

A comparative study on bidding trends and competition analysis before and after limiting number of Project for Bidders Qualification in Procurement of Works in Nepal

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Abstract

In the realm of public procurement, ensuring competition and transparency is paramount to achieving value for money and efficient resource allocation. This study delves into the procurement landscape of Nepal, focusing on the effects of limiting the number of projects for bidders' qualification by 11th amendment of PPR,2064 on bidding trends and competition levels. The objective of this research is to assess how this policy change has influenced the procurement process, bidder behavior, and overall competition dynamics. The study employs a comprehensive approach, combining quantitative deductive analyses of procurement data and bidder response. The data is collected from a period prior to policy change and a period following policy change of the various projects of DUDBC division offices to provide a robust comparative analysis. Key findings from this study include insights into how limiting the number of projects for bidders' qualification has impacted bidder participation, pricing strategies, and the overall competitiveness of the procurement process. This comparative research contributes to a better understanding of the evolving landscape of public procurement in Nepal and offers valuable insights for policymakers, government agencies, and practitioners seeking to enhance competition and efficiency in the procurement of works. The findings may also have broader implications for similar policies and practices in other regions facing similar challenges in public procurement.

Keywords

Public Procurement, Bidding Trends, Competition Analysis, Qualification Criteria, Procurement Policy, Efficiency, Transparency

1. Introduction

Public procurement plays a pivotal role in the economic development of nations, ensuring the efficient allocation of resources while promoting competition and transparency. In Nepal, the first public procurement law was enacted in 1958/59. It addresses issues like transparency, competitiveness, accountability, and financial management. It is related to rules and regulations that change depending on the time of day. In 2007, the financial administration rules 1985/86, 1995/96, and 1999, as well as the Public Procurement Act 2063 (PPA), were established. The 11th amendment of PPR,2064 was published in 2079/12/03 by Nepal gazette followed by the 12th amendment in 2080/03/20. The recent 11th and 12th amendment of PPR has limited the number of signing of contracts up to five (5) numbers. Limiting the number of projects for bidders can have a significant impact on bidding trends and competition dynamics within the procurement process. In this context, this study endeavors to conduct a comparative analysis of bidding trends and competition dynamics before and after the implementation of the amendment that limits the number of projects for bidders' qualification in the procurement of works under the Public Procurement Regulations (PPR) in Nepal.

In Nepal, the Department of Urban Development and Building Construction (DUDBC) is a government agency that oversees a multitude of infrastructure projects, with a substantial budget allocation for the procurement of various works. DUDBC, as a key governmental agency responsible for the development of urban and building infrastructure, plays a

pivotal role in the socioeconomic advancement of Nepal. Efficient and competitive procurement practices are essential to ensure that public funds are utilized optimally and that projects are awarded to qualified and capable bidders.

The "Limiting Number of Project for Bidders Qualification" policy (Rule no.65, PPR), a significant reform under the PPR, sought to address several critical issues. The 11th amendment of PPR allows the construction firms to bid while having maximum five (5) number of running projects and forbid the firms to bid if they had more than five running projects. The 12th amendment of PPR (Rule no. 65.), similar but having a slight difference with the 11th amendment, this regulation stipulated that contractors had no limitation on bidding for projects but are allowed to sign only 5 number of contracts. Firstly, it aimed to prevent the concentration of projects among a few dominant bidders, which could potentially stifle competition. Secondly, the policy aimed to encourage a wider pool of qualified bidders to participate in government agency projects, promoting diversity and broader representation in the procurement process. Lastly, it sought to evaluate the impact of this policy change on bidding trends, bidder behavior, and overall competition levels within the procurement of works in Nepal.

This comparative study endeavors to provide empirical evidence on the effects of this policy change by analyzing data from both the pre-policy and post-policy implementation periods. It aims to uncover how the limitation on the number of projects for bidders' qualification has influenced bidder participation, pricing strategies, and the overall

competitiveness of the procurement process.

Understanding the outcomes of this policy change in the context of DUDBC projects and the broader implications for public procurement in Nepal is crucial. It not only contributes to the body of knowledge surrounding public procurement practices but also provides valuable insights for policymakers, government agencies, and practitioners seeking to enhance competition, transparency, and efficiency in public procurement. Furthermore, the findings may serve as a reference point for other regions facing similar challenges in the quest for effective and accountable public procurement systems.

2. Statement of Problem

After the 11th and 12th amendment in limitation of projects in PPR, there are different perspective reviews from different parties involved in procurement. The Federation of Contractors Association (FCAN) has expressed significant opposition to the probable elimination of the amendment. According to the FCAN, the adoption of this clause of PPR has resulted in project completion on time and allowed for public review of progress. The federation has underlined the significance of carefully enforcing the provision as a necessary framework for the development of nationwide infrastructure. "Rather than attempting to amend the regulations at the hands of vested interest groups, the provision should be upheld." The association has cautioned that if the amendment, which has benefited both contractors and the general population, is overturned, construction entrepreneurs throughout the nation will be forced to protest.

On the contrary, at the National Planning Commission's 50th National Development Action Committee (NDAC) meeting, a request was made to change the PPR's 12th amendment due to a lack of bidding from contractors for relatively small construction projects. Due to the limits, some have stated that nearly no contractors have participated in the process of bidding. [1]

The NDAC meeting suggested that the Public Procurement Monitoring Office undergo an in-depth analysis of the regulations and update them within two months. It was suggested that the maximum number of contracts that contractors could sign be defined by either the estimated amount or the type of construction associated with the project. [1] PPMO has been collecting data from all the public entities all over the country to track the potential effects of the amendment. With collaboration with PPMO, my research will fulfill the gap in study which is so in demand to know the implications of the limitation by amendment.

राष्ट्रिय विकास समस्या समाधान समितिको ५०औं बैठकबाट भएका निर्णयहरु

“१३.सार्वजनिक खरिद नियमावली,२०६४ को बाह्रौं संशोधनले निर्माण व्यवसायीले अधिकतम पाँचवटा ठेक्का मात्र लिन पाउने सीमा तोकेपश्चात कतिपय सडक कार्यमा बोलपत्र पर्ने छाडेको हुँदा निर्माण व्यवसायीले ठेक्का लिन पाउने सीमा टेन्डर मुल्यको आधारमा गर्ने वा संख्या सीमा बढाउने वा भौतिक संरचना (आयोजना) को किसिम बमोजिम संख्या सीमा तोक्ने लगायतका अन्य समसामयिक विषय समावेश गरी नियम संशोधन गर्ने विसयमा सार्वजनिक विषय समावेश गरी नियम संशोधन गर्ने विषयमा सार्वजनिक खरिद अनुगमन कार्यालयले अध्ययन गरी २ महिनाभित्र प्रस्ताव गर्ने।”

Categorization with SIZES
Type 1: Engineers' estimated value: < 2 crore (With VAT and PS)
Type 2: Engineers' estimated value: > 2 crore – 500 crores (With VAT and PS)

3. Research Objectives

- To use statistical analyses to find out the bidding trend of contracts of different type and sizes before and after 11th amendment of PPR of a sample of DUDBC projects.

Bidding trend:

- Level of competition – No. of bidders per bid
- Quality of bids - % below engineer's estimate
- To study the relationship between the number of bidders, the substantially responsive lowest bidding amount, and the estimated cost with respect to the kind and size of projects before and after changes have been made in PPR.

4. Research Methodology and Population

The study has applied a quantitative deductive approach to dig and decide on bidding process trends before and after the 11th amendment of the PPR. The study's methodological approach was an evaluation of secondary data from relevant sources like project Co-ordination offices (PUDBC, FPIU, SBCPCO) of Department of Urban Development and Building Construction (DUDBC). Data from various accomplished projects and ongoing projects before and after amendment which has completed its procurement stage in Project Co-ordinations offices (FPIU, PUDBC, SBCPCO) of DUDBC is collected from office records of DUDBC and PPMO and is analyzed using statistical analysis tools like Mean, Standard deviation, Correlation, regression etc. and results are presented through various charts and tables (bar diagram, scatter charts, trend line) to compare the quality of bids before and after amendment.

Time frame of data:

- Post amendment:
Bid notice Publication date after 2078/12/03
- Pre-amendment:
Bid notice publication date from 2076/03/25 to 2078/12/02 (Recent two fiscal years 76/77 and 77/78 before amendment)

5. Literature Review

Public procurement is guided by Legal Act and Regulation. The Public Procurement Act (PPA) of 2007 and the Public Procurement Regulation (PPR) of 2007 are the governing act and regulation in our country for the execution of contract management by the public sector. The Public Procurement Monitoring Office (PPMO) has prepared standard bidding documents that are followed by the public sector for the execution of construction projects in the public sector based

on PPA (2007) and PPR (2007). Similarly, the guidelines for the execution of different donor funded projects are also prepared on the basis of the procurement system of PPMO which is based the provisions of PPA (2007) and PPR (2007). According to the provisions of PPA (2007) and its regulation, the successful bidder in National Competitive Bidding (NCB) is the one which is substantially evaluated with lowest bid price.[2]

Bidding is an unpredictable process. A contractor's bid price is influenced by a number of factors, including the nature of the work, the bidding requirement, socioeconomic conditions, rivalry, the need for work, the probability of winning, the number of bidders, the accuracy of the estimate, the amount of data and information available, and so on. It is also a widely accepted economic theory that open and fair competition results in lower prices, which clearly benefits the owner. The level of competition in any project can be quantified as the number of bidders per bid. [3]

In Nepal, the construction industry accounts for about 10% of GDP. The construction industry takes up 35% of the total government budget and 60% of the nation's development budget.[4] It is estimated that this sector employs approximately one million people, making it the second largest employer in the country after agriculture. Low bidding forces contractors to constantly reduce costs by implementing cost-cutting technological and managerial advancements. Through the competitive process, these savings are then passed on to the owner.

The competitive low bid method is preferred for saving a significant amount of money and minimizing the level of favoritism and corruption, and the use of such a method has a negative impact on contractor's profit, disputes/claims, coordination, quality control, project cost, and duration. As a result, the profit margin can be calculated by comparing the engineer's estimate to the low-bid contractor's price. A low profit margin can reflect market conditions, such as the level of competition and economic conditions, or it can indicate what is known as the "winners curse." [3]The winner's curse occurs when a low bidder submits an underbid and is thus cursed by being chosen to complete the project.

Lack of healthy competition, i.e. low bidding in contracting, has a negative impact on contractors' financial capacity, in addition to the poor performance of contractors and projects. Contractors can suffer greatly if payments are delayed due to price fluctuations and high interest rates. Owners must commit to making payments on time.

The definitions of low bids and abnormally low bids (ALBs) are not consistent. In India, a bid is considered low if it differs from the estimated rates by more than 25%, even after the scheduled rates have been updated to match the current cost index. In Taiwan, an ALB is defined as a total bid price that is less than 80% of the estimate. According to UK national legislation, a low tender is one that differs by 10% - 15% from the average bid price. According to Luxembourg law, a low bid is a price that leaves no margin for a normal level of profit. A law passed in Lithuania in 2009 states that a tender is considered abnormally low if it is 15% or more below the average of the other bid prices, or 30% or less than the authority's original estimate. According to the European

Commission's Europa report, a tender is considered abnormally low if it: does not provide a margin for a normal level of profit; and the bidder cannot justify its price based on the economy of construction technique, or the technical approach chosen, or the exceptionally favorable circumstances available to the bidder, or the uniqueness of the work proposed. According to Disti (2011), a tender with a bid price that is less than 60% of the engineer's estimate is categorized as an ALB or ALT, and Bhattarai (2015) concluded that the trend of low bidding was increasing. The frequency of bids ranged from 30% to 50% lower than the engineer's estimate.

On the other hand, if the competition is too low, there is a chance of Collusive bidding to occur. Bid rigging is a particular form of collusive price-fixing behavior by which firms coordinate their bids on procurement or project contracts. Also bid rigging is one of the most widely prosecuted forms of collusion. The Antitrust Division of United States Department of Justice explained that bid rigging is the way in which conspiring competitors effectively raise prices where purchasers such as federal, state or local government acquire goods and services by soliciting competing bids. Likewise, the (OECD, n.d.) clarified that a bid rigging often occurs in the construction industry when bidders agree among themselves to eliminate competition in the procurement process. Under bid rigging behavior, the government always pays for goods and services above the market price. Thus, bid rigging has a direct impact on public expenditure and consequently on taxpayers' resources.

Screening for bid rigging by using engineers' estimated cost is based on the study of Visuth et al. (2002: 4-6) who reported that any public procurement with a difference between engineers' estimate cost and a winning bid price less than 5 percent could signal a bid rigging. The conclusion came from interviews of 48 experienced contractors in the public works construction market of Thailand.

Hence, determining a right level of competition is very important to ensure the quality of bids in procurement.

6. Result and Discussion

6.1 Analysis on Bidding Trend:

6.1.1 Before Amendment:

Bidding trend of overall projects are assessed first based on the contractors' overhead as a threshold. Furthermore, categorical bidding trend are also assessed on the basis of ranges of percentage below engineers' estimate and % of number of bidders. Data of before and after amendment of DUDBC projects were used for analysis.

Before the amendment, for the projects below 2 crores, the average percentage below engineer's estimate was found to be 31.61%. Likewise, the average number of bidders was found to be 6.12. The percentage of very high bids, whose criteria is deviation from engineer's estimate: < 5 % was found to be 1.61% only. This means that the probability of collusive bidding/ price rigging is very low. The percentage of low bids is 46% which means the low bids percentage is high.

Table 1: Type 1: Engineer's estimate value < 2 crore

Avg % Below calculation for Estimated value < 2 Crore					
Sno.	% below engineer's estimate	Mid value (X)	No. of contracts(f)	$U=(X-A)/5$	Uxf
1	0-5	2.5	1	-2.5	-2.5
2	5--10	7.5	1	-1.5	-1.5
3	10--15	12.5	2	-0.5	-1
4	15--20	17.5	4	0.5	2
5	20--25	22.5	5	1.5	7.5
6	25--30	27.5	11	2.5	27.5
7	30--35	32.5	14	3.5	49
8	35--40	37.5	10	4.5	45
9	40--45	42.5	11	5.5	60.5
10	45--50	47.5	3	6.5	19.5
11	50--55	52.5	0	7.5	0
12	55-60	57.5	0	8.5	0
		Sum	62		206
Average % below engineers' estimate(y)=A+($\sum U*f/\sum f$) *h					
		31.6129	%		
No. of Normal bids	33	53.23%			
No. of Low bids	29	46.77%			

Avg No. of bidders for Estimated value < 2 Crore					
Sno.	No of bidders	Mid value (X)	No. of contracts(f)	$U=(X-A)/2$	Uxf
1	0-2	1	8	-3	-24
2	2--4	3	11	-2	-22
3	4--6	5	15	-1	-15
4	6--8	7	12	0	0
5	8--10	9	7	1	7
6	10--12	11	6	2	12
7	12--14	13	1	3	3
8	14--16	15	0	4	0
9	16--18	17	1	5	5
10	18--20	19	0	6	0
11	20--22	21	1	7	7
		Sum	62		-27
Average no. of bidders=A+($\sum U*f/\sum f$)*h					
		6.129032			
Competitive	28	45.16%			
Not competitive	34	54.84%			

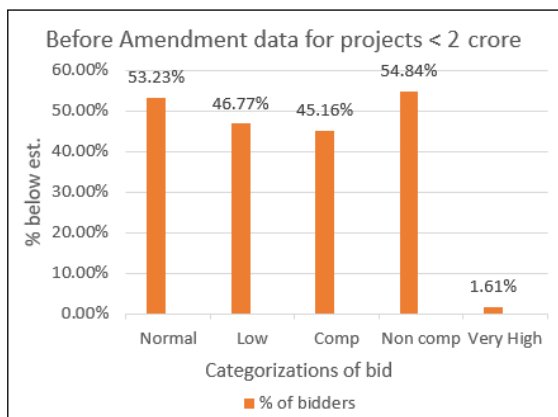


Figure 1: Bidders before amendment data for projects < 2 crores

Table 2: Type 2: Engineer's estimate value > 2 crore

Avg % Below calculation for Estimated value > 2 Crore					
Sno.	% below engineer's estimate	Mid value (X)	No. of contracts(f)	$U=(X-A)/5$	Uxf
1	0-5	2.5	4	-2.5	-10
2	5--10	7.5	2	-1.5	-3
3	10--15	12.5	2	-0.5	-1
4	15--20	17.5	6	0.5	3
5	20--25	22.5	4	1.5	6
6	25--30	27.5	9	2.5	22.5
7	30--35	32.5	7	3.5	24.5
8	35--40	37.5	5	4.5	22.5
9	40--45	42.5	7	5.5	38.5
10	45--50	47.5	1	6.5	6.5
		Sum	47		109.5
Average % below engineers' estimate(y)=A+($\sum U*f/\sum f$) *h					
		26.64894	%		
No. of Normal bids	21	44.68%			
No. of Low bids	26	55.32%			

Avg No. of bidders for Estimated value > 2 Crore					
Sno.	No of bidders	Mid value (X)	No. of contracts(f)	$U=(X-A)/2$	Uxf
1	0-2	1	5	-3	-15
2	2--4	3	4	-2	-8
3	4--6	5	8	-1	-8
4	6--8	7	8	0	0
5	8--10	9	9	1	9
6	10--12	11	5	2	10
7	12--14	13	2	3	6
8	14--16	15	3	4	12
9	16--18	17	1	5	5
10	18--20	19	1	6	6
11	20--22	21	0	7	0
12	22--24	23	0	8	0
13	24--26	25	1	9	9
		Sum	47		26
Average no. of bidders=A+($\sum U*f/\sum f$)*h					
		8.106383			
Competitive	22	46.81%			
Not competitive	25	53.19%			

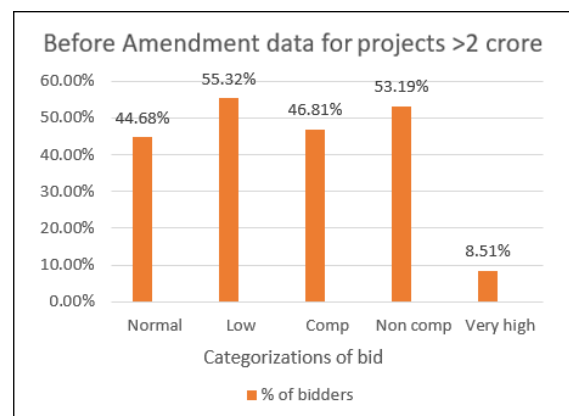


Figure 2: Bidders before amendment data for projects > 2 crores

Before the amendment, for the projects above 2 crores, the average percentage below engineer's estimate was found to be 26.64%. Likewise, the average number of bidders was found to be 8.1. The percentage of very high bids, whose criteria is deviation from engineer's estimate : < 5 % was found to be 8.51% . This means that the probability of collusive bidding/ price rigging is low. The percentage of low bids is 55.32% which means the low bids percentage is high.

6.1.2 After Amendment:

Table 3: Type 1: Engineer's estimate value < 2 crore

Avg % Below calculation for Estimated value < 2 Crore					
Sno.	% below engineer's estimate	Mid value (X)	No. of contracts(f)	$U=(X-A)/5$	Uxf
1	0-5	2.5	10	-2.5	-25
2	5--10	7.5	21	-1.5	-31.5
3	10--15	12.5	26	-0.5	-13
4	15--20	17.5	47	0.5	23.5
5	20--25	22.5	59	1.5	88.5
6	25--30	27.5	67	2.5	167.5
7	30--35	32.5	60	3.5	210
8	35--40	37.5	40	4.5	180
9	40--45	42.5	28	5.5	154
10	45--50	47.5	15	6.5	97.5
11	50--55	52.5	3	7.5	22.5
12	55--60	57.5	1	8.5	8.5
	Sum		377		882.5
Average % below engineers' estimate(y)=A+($\sum U*f/\sum f$) *h					
		26.70424	%		
No. of Normal bids	194	51.46%			
No. of Lowbids	183	48.54%			

Avg % Below calculation for Estimated value < 2 Crore					
Sno.	% below engineer's estimate	Mid value (X)	No. of contracts(f)	$U=(X-A)/5$	Uxf
1	0-5	2.5	10	-2.5	-25
2	5--10	7.5	21	-1.5	-31.5
3	10--15	12.5	26	-0.5	-13
4	15--20	17.5	47	0.5	23.5
5	20--25	22.5	59	1.5	88.5
6	25--30	27.5	67	2.5	167.5
7	30--35	32.5	60	3.5	210
8	35--40	37.5	40	4.5	180
9	40--45	42.5	28	5.5	154
10	45--50	47.5	15	6.5	97.5
11	50--55	52.5	3	7.5	22.5
12	55--60	57.5	1	8.5	8.5
	Sum		377		882.5
Average % below engineers' estimate(y)=A+($\sum U*f/\sum f$) *h					
		26.70424	%		
No. of Normal bids	194	51.46%			
No. of Lowbids	183	48.54%			

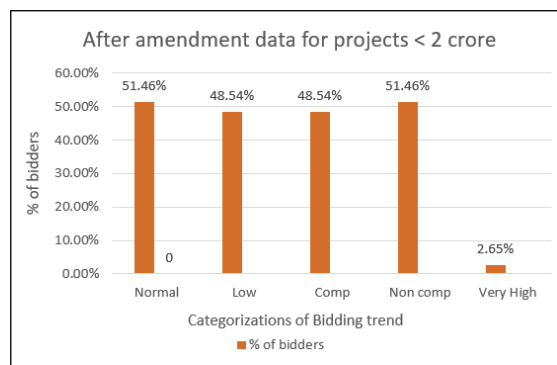


Figure 3: Bidders after amendment data for projects < 2 crores

Table 4: Type 2: Engineer's estimate value > 2 crore

Avg % Below calculation for Estimated value > 2 Crore					
Sno.	% below engineer's estimate	Mid value (X)	No. of contracts(f)	$U=(X-A)/5$	Uxf
1	0-5	2.5	30	-2.5	-75
2	5--10	7.5	16	-1.5	-24
3	10--15	12.5	22	-0.5	-11
4	15--20	17.5	21	0.5	10.5
5	20--25	22.5	13	1.5	19.5
6	25--30	27.5	14	2.5	35
7	30--35	32.5	8	3.5	28
8	35--40	37.5	6	4.5	27
9	40--45	42.5	1	5.5	5.5
10	45--50	47.5	2	6.5	13
	Sum		133		28.5
Average % below engineers' estimate(y)=A+($\sum U*f/\sum f$) *h					
		16.07143	%		
No. of Normal bids	60	45.11%			
No. of Low bids	73	54.89%			

Avg No. of bidders for projects > 2 crore					
Sno.	No of bidders	Mid value (X)	No. of contracts(f)	$U=(X-A)/2$	Uxf
1	0-2	1	53	-3	-159
2	2--4	3	35	-2	-70
3	4--6	5	23	-1	-23
4	6--8	7	13	0	0
5	8--10	9	3	1	3
6	10--12	11	4	2	8
7	12--14	13	2	3	6
	Sum		133		-235
Average no. of bidders=A+($\sum U*f/\sum f$) *h					
		3.466165			
Competitive	49	36.84%			
Not competitive	84	63.16%			

After the amendment, for the projects below 2 crores, the average percentage below engineer's estimate was found to be 26.7%. Likewise, the average number of bidders was found to be 5.67. The percentage of very high bids, whose criteria is

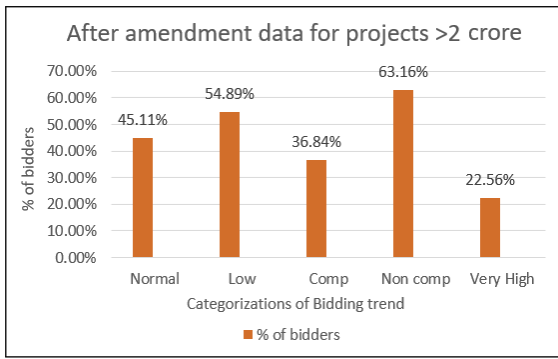


Figure 4: Bidders after amendment data for projects > 2 crores

deviation from engineer's estimate: < 5 % was found to be 2.65% . This means that the probability of collusive bidding/ price rigging is low. The percentage of low bids is 48.54% which means the low bids percentage is high.

After the amendment, for the projects above 2 crores, the average percentage below engineer's estimate was found to be 16.07%. Likewise, the average number of bidders was found to be 3.46. The percentage of very high bids, whose criteria is deviation from engineer's estimate: < 5 % was found to be 22.5%. This means that the probability of collusive bidding/ price rigging is high. The percentage of low bids is 54.89% which means the low bids percentage is high.

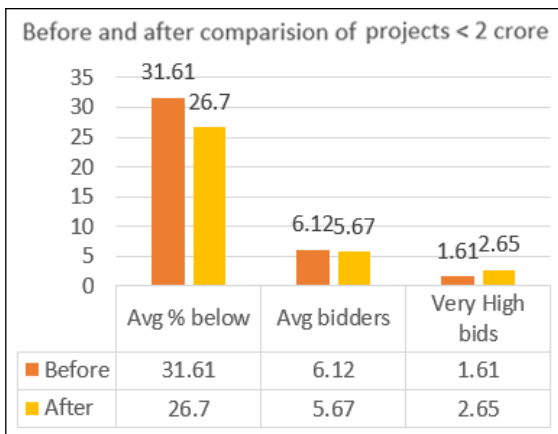


Figure 5: Before and after comparison of projects < 2 crores

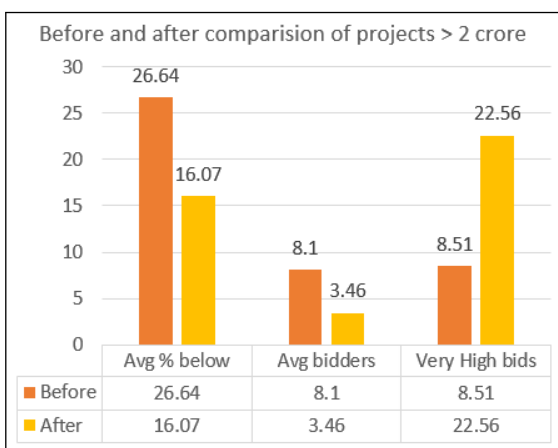


Figure 6: Before and after comparison of projects > 2 crores

Comparing the charts of overall before and after amendment data, it is seen that, for the projects of <2 crore, there isn't a significant change in the average number of bidders. The average number of bidders is found to be slightly decreased from 6.12 to 5.67. The percentage below engineer's estimate is found to be slightly decreased from 31.61% to 26.7%. The status of very high bids (up to 5% below engineer's estimate) is found to be slightly increased from 1.61 to 2.65%.

Comparing the charts of overall before and after amendment data, it is seen that, for the projects of > 2 crore, there is a significant change in the average number of bidders. The average number of bidders is found to be decreased from 8.1 to 3.46. The percentage below engineer's estimate is also found to be decreased from 26.64% to 16.07%. The status of very high bids (up to 5% below engineer's estimate) is found to be significantly increased from 8.51 to 22.56%.

6.2 Analysis on Relation between number of Bidders and % below Engineer's estimate

It is found that there is a positive correlation between percentage below engineer's estimate and number of bidders. The correlation value was found to be 0.54 which indicates that as the number of bidders increased the percentage below engineer's estimate also increases. The trend line indicates that the two are directly proportional to each other for projects greater than 2 crores.

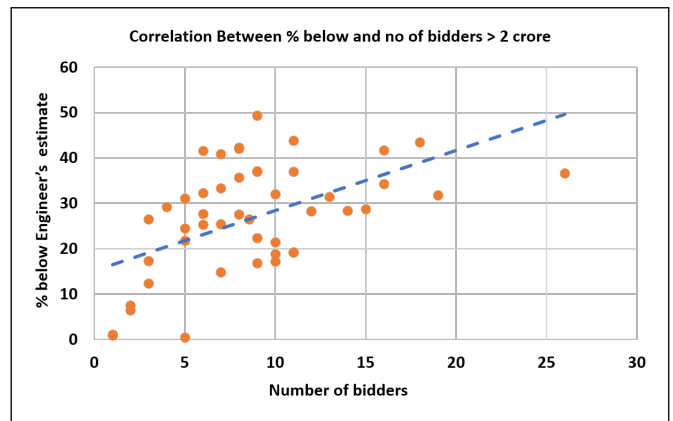


Figure 7: Correlation between % below and no. of bidders > 2 crores

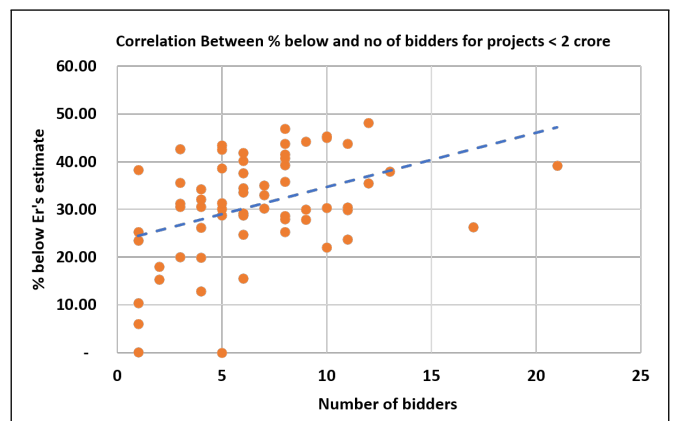


Figure 8: Correlation between % below and no. of bidders < 2 crores

Likewise, it is found that there is a positive correlation between percentage below engineer's estimate and number of bidders for projects. The correlation value was found to be 0.47 which indicates that as the number of bidders increased the percentage below engineer's estimate also increases. The trend line indicates that the two are directly proportional to each other for projects less than 2 crores.

6.2.1 Regression

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	1481.257851	1481.258	13.73701	0.000667722
Residual	38	4097.529177	107.8297		
Total	39	5578.787027			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%
Intercept	18.93	2.969407939	6.375118	1.74E-07	12.91	24.94158	12.91
2	1.16	0.314183485	3.706347	0.000668	0.528	1.800504	0.52

It is found that Best-fit regression equation was obtained as:

$$y = Ax + B$$

where, y is the % age below engineers' estimate and x is the number of bidders. The regression shows the rate of drop in project cost that can be expected for various numbers of bidders. In other words, if there was one fewer bidder, the anticipated impact on the project's budget would be different and of interest. The results of the regression are shown in the tables above. According to the regression model, each bidder lost in the competition results in a about 1.25% increase in project cost.[1]

7. Conclusion

Moreover, Bidding trends analysis of DUDBC shows that there were up to bidding below 47% of estimated cost of projects and after calculating the average number of bidders and average percentage below, the majority of bids have been determined to be low bids. The average percentage below is found to be decreasing for both the projects of size below 2 crore and above 2 crore. The bids with less than 5 percent difference from engineer's estimate is also seen to be increased for the projects greater than 2 crore. These criteria is sometimes used for detection or screening of bids with probability of bid rigging.

The highest frequency of bids is found between 25-30% below engineer's estimate for projects above 2 crores before amendment. Now, the same is decreased to 10-15% after amendment. The maximum contracts were found to have 2-4 bidders for projects > 2 crore after amendment. The same was at 8-10 bidders with highest no of contracts before and after amendment. On the basis of data analysis, a regression analysis was performed with the percentage below as a dependent variable to determine the actual relationship between the number of bidders and the percentage beneath engineers estimate in the process of bidding. The researcher discovered that there is a significant relationship between the number of bidders and the bids becoming low in both time frames before and after the amendment. The result showed a positive correlation in these parameters.

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