival bids are exogenous. That is, these expectations are summarized by a probability distribution that is assumed to be unchanged as incentives and other structural parameters are changed. But any factor that would alter one bidder's strategy would presumably alter rivals' bidding strategies as well, thereby changing the observed distribution of rival bids.

For the game-theoretic model analyzed in this paper, firms' expectations about rivals' bids are endogenous and rational when firms use their Nash equilibrium bidding strategies. The equilibrium effects of contract incentives and other structural parameters on both bidding strategies and expected procurement costs are determined. The effect of an increase in the "guaranteed" profit rate is to lower bids to the extent that each firm's expected contract profit for the bid tendered is unchanged. Thus a change in a profit guarantee will not affect expected procurement costs, but it is shown that the frequency of cost overruns may be affected. Consequently, procurement efficiency is not necessarily associated with the absence of observed cost overruns. On the other hand, an increase in the sharing rule will induce risk-averse firms to bid for greater expected contract profits as compensation for accepting a larger share of the risk associated with uncertain production costs.