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Assessment of Prevalent Practice for Detection and Prevention of Unbalanced Bids in Nepal

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Abstract

Various factors are delaying the country's developmental activities, among which low bidding and unbalanced bids are significant. Contractors tend to unbalance their bids to win contracts and maximize profits, disadvantaging the balanced least bidder and indirect economic loss to the client. The purpose of this study was to compare and analyze prevalent practices with theoretically developed models and to identify the necessity for further studies. Five projects with estimates 20 million above (Single Stage – Two Envelope) from Road Division Surkhet were considered to evaluate whether the bidder to whom the contract was awarded is the most balanced bidder using three models, and also to determine whether the prevalent practice is the most beneficial to the client. This study concluded that 3 out of 5 contracts were awarded to the unbalanced bidder, which caused a systematic disadvantage to the balanced least bidder, and the use of the rebalancing model could have been economic to the Client saving public funds in 4 projects.

Keywords: Unbalanced bid, Theoretical models, Grading system, Construction Industry, Bid evaluation.

1. Introduction

The Nepalese Construction industry is the second largest employer in the country, which contributes around 11 percent to the Gross Domestic Product (GDP). About 60 percent of the nation's development budget is spent through this industry (Federation of Contractors' Associations of Nepal- FCAN, 2025). The public entity procures in accordance with prevailing procurement laws and regulations to obtain the maximum returns of public expenditures in an economical and rational manner by promoting competition, fairness, honesty, accountability, and reliability in the process. The lowest evaluated substantively responsive bid is determined by evaluating based on qualification evaluation criteria set forth in bidding documents (The Public Procurement Act, 2063, 2007).

Unbalanced bidding is a common practice used in both unit price and lump sum contracts, in which contractors may unbalance their bids to achieve a competitive advantage to win the contracts, minimize the financing cost of the project, improve cash flow, and increase the profit. The studies in the literature focus on developing optimizing models that assist contractors in winning contracts and maximizing profits or developing models that assist owners in detecting and/or preventing unbalanced bids during the bid evaluation stage. Unbalanced bidding is one of the most controversial subjects in the construction management literature and practice. While it cannot be stated with certain whether this practice is unethical or not, this is not usually practiced for the benefit of the owners. Therefore, owners have the right to reject unbalanced bids and create a fair competition environment if they have a mechanism to detect it during the bid evaluation process (Polat et al., 2019).

The prevailing legislation of Nepal has the provision of evaluating whether or not the quoted price is imbalanced for the unusually high rate of the bidder for an item carried out at the initial stage of the execution or for an unusually high rate quoted by the bidder for an underestimated item. It also promotes examining low bid prices due to wrong understanding or misunderstanding of the scope or technical specifications of construction works. Where a low price is quoted, the evaluation committee shall have to ask for clarification along with a rate analysis from such bidder. The evaluation committee may recommend for acceptance of a bid by taking additional performance security equivalent to an amount of eight percent of his/her quoted bid

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price if the clarification sought is found to be satisfactory and for rejection of such bid if the clarification is not found to be satisfactory (The Public Procurement Rules, 2064, 2007).

However, there are no clear provisions to determine whether the quoted price is unusually high, low, or unbalanced thus, to conclude whether the submitted bid is unsatisfactory due to which there are sick projects all over the country, which hinders the pace of construction activities, leading to slow the overall development of the country. The purpose of this study is to determine the sufficiency of the prevalent practice by comparing with the outcomes of the models, which establish the need of further study and development of suitable framework for bid evaluation in context of Nepal.

2. Literature Review

Asian Development Bank (2018) defines an unbalanced bid as when the item rate quoted in the bid is exceptionally high for certain items of work and lower for others compared to the Engineer's estimate as well as other bidders. An unbalanced bid can be either mathematically unbalanced or materially unbalanced. A mathematically unbalanced bid is a bid that contains some line item's unit price determined to be significantly overstated or understated. A mathematically unbalanced bid is one containing unit bid items that do not reflect reasonable actual costs plus a reasonable proportionate share of the bidder's anticipated profit, overhead costs, and other indirect costs, which he/she anticipates for the performance of the items in question. If a mathematically unbalanced bid is detected, the bid has to be further analyzed to determine whether it is also materially unbalanced. A materially unbalanced bid is defined as a bid that generates a reasonable doubt that award to the bidder submitting a mathematically unbalanced bid will result in the lowest ultimate cost to the Government (Federal Highway Administration, 1988).

There are several types of unbalancing, depending on the contractor's motivation for employing this practice. The most common types are front-end loading, back-end loading, and quantity error exploitation (Hyari, 2017). Front loading is the most common way to unbalance a bid. Frontloading refers to increasing unit prices on items to be completed in the earlier stages of the project and decreasing the unit prices on items that are to be completed in the later stages. The main advantage of frontloading for the contractor is to relieve the financial problems that contractors face early in the project such as the initial expenses of mobilization and setting up. But if a contractor is set to be paid out in the early stages of the project, the owner ends up paying more when the time value of money is taken into consideration (Olsen, 2024).

Quantity Error Exploitation is a practice of taking advantage of the Engineer's error in the quantity calculation of items in the Bill of Quantities. This process entails loading the price of items whose final quantities are expected to exceed the initial quantities contained in the tender documentation (Cattell et al., 2007). This concept is based on a situation where the Contractor is more informed than the client, which may lead to rejection of a true responsive bid and cost escalation of the project (Chouksey, 2021). This practice arises where the initial contract quantities are not fixed and are subject to review and adjustment as per the quantities executed. The benefit to the contractors is derived from their ability to shift their margin onto items where, when the consequently high prices are applied to increases in these items' quantities, the contractor enjoys far greater compensation for its extra work than is reflected in the increased cost of the added work. Furthermore, a contractor can use the opportunity of a prediction that an item's final quantity will be less than its initial quantity depicted in the bill of quantities, by allocating such items to a low price. If the prediction is correct, the ultimate reduction in the payment made to the contractor will be less than if it were to have priced such an item any higher (Cattell et al., 2008).

Backloading is a practice if the contractor allocates high prices to items that are scheduled to occur in the later stages of the project and helps to obtain a high expected escalation, the contractor will receive larger amounts in escalation in compensation for inflation. Besides the cost of escalation, the contractor receives more, if the line items were allocated lower prices. This opportunity arises in contracts that incorporate the practice of escalation payments in terms of price adjustment provisions. In such situations, an estimate is made of the contractor's actual cost of inflation, with the objective being that the contractor should be compensated for this added expense. The concept is such that, the contractor should neither profit nor make a loss from inflation but rather that any risk that comes from inflation should be passed from the contractor to the project's developer (Cattell et al., 2008).

Polat et al. (2019) focuses on quantity error exploitation in unit price contracts and aims to provide owners with a model, that assists them in detecting the potential unbalanced bids. It helps to detect unbalanced bids by using five different grading systems. All bidders obtain five scores based on the five-grading system, which helps to evaluate the bidder's total score (BTS) based on the calculated final scores as well as the offered bid prices. This study is limited as it focuses on unbalanced bids created by using the quantity error exploitation method in unit price contracts.

Polat et al. (2020) extends the existing approach by defining and adding three new grading systems. This study defines major and minor bid items. If a bid item's total price is > 5% of the owner's ECC (estimated construction cost), this bid item is called a "major bid item". On the other hand, if a bid item's total price is <5% of the ECC, this bid item is called a "minor bid item".

F.D. Akin et al. (2020) encourages owners to reach a compromise between what they want and what bidders want can provide mutual benefits, with an approach that prevents unbalanced bids by adjusting the submitted bids by using a parameter called counterbalance ratio.

Hyari (2016) proposed a model to preserve the lowest bid and to avoid its possible rejection on the basis of irregularity and at the same time minimize the negative consequences of various forms of unbalanced bidding for the owner. It utilizes the average unit price of all bidders to adjust the unit price of every line item submitted by each bidder while keeping the total bid amount of the bidder untouched. The average unit price thus would reflect the collective judgment and experience of all the bidders and their perceptions of the risks involved in the project.

3. Methodology

This study involves the use of Polat et al. (2020), F.D. Akin et al. (2020) and Hyari (2016) models to evaluate the bids of sample projects and provides insights into the practical challenges and feasibility of implementing such models to detect unbalanced bids in the case of Nepal. For case study purposes, estimated price and quantities, bidders' offers, and final quantities along with the final amount paid for five projects of above 20 million (Single Stage – Two Envelope) will be collected from Road Division Surkhet. The results obtained from these models will be a basis for evaluating the shortcomings of the prevalent practice of bid evaluation along with determining the necessity of an additional framework for the detection and prevention of unbalanced bids.

In the Polat et al. (2019) model, the first grading system compares the ratio of each activity's total price offered by each bidder with the one estimated by the owner, the second grading system compares the unit price of each activity offered by each bidder with the one estimated by the owner, the third grading system compares the unit price of each activity offered by each bidder with the average of unit prices offered by all bidders, the fourth grading system compares the bid price offered by the bidder with the estimated construction cost (ECC), and the fifth grading system compares the sum of total prices offered by bidders for those activities whose quantities may likely increase during the construction phase with the ones estimated by the owner.

In addition to the above, Polat et al. (2020) provides three new grading systems, the sixth grading system compares the unit price of each major activity offered by each bidder with the ones estimated by the owner, the seventh grading system compares the unit price of each major activity offered by each bidder with the average of the unit prices offered by all the bidders for that activity and, the eighth grading system compares the ratio of the sum of all major activities' total prices offered by each bidder to that of minor activities on the one hand with the ones estimated by the owner on the other. The weights of different grading systems are considered as given in the illustrative example of the published paper.

In the Hyari (2016) model, the arithmetic mean is used to calculate the average unit price of bid items, which is used to determine the bid adjustment coefficient for all the bidders. This coefficient is used to adjust the unit bid item prices of all the bidders to obtain the total bid price. Although, this model provides a framework to handle both error exploitation unbalancing and front-end loaded bids, only error exploitation unbalancing detection is used in this study.

In the F.D. Akin et al. (2020) model, the first step is to calculate the average unit price of bid items using the Monte Carlo Simulation, which neutralizes the negative effects of unbalanced bids, unlike the Hyari (2016) model. In the second step, the Monte Carlo simulation generates random bid item prices based on the designated range of values, and triangular distribution for 5000 number of iterations, the arithmetic mean of the bid item prices is used to compute the counterbalance ratio. Then, adjusted bid item prices are obtained by multiplying the counterbalance ratio with the bid item prices submitted by the bidders, which is used to calculate the total bid price.

For confidentiality issues, Projects are coded as Project No. 1, Bidders are coded as Bidder No. 1 and, Activities are coded as Activity No. 1.

4. Result and discussion

4.1. Project No. 1

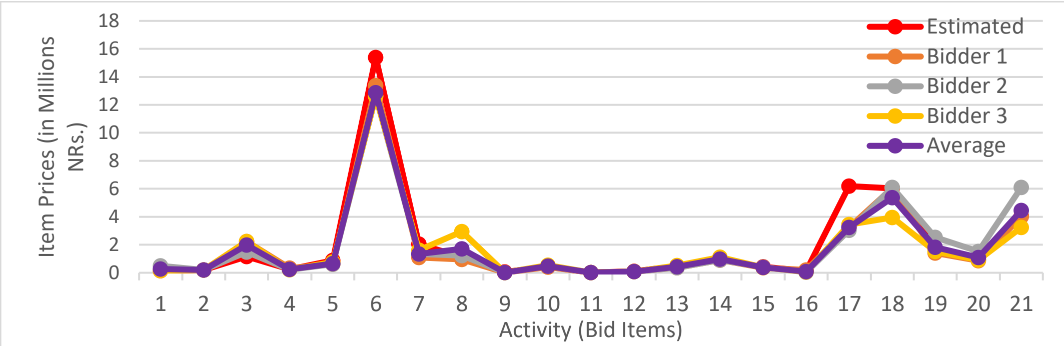

Figure 1. Comparison between estimate, bidders' and average price of Project No. 1

Bidder No.3 has submitted the lowest bid. Figure 1 shows that Bidder No. 3 has substantially hiked the price of Activity No. 8 (gabion works, which covers around 2.5% of total estimated cost) and reduced the price of Activity No. 18 (base works, which covers around 15% of total estimated cost) and Activity No. 21 (premix works, which covers around 10% of total estimated cost) to be the lowest bidder in comparison to other bidders, their average as well as engineer's estimate.

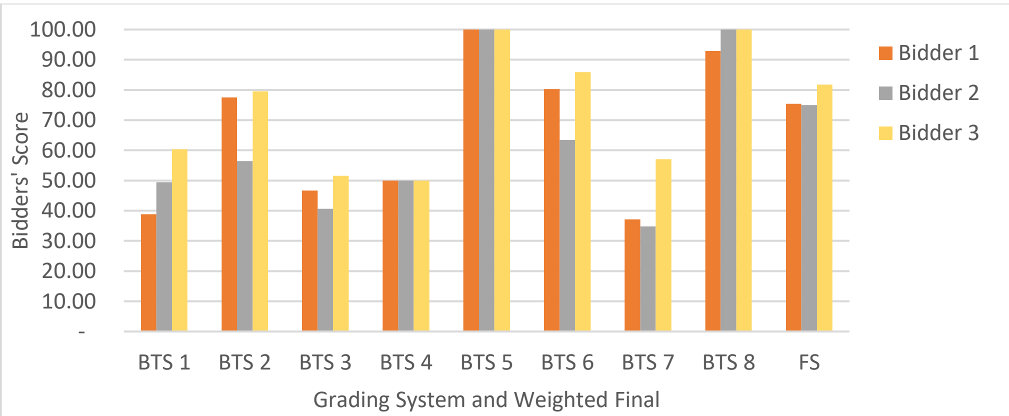

Figure 2. Bidders' Score as per Eight Grading System of Project No.1

As per Polat et al. (2020) model, Figure 2 shows that Bidder No. 3 is the most balanced bidder. However, use of F.D. Akin et al. (2020) and Hyari (2016) models would have saved around 1% of the project cost, which is an indirect economic loss to the public entity.

4.2. Project No. 2

Bidder No.1 has submitted the lowest bid. Figure 3 shows that Bidder No. 1 has not substantially hiked the price of any Activity but reduced the price of Activity No. 8 (plum concrete works, which covers around 48% of the total estimated cost) to be the lowest bidder in comparison to other bidders, their average as well as Engineer's Estimate.

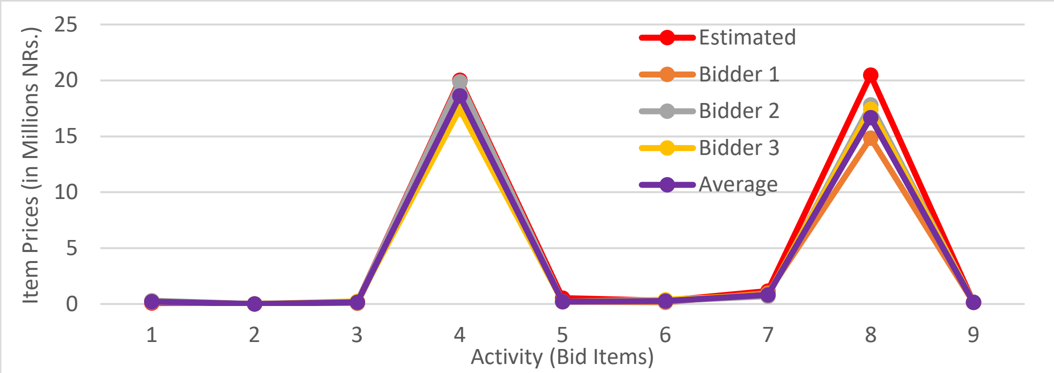

Figure 3. Comparison between estimate, bidders' and average price of Project No. 2

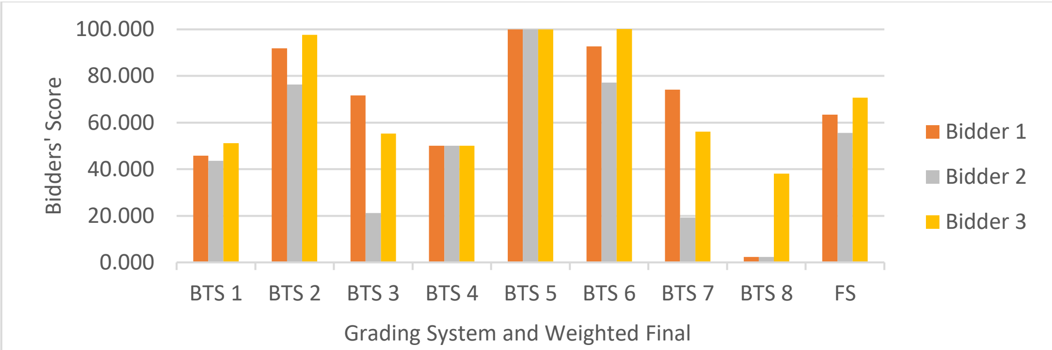

Figure 4. Bidders' Score as per Eight Grading System of Project No.2

As per Polat et al. (2020) model, Bidder No. 3 is the most balanced bidder as compared to the least price bidder. In addition to the above, other theoretical models considered, does not indicates significant difference in awarding the contract to the least price bidder.

4.3. Project No. 3

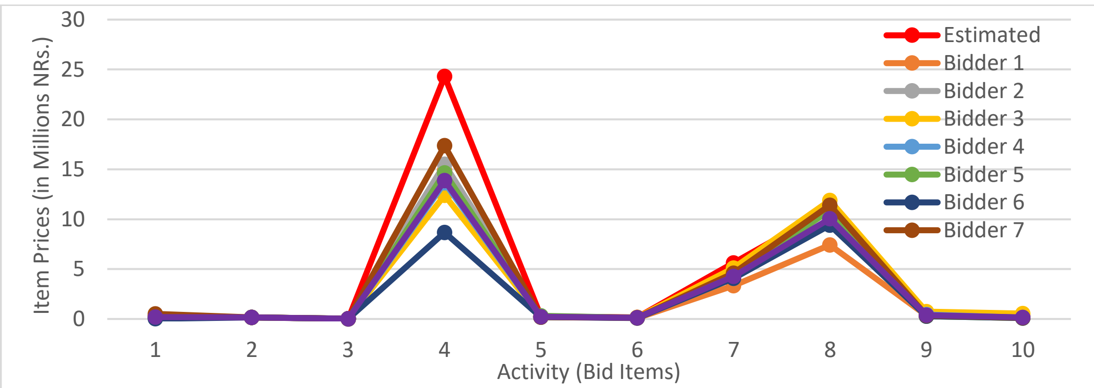

Figure 4. Comparison between estimate, bidders' and average price of Project No. 3

Bidder No.6 has submitted the lowest bid. Figure 4 shows that Bidder No. 6 has not substantially hiked the price of any activity but has substantially reduced the price of Activity No. 4 (roadway excavation works, which covers more than 55% of the total estimated cost) to be the lowest bidder in comparison to other bidders, their average as well as Engineer's Estimate.

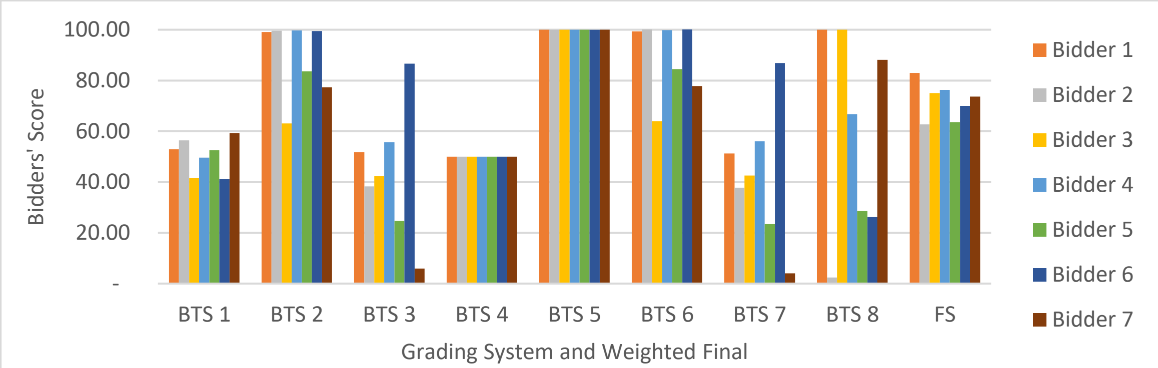

Figure 5. Bidders' Score as per Eight Grading System of Project No.3

As per Polat et al. (2020) model, Bidder No. 1 is the most balanced bidder as compared to the least price bidder. However, use of F.D. Akin et al. (2020) and Hyari (2016) models, would have saved more than 1% of the project cost, which is an indirect economic loss to the public entity.

4.4. Project No. 4

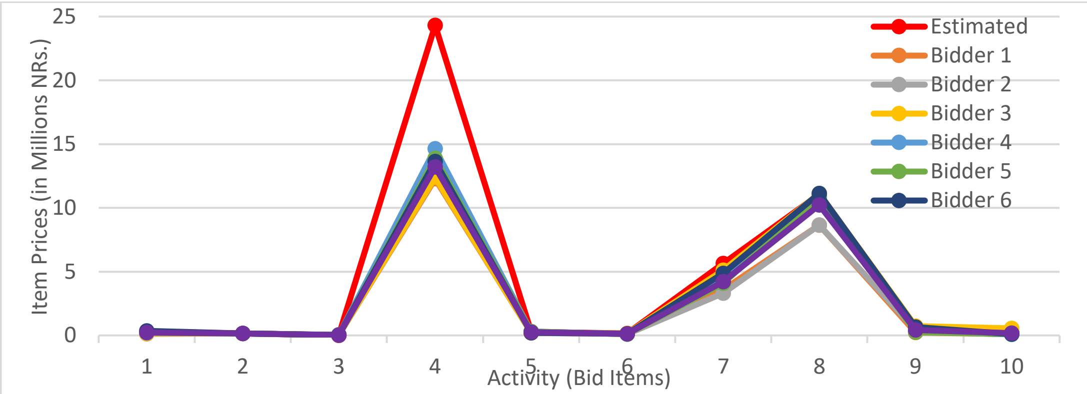

Figure 6. Comparison between estimate, bidders' and average price of Project No. 4

Bidder No.1 has submitted the lowest bid. Figure 6 shows that Bidder No. 1 has neither substantially hiked the price of any activity nor reduced the price of any activity but has reduced the overall bid in a proportionate way to be the lowest bidder in comparison to other bidders and their average and all the bidders seem to reduce the price of Activity No. 4 (roadway excavation works, which covers more than 55% of the total estimated cost) in comparison to the Engineer's estimate.

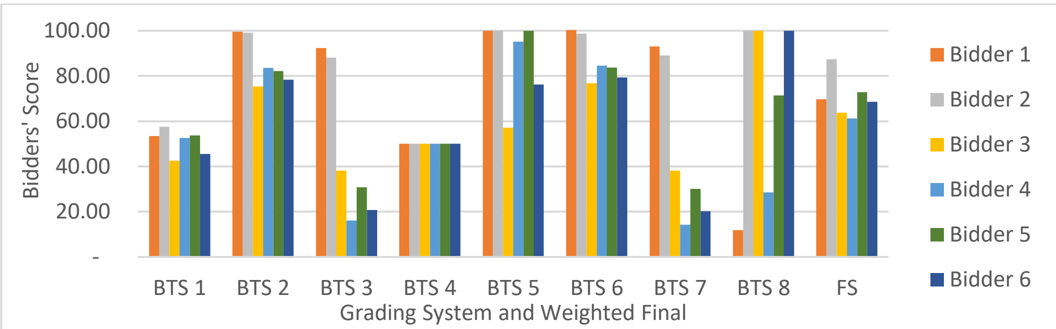

Figure 7. Bidders' Score as per Eight Grading System of Project No.4

As per Polat et al. (2020) model, Bidder No. 2 is the most balanced bidder as compared to the least price bidder. However, use of Hyari (2016) models, would have saved around 0.16% of the project cost, which is an indirect economic loss to the public entity.

4.5. Project No. 5

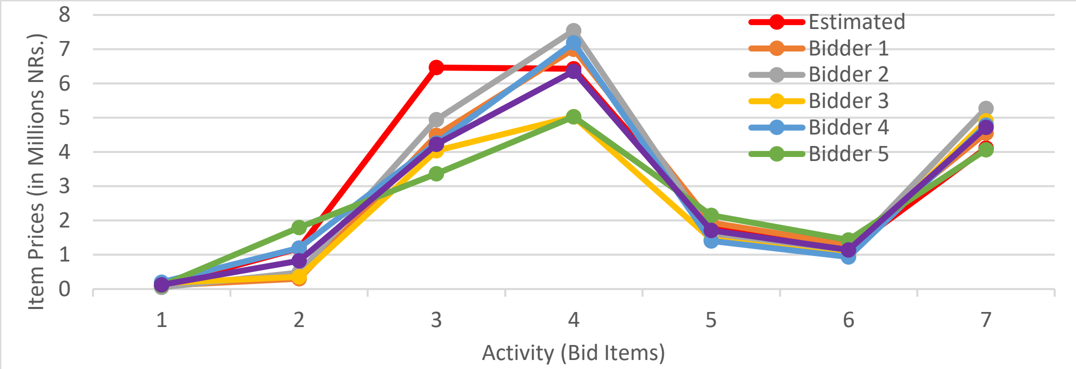

Figure 8. Comparison between estimate, bidders' and average price of Project No. 5

Bidder No.3 has submitted the lowest bid. Figure 8 shows more dispersion in bid prices of different bidders, Bidder No. 3 has quoted lower prices in a majority of activities in comparison to the average bid and engineer's estimate. The substantial reduction is seen in Activity No.4 (base works, which covers around 30% of the total estimated cost) to be the lowest bidder.

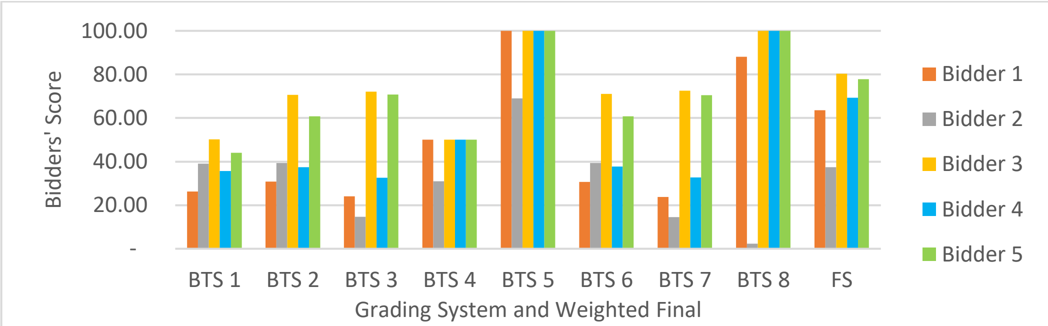

Figure 9. Bidders' Score as per Eight Grading System of Project No.5

As per Polat et al. (2020) model, Bidder No. 3 is the most balanced bidder. However, use of F.D. Akin et al. (2020) and Hyari (2016) models, would have saved around 0.35% of the project cost, which is an indirect economic loss to the public entity.

5. Conclusion and recommendation

Unbalanced bids invites invalid advantage to the bidders, which has several negative consequences such as default of the project at the later stages, disadvantage to the balanced bidder and difficult in tracking of the project. Current provisions of procurement understand the problem of unbalanced bids however, a clear framework lacks to guide through the detection or prevention of such bids.

The main aim of this study was to identify whether the prevalent practice is sufficient or requires the application of a certain framework to detect unbalanced bids. Above results indicates that there is utmost necessity of additional framework to conduct a uniform, transparent and economic evaluation of bids, which should be incorporated in public procurement guidelines, acts and regulations.

In Project No.1, there was a price hike in gabion works and a reduction in the price of base works and premix works, which suggested the prevalence of front loading in that particular project. Use of Polat et al. (2020) model suggested that 3 out of 5 projects, were awarded to the unbalanced bidder, which helps to conclude that there was systematic disadvantage to the balanced bidders. Use of F.D. Akin et al. (2020) and Hyari (2016) model suggested that 4 out of 5 could have been economic to the Client saving public fund.

It is recommended to conduct further analysis with the use of international organizations' practices as the Asian Development Bank and World Bank, along with other theoretical models. The use of models to detect front loading in a larger number of projects, in other projects than road and out of the Surkhet District, is also recommended before any strong conclusion and development of a legal framework.

6. Limitations

This paper is majorly focused on quantity error exploitation, rather than frontloading and backloading. Its case studies are conducted on only road projects of Surkhet District with only 5 projects. The weightage of different grading system was taken as assumed by the model developer, which should be developed based on Expert's opinion.

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