

# Market Competition and Dispute Occurrence



Sai On Cheung and Lu Shen

## Introduction

The making of suicidal bids arises from extremely competitive construction markets characterized by low market entry thresholds [1]. Rooke et al. [1] and Cannon and Hillebrandt [2] observed that the return on capital that can be obtained by contractors can be larger than profit markups by increasing the turnover rate and through extensive subcontracting. The combination of fierce bidding competitions and insufficiently developed design at the bidding stage has led to tenders with negative profits [3]. The culture of exploiting claims and opportunism is often then legitimized, since it is believed that contractors have no other option in such a competitive environment [1]. The commercial reality is that securing a project outweighs all other considerations at the time of tender. Market competition may force contractors to become claim conscious ex post and to practice opportunism as circumstances arise. Unresolved claims develop into disputes [4].

## Identifying Construction Disputes

Many studies have attempted to define disputes. Mururu [5] defined disputes as the formation of a position to maintain conflict, while Brown and Marriot [6] proposed that disputes should be regarded as conflicts that require resolution. In comparison, construction disputes are often more complex in nature and involve larger numbers of stakeholders, which increases the difficulty of developing a universally accepted definition. Spittler and Jentzen [7] argued that construction disputes are associated

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S. O. Cheung (✉) · L. Shen  
Construction Dispute Resolution Research Unit, City University of Hong Kong, Hong Kong, China  
e-mail: [Saion.cheung@cityu.edu.hk](mailto:Saion.cheung@cityu.edu.hk)

with differences in the perspectives, interests and agendas of different people. The large number of stakeholders involved can worsen the situation. As suggested by Tillet and French [8], construction disputes are caused by the incompatibility of two or more groups' interests, needs or goals. As a result, the resolution of disputes in construction must deal appropriately with different causes [9].

The high levels of uncertainty involved in construction projects and the bounded rationality of human beings render construction contracts incomplete. Williamson [10] convincingly explained that incomplete contracts are inadequate to exhaustively deal with the eventualities that may arise from complex projects. Unfortunately, project happenings without preplanned solutions very easily result in disputes [11]. Although construction disputes are seldom defined, they are often identified with reference to the focused dimension. The most common identification is made by subject matter. In this regard, Diekman et al. [12] classified the causes of construction disputes into people, processes and products. Rhys-Jones [13] identified ten types of dispute causes: (1) management, (2) culture, (3) communication, (4) design, (5) economics, (6) tendering pressures, (7) law, (8) unrealistic expectations, (9) contracts, and (10) workmanship. In a similar fashion, Hewitt [14] classified construction disputes into six groups: (1) change of scope, (2) change of conditions, (3) delays, (4) disruptions, (5) acceleration, and (6) terminations. These categories can be further broken down to 59 different types, which can be summarized into six generic types: (1) determination of contracts, (2) payment related, (3) the site and execution of work, (4) time related, (5) final certificate and final payment, and (6) tort related. Heath et al. [15] identified seven major types of construction disputes: (1) contract terms, (2) payments, (3) variations, (4) extensions of time, (5) nominations, (6) renominations, and (7) availability of information. Conlin et al. [16] identified six causes of construction disputes: (1) payment, (2) performance, (3) delay, (4) negligence, (5) quality and (6) administration. Among the previous studies identifying major causes, Kumaraswamy [17] further ranked the causes based on the frequency and magnitude of disputes each can lead to. The ranked causes are listed by order: (1) variations due to site conditions, (2) variations due to client changes; (3) variations due to design errors; (4) unforeseen ground conditions; (5) ambiguities in contract documents; (6) variations due to external events; (7) interferences with utility lines; (8) exceptional inclement weather; (9) delayed design information; and (10) delayed site possession.

In terms of contractual disputes in the construction industry, Semple et al. [18] identified that site overhead, loss in productivity or revenue and financing costs are the major dispute types arising from construction contracts. On the other hand, Yates [11] proposed seven causes of contractual disputes: (1) variations, (2) ambiguities in contract documents, (3) inclement weather, (4) late issue of design information/drawings, (5) delayed possession of a site, (6) delays by other contractors employed by the developer, and (7) postponement of part of the project.

According to data collected by the UK Adjudication Reporting Center, the three most common types of construction disputes that reach adjudication include those involving the "valuation of variations", the "valuation of final account" and a "failure to comply with payment provisions" [19]. Regarding mediation in the UK, 72% of the mediation cases are related to payments, delays, quality issues and professional

negligence [20]. In Hong Kong, the most common dispute subjects settled by mediation include variation, progress delays, the expectations of involved parties and problems arising between parties [21]. Spittler and Jentzen [7], on the other hand, argued that ambiguity in contract documents, adversarial attitudes and perceptions of unfairness among parties cause most of the disputes. Furthermore, it has been found that contractual provision itself can lead to disputes [18]. Similarly, Semple et al. [18] proposed that the two major sources of construction disputes are contracts and unpredictable events. To prevent disputes caused by uncertainties, contradictory contractual provisions must be avoided. Applying the transaction cost framework proposed by Mitropoulos and Howell [22], Williamson [10] proposed that the fundamental factors causing disputes include (1) project uncertainty, (2) contractual problems; and (3) opportunistic behaviours.

In a competitive market involving numerous bidders, the project owner will face a significant risk of awarding contracts to the bidder setting an unrealistic price [23, 24]. Pegged with the below cost bid, the contractor reverts to claims during construction to recoup the cost shortfall [24]. Several studies have pointed out that the setting of a bidding price depends on both actual costs and market competition [25, 26]. Rational contractors who intend to maximize their expected value will adjust profit markups to reflect market competition levels [27]. Since competitors are expected undercut the markup as well, Carr [27] suggests that the more competitors there are, the lower the markup will be. Carr [27] further argued that a contractor with lower actual costs is able to bid with a higher markup but still at a lower price than other competitors can. Without taking into consideration the possible gains from claims and disputes, it seems irrational and unlikely for any contractor to bid a price lower than its costs. However, more recent reports have found that competition can induce unrealistically low bids. Where cost factors are constant, an excessive number of contractors may lead to abnormally low bidding prices and associated excessive disputes [28]. Contractors adjust their markups in response to market competition levels, and [25, 29] argued that both actual and potential competitions can reduce bidder returns. Furthermore, it has been found that in an overtly competitive market, successful bidders in multiple-bidder contests earn significantly negative returns and fare worse than in single-bidder contests [29]. With sufficient competition in the market, the equilibrium market price decreases as the lowest bidding price drops, and the contractor that cannot efficiently reduce its costs will lose its competitive edge in the long term. Lo et al. [28] reported that contractors tend to compensate for the low bidding price by cutting corners [30] or bringing more disputes against the project owner [31]. Instead of suffering from the “Winner’s Curse” proposed by Capen et al. [32], contractors bid lower prices knowing that they are able to claim back the loss in bidding prices [31]. This arrangement results in contractors being able to remain competitive, secure more bid awards and achieve more dominant positions in the market by submitting tender prices lower than the actual estimated prices while generating more claims or cutting corners after the award is made [31]. Although fierce competition is an intrinsically appealing concept, it might lead to significant dispute burdens [31]. To enhance competitiveness, although risks should theoretically be priced into the bidding price, in practice, risks are mostly priced

based on the contractual mechanism instead [33]. Claims can be well planned as early as in the tender stage by contractors lowering their bids with the shortfall to be recouped in ex post claims [1, 34]. Claims can thus be preplanned and allowed in the bids to legitimize negative profit bidding [34]. However, such a strategy is believed to harm competition in the construction market, as only large contractors are able to afford the staff and expertise required to plan and estimate the claims to be made and the associated bidding prices [1]. Small contractors can be eliminated at the tender stage by repeated aggressive bidding offered by more resourceful competitors.

Applying game theory, Ho and Liu [35] argued that contractors tend to lower bidding prices when they expect profits from claims to be made during construction. From computer simulations, Lo et al. [28] found that when the market competition level reaches a certain point, the bidding price is inevitably lowered to even below the costs, and fierce competition is able to force contractors to make claims to restore the loss in profits. A number of studies have found that bidding strategies vary according to the conditions of the market. Carr and Sandahl [36] proposed that bidding strategies should be formed under the influence of job characteristics, the economic environment and competition conditions. Drew and Skitmore [37] proposed that factors at play include (1) the behaviours of contractors as a group (market conditions, the number of competitors, etc.), (2) the characteristics of individual contractors (contractor size, availability of staff, tenders in hand, etc.); and (3) the characteristics of contracts (size and type of project and client, project location, etc.). Flanagan [38] listed the factors affecting bidding behaviours, including (1) the size and value of the project, (2) the technical and managerial complexity of project completion; (3) regional market conditions; (4) the current and projected workload; (5) the type of client; and (6) the type of project. Drew et al. [26] found that in Hong Kong's construction industry, due to fierce competition, the bidding strategies of contractors are not clearly formed. Instead, contractors are encouraged to bid for various projects.

An experienced contractor will be able to identify mistakes in bills of quantities and exploit the same ex post. Rooke et al. [1] identified that a contractor will charge more for work items for which the quantities are expected to be increased and less for those with quantities that will be reduced during construction. This loaded pricing effort will embed potential profit without sacrificing bid competitiveness. Another way to do so is to make use of the possible delays the client may be responsible for and to maximize the cost of such delays. Contractors may deliberately bid for projects that are more likely to yield delays, claims and disputes. Rooke et al. [1] quoted a contractor estimator who indicated that "in construction, the only way to make a profit is when a contract goes wrong". Both proactive and reactive claims can be made during the course of construction. Rooke et al. [3] argued that subscription to market competition leads to an adaptive interdependent system and a system of personal relationships that achieves collective benefits that might be regarded as opportunist but that enables a tolerable level of performance. In summary, defining disputes in construction is not a straightforward task due to the wide range of possible causes involved. Proactive project management may help minimize their occurrence. For example, Cheung and Yiu [4] proposed several ways to address this issue. The authors

suggested the use of prudent staffing policies, vigorous quality assurance, more realistic tender preparations and the separation of the roles of designs from contract administrations. Drew and Skitmore [37] regarded prequalification as a useful method with which clients can differentiate willing contractors. All of these methods cannot address the contracting behaviour issues arising from excessive market competition.

## Competition in General

It has been commonly argued that the likelihood of anticompetition behaviours is closely related to the market concentration level [39–46]. Although the construction industry has always been characterized by a highly competitive market, empirical research supporting this proposition is rather rare [47].

Competition has been regarded as “a force that leads to an ideal solution of the economic performance problems” [48]. Construction contractors provide labour and skills that are highly similar and thus substitutable [47]. Contractors can choose to provide focused and specialized skills and expertise or a broad scope of services exploiting opportunities in various segments and accumulate reputations to rapidly enter and compete in new segments [49–51], especially given that in the construction contracting market, the fixed costs to enter one segment of the market are extremely low. Cheung and Shen [47] collected all procurement and tendering contract information of ten mega infrastructure projects in Hong Kong awarded to contractors as indicators of market shares. During the tendering stages of mega construction projects, centralized procurement was adopted in consideration of public accountability and cost efficiency. The adoption of centralized procurement raised concerns about an increase in contract size and in entry barriers for small- to medium-sized contractors. The two most commonly used methods to assess market concentration level are adopted. However, different results from using these two approaches are reported. The results for four-firm concentration ratios (CR4) show that the market is moderately concentrated, and the structure fits the oligopolistic market, while Herfindahl–Hirschman Index (HHI) results show that the market is fully competitive. However, as argued by Bikker and Haaf [52] and Rhoades [53], the inequality in market share distributions of contractors cannot be sufficiently reflected by HHI results. Significant inequality implies the power of larger firms to dominate the market price. Meanwhile, HHI results are too sensitive to the entry of small firms, while such new entrants hardly pose threats to existing large firms [54]. In combining the significant inequality of market share distributions and concentration index results from the CR4 and HHI, Cheung and Shen [47] argued that there exist two tiers of competition in the construction contracting market in Hong Kong. Ball [55] reported similar observations that a handful of large firms capture the majority of the project value, while a vast number of fringe firms compete for the rest. De Valence [56] argued that the existence of two levels of market is partially attributed to the additional barriers established through listings and prequalification. The contracting market in the construction industry thus includes two sectors. One sector includes a few large

oligopolistic firms, and the other includes numerous small firms acting as price takers [47].

Cheung and Shen [47] found that the CR4 calculated in the mega project market to have reached 46, surpassing the threshold of 40, while the HHI value at 0.07167 was found to be much lower than the threshold of 0.15. The HHI value can also be interpreted using the concept of number equivalence, which is the inverse of the HHI value, as argued by Bishop [57] and Adelman [58]. The inverse-H identified in the study indicates that 14 firms of equal sizes exist in the same market. To examine the specificities of the market, the tests are repeated with the small sector distinguished by trades and employers. The results are consistent in that although the CR4 leads to the conclusion that the market is loosely concentrated, the HHI shows that the market is fully competitive. Listing and prequalifications are often believed to be prevent new entrants from accessing the market [59]. Bikker and Haaf [52] argued that the relative impacts of large or small firms on competition levels should determine the selection of concentration measures, especially as the HHI is vulnerable to market share inequality. Rhoades [53] suggested that the inequality of market shares implies the ability of leading firms to set market prices. The greatest criticism of the HHI is that it reacts too sensitively to the entry of any small firm, which usually does not have any impact on market competition or market structure [54]. In combining the results of the CR4 and HHI, Cheung and Shen [47] found it unlikely to classify the construction marketing market into the existing market structure types as a pure oligopoly market or fully competitive market. The divergence in the results indicates significant market share inequality [47]. Male [60] reported that although the entry barriers for lower-end firms are relatively low, merely requiring labour and a few pieces of equipment, entering the ranks of top-end companies is highly demanding, requiring previous work records and adequate financial support. In addition, it has been found that the size of incumbent firms has also become a barrier for smaller firms [61]. Specifically, two layers of barriers to entry are identified [56]. Cheung and Shen [47] extended the argument based on HHI and CR4 results by concluding that there exist two layers of entry barriers with the first layer being extremely weak, allowing numerous small firms to participate. Meanwhile, most small- to medium-sized contractors cannot surpass the second layer of entry barriers, leaving only a few larger firms qualified to compete for contracts of greater value. For such projects, competition is extremely limited [47].

## Joint-Venture and Market Competition

Shen and Cheung [62] further reported a procurement strategy of forming joint ventures in the tendering and procurement stages in the construction contracting market. Previous studies report that forming joint ventures contributes to solving the anticompetitive effects of using centralized procurements and contract size expansions. Furthermore, forming joint ventures assists international contractors in easing their way into the local construction industry and accessing relevant knowledge

and expertise [62] in addition to offering greater convenience to project owners as a form of single point responsibility [63]. Not only can the chances of winning bids be increased by combining the resources of joint venture partners, but also by reducing the capabilities of competitors, joint venture formations can contribute to success at the tendering stage, as joint ventures can be formed vertically with suppliers or subcontractors, which may prohibit these firms from providing services to competitors for the same project [64]. While forming joint ventures leads to reductions in the number of competitors [63, 65–67], some studies have reported that joint venture formation can lower entry barriers and allow new entrants into the market by rendering the participants more competitive. Such an advantage induces the formation of ad hoc joint ventures among contractors [64].

Many previous studies have found that by allowing joint ventures, bid rigging and price fixing are more likely to occur [64, 65, 67]. However, Rondeau et al. [63] found that prohibitions on joint venture formations increase the number of collusive bids due to a complex interaction between joint ventures and market competition. Infrastructure projects in the construction industry tend to be of large scale and great complexity, raising entry barriers to placing bids. Although one of the main motives for forming joint ventures is to prevent the entry of competitors into the market [68], joint ventures enable the entry of small- to medium-sized contractors through the accumulation of capital and the assembly of resources [42, 44, 69, 70]. The procompetition advantage of reductions in information costs has also been identified [71, 72].

Forming joint ventures is one of the preferred bidding strategies in the construction industry, as it also provides quicker and easier access to a new segment of the market [73]. Meanwhile, the value of reputations [74] and technology improvements can be shared among joint venture parents, while risks can be optimally distributed [73, 75]. However, forming joint ventures changes the competitive relationships and incentives among contractors. It has been found that joint venture partners or previous partners compete much less rigorously than otherwise [40, 42, 44, 76]. Especially where the joint venture parents are all fully capable contractors, the anticompetition effects become blatant [42]. Meanwhile, allowing joint ventures may raise entry barriers in terms of financial and technical qualifications [44, 77].

Concentration measures are used to capture the competition level of certain markets [48]. Commonly adopted methodologies in accessing market concentration levels include the four-firm concentration ratio (CR4) and Herfindahl–Hirschman index (HHI). The CR4 is commonly used by the Government Accountability Office (GAO) in the US, while the HHI is adopted by the Department of Justice (DOJ) and the Federal Trade Commission (FTC) in the US. The CR4 is defined as the sum of the market shares of the largest four firms in the market [78] and can be expressed as follows:

$$CR_4 = S_1 + S_2 + S_3 + S_4 \quad (1)$$

When the index equals 1, the market shares of the largest four firms make up the whole market, and when it approaches zero, the market is made up of numerous small fringe firms [52]. The HHI is the sum of the square market shares of all firms in the market [78], and the function can be expressed as follows.

$$HHI = \sum_{i=1}^n S_i^2 \tag{2}$$

where  $S_i$  is the market share of the  $i$ th firm. The HHI value ranges from 0 to 1 and increases as the market concentration level rises. The HHI equals 1 when the market structure is a monopoly [48, 79].

The results obtained from conducting both tests of the CR4 and HHI are compared with the standards adopted by the DOJ, FTC (Table 1) and GAO (Table 2) in the studies done by Shen and Cheung [62] and Cheung and Shen [47]. Such thresholds are also widely adopted in scientific studies [80–82].

When the CR<sub>4</sub> is below 40% or the HHI value is lower than 0.15, the market is considered to be unconcentrated. When the CR<sub>4</sub> value is between 40 and 60% or the HHI value is between 0.15 and 0.25, the market is considered to be moderately concentrated or a loose oligopoly. When the CR<sub>4</sub> is larger than 60% or the HHI is larger than 0.25, the market is considered to be highly concentrated or a tight oligopoly (Tables 3, 4, 5, 6, 7, 8 and 9).

Shen and Cheung [62] conducted two tests. In the first test, joint ventures are regarded as new entities independent of the parent companies, while in the second test, the market shares of the joint venture firms are split into the parent firms. Furthermore, the contractors are divided into active and occasional contractors. Active contractors are defined as the top 10% of contractors based on the number of contracts obtained from Ten Mega Infrastructure Projects, while the remaining contractors are regarded as occasional. Shen and Cheung [62] found that the allowance of joint ventures lowers market concentration levels for active contractors, while it increases

**Table 1** U.S. department of justice threshold

Market types	Thresholds	Remarks
Unconcentrated market	$HHI < 0.15$	Unlikely to have adverse competitive effects
Moderately concentrated market	$0.15 \leq HHI \leq 0.25$	Delta > 100 can raise significant competition concerns

**Table 2** U.S. government accountability office threshold

Market types	Thresholds (%)
Unconcentrated market	$CR_4 < 40$
Loose oligopoly	$40\% \leq CR_4 \leq 60$
Tight oligopoly	$CR_4 > 60$



**Table 3** Summary of ten mega projects

Project type	Project no	Project name	Project size (US Dollars)	Begin/Completion	Employer	Procurement methods
Transportation infrastructure	1	Project A	1.59 billion	2011–2015 (Expected)	Employer K	Selective
	2	Project B	10.3 billion	2012–2020 (Expected)	Employer K	Selective
	3	Project C	6.03 billion	2011–2018 (Expected)	Employer L	Selective (Listing)
Cross-border Infrastructure Projects	4	Project D	8.05 billion	2010–2017 (Expected)	Employer K	Selective
	5	Project E	2.74 billion	2009–2016 (Expected)	Employer L	Selective (Listing)
	6	Project F	Unknown	Not yet commence	–	–
	7	Project G	Unknown	Still in planning stage	Employers M & N	–
New urban development areas	8	Project H	Exceeding 6 billion	Still in planning	Employer O	–
	9	Project I	Exceeding 16.7 billion	2010–2021	Employers M & N	Selective (Listing)
	10	Project J	Unknown	Still in planning	Employers M & N	–

**Table 4** Summary of sales revenues obtained by the firms

Contract value	Number of the firms
Above 10 billion	6
1–10 billion	17
0.1–1 billion	28
10 million–0.1 billion	17
1–10 million	2
Below 1 million	1

**Table 5** Summary of firm size distribution

Rank	Firm name	Market share (%)	Rank	Firm name	Market share (%)
1	Firm A	12.29	25	Firm W	0.59
2	Firm B	12.16	26	Firm Z	0.58
3	Firm C	11.10	27	Firm A'	0.57
4	Firm D	10.71	28	Firm B'	0.56
5	Firm E	7.82	29	Firm C'	0.42
6	Firm F	7.56	30	Firm D'	0.38
7	Firm G	2.99	31	Firm E'	0.38
8	Firm H	2.89	32	Firm F'	0.38
9	Firm I	2.74	33	Firm G'	0.37
10	Firm J	2.40	34	Firm H'	0.36
11	Firm K	1.90	35	Firm I'	0.33
12	Firm L	1.83	36	Firm J'	0.31
13	Firm M	1.81	37	Firm K'	0.29
14	Firm N	1.79	38	Firm L'	0.26
15	Firm O	1.65	39	Firm M'	0.26
16	Firm P	1.59	40	Firm N'	0.22
17	Firm Q	1.54	41	Firm O'	0.22
18	Firm R	1.39	42	Firm P'	0.19
19	Firm S	1.21	43	Firm Q'	0.18
20	Firm T	1.17	44	Firm R'	0.17
21	Firm U	0.86	45	Firm S'	0.12
22	Firm V	0.81	46	Firm T'	0.11
23	Firm W	0.72	47	Firm U'	0.11
24	Firm X	0.65	48	Firm V'	0.10

**Table 6** Results of concentration measures

	CR4 (%)	HHI
<i>By company</i>		
1. Overall	46	0.07167
2. Employer K	41	0.0730
3. Employer L, M & N	75	0.1747
<i>Projects of employer K</i>		
1. Overall	41	0.0730
2. Main Works	49	0.1026
3. E&M Works	55	0.125
<i>Projects of employer L, M &amp; N</i>		
1. Overall	75	0.1747
2. Main Works	74	0.1787
<i>By work trades—Main works</i>		
1. Overall	51	0.08476
2. Employer K	49	0.1026
3. Employer L, M & N	74	0.1787
<i>By work trades—E&amp;M works</i>		
1. Overall	55	0.103
2. Employer K	55	0.125

**Table 7** Concentration level change for most active contractors

	Test I (7 firm)	Test II (7 firm)	Test I (9 firm)	Test II (9 firm)
CR4 (%)	55.75	80.54	55.70	75.72
HHI	0.105689381	0.2004854312	0.1116355113	0.1616725451

**Table 8** Concentration level change for 50 most occasional contractors

	Test I	Test II
CR4 (%)	42.45	42.45
HHI	0.07406297	0.06844039

**Table 9** Summary of comparisons

	Concentration Level	No. of firms	Average contract value	Technical Requirements
Active (Test II)	0.2004	7	1.6 billion	More demanding
Occasional (Test II)	0.684	50	451 million	Less demanding

the concentration for occasional contractors. From the concentration levels allowing joint ventures, it is found that for occasional contractors, forming joint ventures is a good way to penetrate the market and increase its competitiveness. Although allowing joint ventures increases the market concentration level for occasional contractors, the concentration level still remains extremely low since occasional contractors are mostly from fringe firms in the market with extremely small market shares. For active contractors, allowing joint ventures has limited impacts on the concentration or competition level since most joint ventures are made ad hoc for certain contracts instead of for long-term cooperative relationships. Shen and Cheung [62] argued that forming joint ventures in the construction contracting market is more often pursued as a temporary agreement to synergize resources for better capability and fewer risks than to actually introduce new entrants to the market. Meanwhile, sizing down and segmenting contracts to smaller ones to lower the entry barriers of smaller contractors are suggested to improve competition in the market [62].

## Discussion

In the construction contracting market, the products and services offered are often homogeneous with similar cost functions. Akintoye and Skitmore [83] argued that the profitability of construction firms remains extremely low due to excessive market competition, but larger firms were found to be able to persistently enjoy a higher rate of return. It is suggested that unrestrained competition is likely to harm economic efficiency and innovation motives [83]. Ball et al. [84] found that in the UK, the construction market is made of a number of publicly listed middle-sized construction firms based on data ranging for 1990–1994 and rebut the argument that competition in the construction industry is excessive.

Only large firms can raise the financial resources needed to satisfy project financial requirements [84]. Clients can be easily tempted by a lower bidding price to trust projects with new entrants or firms that move resources to a new sector above the optimal level. The innovation cycle of the construction industry is extremely short, and therefore, instead of earning economic rents from initiating innovations at their own costs, most contractors just follow and adopt the newest techniques, materials or organization and management methods [84]. In the meantime, it has been found that although contracting firms value reputations as assets, the brand name has almost no effect on clients [84].

Cheung and Shen [47] found that the Hong Kong mega project contracting market can be separated into two sectors. One sector includes a small number of large contractors forming an oligopolistic market. The other sector includes numerous small firms that compete vigorously for contracts. Most of the reported studies on construction bidding describe competition associated with a winner's curse and an ex-post claim culture. The message seems to support the notion that excessive competition has led to cut-throat pricing and calculated claiming strategies. In this regard, firms with

more resources are more capable of planning their bids with future claims anticipated. Therefore, high competition would need more rock bottom bids, and while some contracting organizations are able to execute postcontract claims, many less resourceful contractors may run into difficulties. Either way, claims and disputes become the only outlet as the outcome of planned action (oligopoly market of several large firms) or desperate attempts (free market of numerous small firms). Furthermore, due to the oligopolistic market structure, they might have greater incentives to engage in bid rigging instead of lowering bid values strategically. Whether forming joint ventures is allowed does not seem to directly affect dispute occurrence. However, if forming joint ventures changes market competitiveness, it might indirectly change dispute occurrence.

## Summary

Construction contracting markets have been suffering from a culture of submitting suicidal bids and making unjustified postcontract claims. These conditions form a breeding ground for major disputes. Opportunistic behaviours such as raising unfounded claims have contributed to the occurrence of construction disputes. Previous studies have found that more competition may induce lower bidding prices. Experienced contractors are able to submit below lower-than-cost bids to secure projects with the aim of obtaining a dominant position in the market. Recovering losses through making claims and cutting corners postcontract are noted as obvious consequences. However, it is also found that only resourceful contractors are capable of planning and calculating the potential claims. Smaller contractors are unable to submit low bidding prices, as their ability to claim back such losses is quite limited. The unhealthy request is that lowering competition in the medium and long run. It is of interest to review construction market concentration in Hong Kong. This study adopted two concentration assessment tools: the CR and HHI. The CR4 results indicate that the market is moderately concentrated, while the HHI results suggest that the market is fully competitive. With a more detailed analysis, significant market share inequality is found among contractors and the mega project contracting market is found to be segmented by two layers of entry barriers. It is likely that larger contractors can try to make use of the oligopolistic market and to adopt certain anti-competitive behaviours. One unfortunate observation concerns the rise of sustensive disputes. Another common practice is the formation of joint ventures to bid mega projects. Would forming joint-ventures lower levels of competition?

With joint ventures allowed, occasional contractors are not only able to enter the second-tier market but can also access more resources and might be able to make use of the strategy of bidding lower than expected costs, introducing more disputes postcontract to compensate for the losses on contracts. In this case, the oligopolistic market structure of the second-tier market might be disrupted, and competition may intensify. On the one hand, the chances of anticompetitive conduct requiring an oligopoly, such as bid-rigging or price-fixing conduct, are lowered.

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