The motives for and consequences of UNDERPRICING FOR CONSTRUCTION CONTRACTORS—EVIDENCE FROM AUSTRALIA

1. Introduction

During the period 2011-2013, there was a spate of bankruptcies of medium-to-large Australian construction contractors (many of whom were well-established), coinciding with a prolonged decline in the property market. Anecdotal evidence suggests that underpricing played a major role in the collapse of these companies and the financial misfortune of many major Australian construction contractors. On the other hand, anecdotal evidence also suggests that underpricing can be an effective tactic to penetrate markets or weaken competitors when used as part of a strategic mix—a double-edged sword. Because of the political sensitivity of the topic of underpricing, there has been a dearth of research in this area. This study investigates the extent and consequences of the practice of underpricing (in the Australian context), where it is defined as the submission of a tender price at a significantly lower level than the best estimate for the costs, profit margins, and risks of the construction project. Drawing from the literature on construction tendering, we develop a framework that separates the motives for underpricing into need-for-work and marketing-based competitive pricing; and predict the consequences of the practice of underpricing in terms of adverse financial consequences. Drawing from the literature on construction tenderer price, we develop a framework that separates the motives for underpricing into need-for-work and marketing-based competitive pricing; and predict the consequences of the practice of underpricing in terms of adverse financial consequences.

The survey found that underpricing was prevalent in construction projects. Contributing to the literature, the study results show that when underpricing is primarily driven by a contractor’s need for work to maintain cash flow, underpricing contractors are likely to engage in deceptive practices, such as market penetration or to weaken competitors, was found to be linked with long-term financial profitability of the contractor. Over the period of 2011-2013, there was a spate of bankruptcies of medium-to-large Australian construction contractors (many of whom were well-established), coinciding with a prolonged decline in the property market. Anecdotal evidence suggests that underpricing played a major role in the collapse of these companies and the financial misfortune of many major Australian construction contractors. On the other hand, anecdotal evidence also suggests that underpricing can be an effective tactic to penetrate markets or weaken competitors when used as part of a strategic mix—a double-edged sword. Because of the political sensitivity of the topic of underpricing, there has been a dearth of research in this area. This study investigates the extent and consequences of the practice of underpricing (in the Australian context), where it is defined as the submission of a tender price at a significantly lower level than the best estimate for the costs, profit margins, and risks of the construction project. Drawing from the literature on construction tendering, we develop a framework that separates the motives for underpricing into need-for-work and marketing-based competitive pricing; and predict the consequences of the practice of underpricing in terms of adverse financial consequences.
2. Prior Research and Related Theory

Underpricing in tender bids in infrastructure projects is common in practice, yet it has rarely been directly studied in the published research literature (Flyvbjerg, Holm, & Buhl, 2002; Yu & Tan, 2006). More typically, the literature has focused on cost overruns and cost underestimation, for which underpricing can be a contributing factor. For example, in examining cost underestimation, Flyvbjerg et al. (2002) consider four possible technical (forecasting errors); psychological (appraisal optimism); economic (self-interest or public interest); and political (interests of the client) reasons for underestimation. Their study finds five factors, two of which are underestimation (economic and political), to which they jointly refer as “strategic misrepresentation” (that is, deception and lying).

To understand underpricing and its effects on contractors and competitors, it is important to understand the pricing formation process for construction project tendering. Here, we focus on literature on the pricing formation process in the construction industry. Then, drawing from the economic and strategy literature, hypotheses on the effects of underpricing and associated motives are developed (in the next section). As outlined by Akintoye and Skitmore (1992) and Assael (1985), the typical pricing decision process involves four steps: set pricing objectives, consider pricing-related factors relating to market position, select pricing strategy, and implement pricing. Pricing objectives typically vary from maintaining cash flow to maximizing profit. Pricing-related factors include past experience on similar projects, market conditions (e.g. the number, quality, and competitiveness of bidders) to determine whether to bid and, if yes, what pricing strategy to use. There is a wide spectrum of factors affecting contractors’ bid/no-bid and pricing decisions. Factors include experience in similar types of projects, current workload, availability of qualified personnel, need for work, utilization of workforce, profit margin from similar projects, and market conditions (Ahmed & Shukla, 1988; Shukla, 1993; Fley, Glinsho, & AbouRizk, 1999; De Neufville, Lesage, & Arditi, 1977; Akintoye & Skitmore, 1990).

Pricing strategies vary from cost-plus, market-based, and value-based, to experience-adjusted pricing (Phillips 2005). Cost-plus pricing is based on cost estimates plus a mark-up, with no consideration for market conditions or strategic objectives. Value-based pricing relies heavily on the contractor’s value proposition and tailored product/services and pricing to suit the client’s needs. In contrast, market-based pricing decisions primarily focus on market competition and strategic considerations on top of cost considerations. In practice, the final tender price is often adjusted by senior managers based on their past experience on similar projects (Fu, Drew, & Lo, 2003). The effectiveness of a particular strategy depends on its implementation (Nagle & Hogan, 2006). For example, collecting, tracking, and benchmarking prevailing underbids across multiple projects assists pricing efforts and improves the pricing processes (Nagle & Hogan, 2006). There are many aspects and factors relating to pricing implementation. Since our focus is on pricing objectives and underpricing, we will not review, in-depth, the literature on pricing implementation.

The construction market in many countries is very competitive, where typical mark-up in the building construction sector can be as low as 7%. Construction companies procure work through competitive tendering (Dyer & Kapel 1996) in which the winner takes all. The predominant pricing approach in the construction market is cost-based (Mochtar & Arditi, 2001), in which the contractor adds a cost of the project to the cost estimate to form the bidding price. However, studies have shown that clients predominantly focus on cost as a selection criterion, where the lowest bid often wins. As a consequence, underpricing is common, or even necessary, to win contracts. The critical question is whether winning the contract using underpricing leads to the so-called “winner’s curse”—a double-edged sword—where the contractor wins the project, but makes below-par profits (or even incurs a loss) and risks its longer-term profitability.

Contractors that underprice their bids certainly do not intend to incur financial losses over the long term. There are three possible reasons for underpricing by contractors. The first is that the market is tight and the contractor needs to find work to maintain cash flow and keep staff employed. Under this circumstance, the profit margin for the contractor is likely to be below-normal or even negative. The contractor will do its best to recover losses in a subsequent project and/or with one of the most common tactics being through variances in the context of infrastructure projects, Flyvbjerg et al. (2002) believe that strategic misrepresentation or deception is commonly used to win projects. This can involve underestimating their costs and then recouping losses using deceptive techniques such as increasing claims for variations, reducing the quality of work, and/or taking advantage of poor project scoping (Steen, 2007; Yiu & Tan, 2006; De Neufville, Lesage, & Arditi, 2001; Glinsho, 1993). Yao (1988) and Smith and Bohm (1999) report that excessive variations may be falsified or manipulated to increase profitability or recoup costs from underpricing.

The second reason is due to mistakes on the part of the contractor, resulting in under-estimation of project costs. For example, the wrongly estimated project cost due to poor quality of historical data or incorrect assumptions. In this context, the contractor is likely to bear the cost of underpricing. Nevertheless, this type of underpricing is unlikely as the contractor is likely to learn from past mistakes.

The third reason for underpricing is market strategy, whereby the contractor deliberately underprices as part of a strategy to secure the project or weaken competitors. To enter an established market sector, a contractor often sets project margins deliberately (and consistently lower than the market standard) to outbid competitors entrenched in the sector. Despite the short-term prospect of minimal profit margin or even small loss, this strategy aims at securing a foothold in the sector with a view to growth and long-term profitability.

Economics further informs the pricing formation process (Yao, 1988) and the dichotomy created by underpricing. From a transaction cost perspective, the main transaction cost for the contractor is related to the extent to which the profit margin is below the typical return expected from similar projects. Underpricing effectively increases the transaction costs for all the contrator bidding for the project. If the decision to underprice is a strategy to secure work and cash flow for survival, the contractor is unlikely to be confident about profitability in the long run. In this circumstance, it is likely to engage in opportunistic pricing strategy—more specifically, deceptive conduct—to recoup costs, most commonly through variations. Although such conduct could help the contractor to recoup some costs in the short run; in the long run, it is likely to damage the contractor’s reputation and relationship with clients, which is unlikely to sustain profitability in the long run.

This internally-focused negative edge of the underpricing sword is likely to lead to market inefficiencies (Yao, 1988) and an adverse financial outcome. Alternatively, if the pricing decision is part of a strategy to penetrate the market sector for growth, or to make it harder for competitors to win contracts, then the contractor is likely to have analyzed the market and the costs for all the contractors bidding for the project. For this contractor, the motive is to penetrate the market or weaken competitors. To achieve this, the contractor is likely to bear the cost of underpricing from the focal project. If the contractor has done its homework, then the analysis would indicate how long the contractor could sustain the underpricing and the benefits that such underpricing could bring in the long run. If the analysis shows the consequences of an underpricing strategy, the contractor is likely to be negative, the contractor will most likely reject the strategy. Therefore, the consequences for competitive pricing based on systematic strategic analysis are likely to lead to positive financial outcomes.

A study of UK contractors found that the top five factors affecting a bid/no bid decision are need-for-work, number of competitors, contractor experience for the particular project, current work load, and the client identity (Shukla, 1993). A similar study of Canadian contractors found that the top three pricing objectives are to win the project, maximize profit, and improve project life cycle. Shash (1993) identifies the weapon as double-edged in that it could also damage substandard work. More typically, the literature describes that motives for underpricing lead to different actions for recouping the costs from underpricing. If the motive is need-for-work, there will be an imperative for the contractors to recoup losses, often by engaging in deceptive or non-transparent conduct to mitigate adverse financial consequences as a result of underpricing. For a competitive pricing strategy, the motive is to penetrate the market or weaken competitors; there is no imperative to recoup the cost of underpricing from the focal project. If the contractor has done its homework, then the analysis would indicate how long the contractor could sustain the underpricing and the benefits that such underpricing could bring in the long run. If the analysis shows the consequences of an underpricing strategy, the contractor is likely to be negative, the contractor will most likely reject the strategy. Therefore, the consequences for competitive pricing based on systematic strategic analysis are likely to lead to positive financial outcomes.

3. Hypothesis Development

Based on review of the relevant literature above, Figure 1 presents a high-level conceptual model for this study. It describes that motives for underpricing lead to different actions for recouping the costs from underpricing. If the motive is need-for-work, there will be an imperative for the contractors to recoup losses, often by engaging in deceptive or non-transparent conduct to mitigate adverse financial consequences as a result of underpricing. For a competitive pricing strategy, the motive is to penetrate the market or weaken competitors; there is no imperative to recoup the cost of underpricing from the focal project. If the contractor has done its homework, then the analysis would indicate how long the contractor could sustain the underpricing and the benefits that such underpricing could bring in the long run. If the analysis shows the consequences of an underpricing strategy, the contractor is likely to be negative, the contractor will most likely reject the strategy. Therefore, the consequences for competitive pricing based on systematic strategic analysis are likely to lead to positive financial outcomes.

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Hypothesis 1: Deception is significantly and positively influenced by need-for-work. The consequences of deception have not been empirically studied. Anecdotal evidence suggests that it has been widely practiced. Therefore, it must have some benefit to the contractors engaging in this behavior. Contractors who are under contract for work that is substantially under-priced are likely to perform substantial hard work and dispute the contract in an attempt to improve their profit margin (LePutter, 2008). The Industry Commission: Construction Costs for Major Projects (1992), agrees underpricing is inversely proportional to the quality of work, finding that there is a considerable tendency for contractors to perform work at a reduced quality to increase their profit margins. It has been seen in the Australian contracting environment that if the contractor’s bid is too low, it may result in ‘excessive time delays and claims from the contractor … in the hope of getting extra claims to compensate for the low price’ (Chau & Young, 1995). Another study found that a contractor had even “manipulated change orders” to make up for losses in other areas of construction (Smith & Bohn, 1999). In addition, if the contractor is unable to fulfill the contract, this can add considerable costs and delays to projects in finding new contractors (Alderson & Hutlen, 2006). The standard work or deceptive conduct will damage the contractor’s reputation in the long term and is therefore unlikely to contribute positively to the contractor’s long-term financial health. Nevertheless, underpricing may be a technique for the contractor to recoup some costs, especially from inexperienced clients, thus mitigating its adverse financial outcomes.

Hypothesis 2: Deception mitigates adverse financial outcomes. A contractor that persistently uses underpricing tactics to win projects is likely to experience adverse financial outcomes unless it can find alternative ways to recoup the costs of underpricing. Langan, Ford, and Komba (1999) analyzed the reasons for failures of selected construction companies during 1988-1993 and found that consistent cost and time overruns of projects were the main causes. Arditi, Koksal, and Kale, (2000) found that 26.7% of bankruptcies in construction industry failures were due to insufficient profit margins, which was attributed to the competitive tender environment, the cost of variations claims, and the inaccuracy of cost estimates. Similarly, a study of construction business failures of 84 companies in Palestine found that reduced profit margins due to competition in the market played a significant role in company failures (Mahamid, 2012). Finally, Rvwelamia, Lohel, and Kupakwana. (2004) found that within West Cape Province of South Africa, the main cause of insolvencies among civil engineering contractors was underpricing. Therefore, 

Hypothesis 3: Underpricing contributes positively to adverse financial outcomes. In contrast to need-for-work driven underpricing, competitive pricing strategy uses underpricing as part of the overall strategic mix to penetrate the market or weaken competitors. Competitive pricing focuses on the overall long-term profitability of the company and not the short-term profitability of the focal project. It is based on thorough analysis of the company’s strategic position, not just the cost of the project or the immediate survival needs of the company. Therefore, underpricing driven by competitive pricing strategy is more likely to improve a company’s long-term profitability.

Hypothesis 4: Underpricing based on competitive pricing strategy improves a company’s profitability.

The research framework comprising the above four hypotheses is presented in Figure 2.

4. Research Design

To empirically investigate underpricing, an initial study was conducted in Australia. A survey questionnaire was designed to test the hypotheses developed above using Survey Monkey. The study was conducted with employees of construction organizations employing more than 50 people in the Australian State of New South Wales. The employees surveyed had responsibilities in tender pricing, contract administration, project management, or upper-level management of a construction company. The request for completing the questionnaire was distributed to members of the Australian Institute of Quantity Surveyors in the Institute’s fortnightly newsletter and to construction contractors with more than 50 staff and with typical projects worth more than US$5 million. In total, 43 responses were received from employees of 14-30 organizations (not all respondents identified their organizations). Of the respondents, nearly 80% were in a position to directly influence pricing strategy (37.2% were in estimating, 16.3% in quantity surveying, 18.6% in project management, 4.7% were in management, and 2.3% were in design), while the remainder were in contract administration (16.3%) and construction (4.6%). More than 50% of respondents were from construction companies with more than 500 employees. The items in the questionnaire were designed to measure the key constructs and relationships identified in the hypotheses developed above. For each construct, Table 1 lists the related survey questions, Cronbach’s Alphas, and related literature sources. The Cronbach’s Alphas indicate good reliability for the constructs underpricing and need-for-work (above 0.7), and acceptable reliability for the remaining two constructs (above 0.6 for exploratory studies). Multiple regression analysis was used to analyze the survey data. Hypotheses 1, 2, 3, and 4 are tested sequentially using the regression analysis. For example, the effect of Underpricing on adverse financial outcomes (Hypothesis 3) is tested by estimating Equation 1 (Assuming β2>0). A significant positive β1 supports Hypothesis 3. Dependent Variable = Constant + β1Independent Variable 1 + β2Independent Variable 2 + e Equation 1

5. Results

In this section, descriptive statistics are presented first; before the regression analysis results are explained. On the question of whether the respondent’s last completed project was underpriced, 38.5% indicated underpricing. Re-evaluating this result, more than 75% of respondents perceived that the practice of underpricing in the New South Wales construction industry is prevalent. On reasons for underpricing (see Table 2), the predominant reasons were “to win the bid” (73.5%) and “to maintain turnover/need-for-work” (72.3%), followed by “to maintain or build relationships with clients” (68.7%), “to take advantage of insufficient project scope,” and “occurred by accident” (56.9%). A marketing-based pricing approach ranked lower with “to penetrate the market” (52.7%) and “to weaken a competitor” (39.3%). Regarding how the costs of underpricing are recouped (see Table 3), 72.7% answered “through other more profitable projects,” 66% answered “through variations,” 63.2% answered “increases in company efficiency,” while 51.3% answered “reducing the standard of work.” On the consequences of underpricing (see Table 4), the top ranking was “loss of future work,” followed by “disputes with the client” (68.7%), “financial distress” (64%), “maintaining cash flow” (61.3%), “improved relationships with the clients” (56.7%), and only a relatively small proportion of respondents indicated “financial gain at or above typical profit margins” (43.4%).

FIGURE 2. Research framework

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Questions</th>
<th>Cronbach’s Alpha</th>
<th>References</th>
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<tbody>
<tr>
<td>Deception</td>
<td>Motivated to underprice to take advantage of insufficient scope; Losses from underpricing through reduced standard of work</td>
<td>0.83</td>
<td>Flyvbjerg (2005, 2006a, 2006b), Flyvbjerg et al. (2001, 2005), Siemiatycki (2009)</td>
</tr>
<tr>
<td>Need-for-work</td>
<td>Motivated to underprice to maintain turnover/need-for-work; Results from underpricing-maintaining cash flow</td>
<td>0.78</td>
<td>Blake Dawson (2011), Dutami &amp; Shin (2002), Ding (2012), De Neufville &amp; King (1995), Runeson &amp; Skitmore (1999), Shash (1999)</td>
</tr>
<tr>
<td>Adverse financial consequences</td>
<td>Results of underpricing-lack of profit; Results of underpricing-financial distress; Reverse of results of underpricing at or above the margin</td>
<td>0.65</td>
<td>Aitken et al. (2000), Kangari (2002), Langford et al. (2003), Mahamid (2001), Rvwelamia et al. (2004)</td>
</tr>
<tr>
<td>Competitive pricing strategies</td>
<td>Motivated to underprice to penetrate market; Motivated to underprice to weaken a competitor</td>
<td>0.62</td>
<td>Mohtar &amp; Arditi (2012); Yu, Tam (2016), Alexander &amp; Hutten (2010), Oo, Drew, &amp; Runeson (2010)</td>
</tr>
<tr>
<td>Last project was underpriced</td>
<td>Was your last completed project underpriced?</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Frequent project cost overruns</td>
<td>Did your company experience frequent project cost overruns?</td>
<td>N/A</td>
<td></td>
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</table>
The regression analysis results are presented in Table 5. Table 5 shows that Hypothesis 1 is supported—deception is significantly and positively influenced by the need for work (β = 0.64, p < 0.05). Also evident from Table 5 is that Hypothesis 2 is supported—deception mitigates adverse financial outcomes (β = 0.41, p < 0.05). Similarly, Hypothesis 3 is also supported—underpricing contributes positively to adverse financial outcomes (β = 0.01, p < 0.01). Finally, Hypothesis 4 is supported—underpricing based on a competitive pricing strategy is significantly and positively related to financial gain at or above the standard profit margin, which improves a company’s profitability (β = 0.24, p < 0.05).

6. Discussion

Consistent with literature and general perception, the findings indicate that underpricing in the construction market in New South Wales is widespread. Similar to the rankings of reasons for underpricing in other studies (such as those of Feyek, Young, and Duffield (1998) on the Australian construction industry; Feyek et al. (1999) on the Canadian construction industry; and Shash (1993) on the United Kingdom’s construction industry), this study finds need-for-work and winning the bid as top considerations in sizing project mark-up in a bid or for underpricing.

Interestingly, while strategic underpricing is not widely used as a competitive tool, it has been shown to have a direct, positive impact on contractors’ profitability. The plausible explanation for this phenomenon is that strategic underpricing may be employed by contractors to mitigate competitive advantages, such as cost advantage due to economy of scale and scope, relatively high sunk-cost, and/or high transaction costs for the competitors. This underpricing backed by competitive advantages is done in order to sustain (possibly for a prolonged period of time) lower than normal profit margins or even small losses (Tao, 1988). In reality, only a small proportion of contractors have such advantageous positions. Further, this survey was undertaken during the second half of 2012, during a period of prolonged downturn in the Australian construction market when market conditions were conducive to needs-based considerations, rather than strategic considerations (Ravenhill & Skitmore, 1999).

Need-for-work has been identified as one of the main reasons leading to deception or strategic misrepresentation (Flyvbjerg, 2005, 2006a, 2006b; Flyvbjerg et al., 2002; Flyvbjerg et al., 2003a). A contractor driven by need-for-work is likely to engage in activities, whether deceptive or not, to recoup losses due to underpricing. Typical deceptive activities include taking advantage of insufficient scoping (Smiatić, 2009) or “having the costs underestimated and benefit overestimated” to get a project started as it “creates work for engineers and construction firms, and many stakeholders make money” (Feyek et al., 2003, p. 284). Such deceptive activities often lead to costly late design changes that can result in cost overruns (LePutman, 2008). Adding to Flyvbjerg’s concept of strategic misrepresentation, this study is the first to empirically identify the need for work as an antecedent for deceptive conduct in construction tendering.

The research found that underpricing leads to adverse financial outcomes. Contributing to the literature, this study finds that deceptive conduct mitigates adverse financial outcomes in short term. However, deception does not contribute to above-average long-term profitability. Consistent with Flyvbjerg et al. (2004) finding that underpricing is a major cause of contractor insolvencies, this study finds that underpricing directly contributes to adverse financial outcomes.

Further, we find that the frequency of project cost overruns in a company is directly linked to adverse financial outcomes for the company, supporting the arguments by Arditi et al. (2000), Kangari (1988), Langford et al. (1993), and Mamadit (2012), that persistent cost overruns erode profits and have a significant effect on the financial health of organizations.

This study also found that competitive pricing strategy is directly linked to financial gain at or above the typical profit margin, suggesting underpricing (when used as part of an overall strategy to penetrate the market or win competitors), can be an effective tool to improve company profitability. The finding is consistent with observations by Mohtar and Arditi (2003), Yiu and Tam (2006), Alexandersson and Hultén (2006), and Ou et al. (2010) that these market-based strategies are common in tendering and that it is profitable to target one’s competitors.

Further, clients should be wary of the lowest bid in the tender process as there is financial motivation for the contractor to use deceptive practices against the client to maintain turn-around. The client should be particularly wary if the contractor is experiencing low utilization of staff and difficulties in maintaining sales turnover (Blake Dawson, 2011; De Neufville & King, 1991; Ou, Lo, & Lim, 2012; Shash, 1993). For contractors, although deception can mitigate financial woes temporarily, it does not contribute to the long-term financial health of the company. To be profitable over the long term, it is important to develop a market-based strategy, and underpricing can be used as a component of the strategy. Underpricing motivated by a need-for-work tends to lead to deceptive and adverse financial outcomes and, therefore, should not be relied upon as the primary means to win projects.

7. Limitations and Future Research Directions

Caution should be taken when generalizing the findings of this study. This study is based on a relatively small sample and was conducted during a period of prolonged downturn in the construction market. Further studies should examine the issues in various markets with different market conditions to further validate the findings.

Further, the Cronbach Alphas for both constructs, adverse financial consequences and competitive pricing strategy are marginal for exploratory studies (~0.6). Future studies need to refine the instrument so as to improve the reliability of the constructs.

In this study, the dependent variable and the independent variables are measured via the same survey instrument. As a result, the findings are subject to common variance error (CVE). Further studies should use CVE by collecting the performance data through different means such as company annual reports or stock market reports.

8. Conclusions

This study found that underpricing was commonly used to win projects in the New South Wales construction industry; this study finds need-for-work as an antecedent for underpricing based on a competitive mix to penetrate a market, and to maintain turnover/need-for-work temporarily, it does not contribute to the long-term financial health of the company. In contrast, we found that when used as part of a strategic mix to penetrate a market, win a client, and or weaken competitors, underpricing can be an effective tool to improve company profitability. Therefore, underpricing as a tool to mitigate financial woes of the company temporarily does not contribute to the long-term financial health of the company.

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