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## THE WISDOM OF THE CROWDS AND COST OVERRUNS IN CONSTRUCTION PROJECT TENDERS [ABSTRACT]

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### ABSTRACT

**Aim/Purpose**                      This study's objective is to demonstrate the wisdom of the crowds phenomenon in construction project tenders and relate it to cost overruns in these projects.

**Background**                      The wisdom of the crowd's phenomenon is an age-old idea that argues that collective opinion is better than any single (even expert) opinion. The first data-based evidence for it is from the beginning of the twentieth century when statistician Francis Galton attended an exhibition in which attendants were asked to estimate the weight of a large ox. He found that while individual estimates varied considerably, the median estimate was within less than one percent from the true weight. The existence of the wisdom of the crowds has a particularly important implication in tenders. Consider a tender for a contract in which the winner is the bidder that agrees to take the contract for the lowest cost. If the collective bid, i.e., the mean bid, is the most accurate in assessing the true value of the contract, then the winning bid is overestimating the contract and is therefore expected to end up with a loss. Indeed, this winner's curse, was first observed in tenders in the petroleum industry and has been since found in many other fields.

**Methodology**                      All the construction projects that were tendered and completed between January 2017 and July 2020 under the management of the department of engineering and construction, a government agency in Israel, were analyzed. After data cleansing, the data comprised 148 tenders with 1295 bids and total value of 229 million US dollars. For each project we determined the valid bids, average (valid) bid, the winning bid, the original project estimated cost, and the actual payments to the winning contractor (actual project cost).

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|-----------------------------------|--|
| Contribution                      | Construction projects in the public sector are typically granted through a bidding process in which the lowest bidder is granted the contract. It is therefore of interest to examine whether the wisdom of the crowds and the winner's curse phenomena are manifested in this type of tenders. The results could help understand the reasons for cost overruns in public construction projects.   |
| Findings                          | <ol style="list-style-type: none"><li>1. Wisdom of the crowds: For each project we computed the ratio of the average bid and the project's estimated cost. The mean ratio (for the 148 projects) was 1.01 suggesting that, on average, the bids are within 1 percent from the true project value.</li><li>2. Winner's curse: On average the winning bid was 7.9% less than the estimated cost and 8.1% less than the average bid.</li><li>3. Cost overruns: On average, the payments to the contractor were 16.3% higher than the estimated cost, and 18.8% higher than the average bid.</li><li>4. In total these results demonstrate how contractors are able to overcome the winner's curse. On average, payments to the contractor were 30.7% higher than their bid.</li></ol> |
| Recommendations for Practitioners | Tender issuing public agencies should take into account that the winning bid is based on unrealistic optimism and when the winning contractor is tested by the real costs, they will be hard pressed to avoid these losses and therefore will drive the project into cost overruns.  |
| Recommendations for Researchers   | It is important to model the strategic game between contractors and project managers that represent the tender-issuing agency. This may explain why the construction industry is beleaguered by cost overruns.   |
| Impact on Society                 | In the current state, the public is paying more than needed for construction projects since winning contractors are struggling to spin their losses into gains.  |
| Future Research                   | Develop game theory models that are based on our empirical findings and that can help to reduce cost overruns in construction projects.  |
| Keywords                          | construction projects, tenders, minimum bid, winner's curse, wisdom of the crowds  |

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