

# **Calculating Cartel Follow-on Damages**

General considerations as well as application to South African construction sector

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# Table of Contents

<b>1</b>	<b>Introduction.....</b>	<b>1</b>
<b>2</b>	<b>Consent Agreements in the Construction Sector .....</b>	<b>1</b>
<b>3</b>	<b>Theoretical Methodological Overview .....</b>	<b>4</b>
3.1	Relevant Literature.....	5
3.2	Methods .....	7
3.2.1	Comparator Based Methods .....	8
3.2.2	Financial Analysis based Methods.....	13
3.2.3	Market structure based Methods.....	15
<b>4</b>	<b>Practical Examples .....</b>	<b>17</b>
4.1	Connor (2014) Meta-study .....	17
4.2	South African Example: Construction of World Cup Stadia.....	18
<b>5</b>	<b>Conclusion .....</b>	<b>22</b>
	<b>Appendix A: Data for Model .....</b>	<b>24</b>
	<b>Appendix B: Estimation of Model and Results .....</b>	<b>25</b>
	Forecasting and “But for” Analysis .....	25
	Model Results .....	26
	<b>Appendix C: Profit Margins derived from StatsSA data.....</b>	<b>29</b>

## List of figures

Figure 1: Cross sectional Data.....	9
Figure 2: Time series Data.....	11
Figure 3: Panel Data .....	13
Figure 4: Distribution of Overcharge Estimates from Connor (2014).....	18
Figure 5: BER BCI Actual, Fitted and Forecasted Values - Unrestricted Model (Left) and Specific Model (Right).....	20
Figure 6: Historic BER BCI and Haylett Indices (left) and Y-o-Y Growth (right) .....	24
Figure 7: RMB/BER Business Confidence Index for Building Contractors .....	24

## List of tables

Table 1: Projects affected by cartel activity, Prescribed vs. Non-prescribed.....	3
Table 2: Projects affected by cartel activity, Private vs. Public.....	3
Table 3: Administrative Penalties by firm.....	3
Table 4: Average Deviation of Forecasted Value from Actual Values .....	20
Table 5: Relevant average profit margins, 2007 - 2010.....	22
Table 6: Coefficients for the Variables in Levels.....	28
Table 7: Profit margins according to different measures .....	29
Table 8: Profit margins according to different measures, disaggregated according to company size .....	29
Table 9: Profit margins according to different measures, disaggregated according to type of construction activity .....	30

# 1 Introduction

Construction is one of the high-impact sectors prioritised by the Competition Commission ('the Commission'). As such, the efficient functioning of this sector is of utmost importance both to the Commission, as well as the South African economy in general. However, as a result of the Construction Fast Track Settlement Process (CSP) which the Commission launched in February 2011, some 300 instances of bid-rigging were uncovered between (at least) 2000 and 2009. At the conclusion of the Commission's settlement process, there were settlements by 15 out of the 18 construction firms that participated in the CSP, including South Africa's top tier construction firms. The outcome of the CSP, as well as the resulting aggregate administrative penalties of R1.46 Billion, presents a satisfactory outcome for the Commission and the various parties involved. Nevertheless, there are various organizations who have indicated their intent to pursue civil follow-on damage claims.

The quantification of such follow-on damages is a relatively new development in the South African context, and no case for damages in the South African construction sector has yet been brought to court. Furthermore, quantification of damages in the construction sector is particularly challenging: construction projects are often unique, once-off projects for which long price and other comparator series are not readily available, complicating the calculation of the 'but for' price<sup>1</sup>.

Building on the literature and recent EU policy experience, this paper evaluates a range of economic methods applied in the quantification of follow-on damages, with specific reference to their applicability within the construction sector. The evaluation also includes a consideration of recent international examples of follow-on damages in the construction sector from other jurisdictions.

The paper is structured as follows: section 2 considers the outcome of the *Construction Fast Track Settlement Process* and what effect the bid-rigging activities of firms had on the South African economy. Section 3 provides a theoretical overview of the quantification damages in general, and applies this to the construction sector. Section 4 provides an example of how these methods could be applied in practice, using as an example the bid-rigging in construction of the 2010 FIFA World Cup Stadia. Section 5 concludes.

## 2 Consent Agreements in the Construction Sector

A key tool in an investigation into cartel conduct internationally is the use of a corporate leniency provision. In the South Africa context, the Commission's *Corporate Leniency Policy (CLP)*<sup>2</sup> provides leniency to the first firm to provide information on a cartel to the authority in exchange for its full

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<sup>1</sup> As explained further in the paper, the 'but for' price is the price that would have prevailed but for the collusion.

<sup>2</sup> See the Competition Commission's 2013/2014 Annual Report for more information regarding this policy.

cooperation<sup>3</sup>. Nevertheless, the Commission can encourage co-operation outside the scope of the CLP through programs that incentivise firms to disclose information regarding cartels, by offering them a reduction in the fine to be paid in a settlement agreement through targeted programs.

One such program, specifically pertaining to the construction sector, is the *Construction Fast Track Settlement Process (CSP)* which the Commission launched in February 2011<sup>4</sup>. Under this agreement, companies in the construction industry are incentivised to make full and truthful disclosure of contraventions of the Act. In return, they face lower penalties than would be the case under individual adjudication<sup>5</sup>.

As a result of the CSP, more than 300 instances of bid-rigging were uncovered between (at least) 2000 and 2009<sup>6</sup>. These collusive practices were instigated by the top-tier of South Africa's construction firms graded for large projects in the Construction Industry Development Board's General Building and Civil Engineering categories for grade 9 firms<sup>7</sup>. While there are more than 50 firms registered in this category, only the top-tier of these firms are realistically capable of handling large infrastructure projects. This facilitated the collusion between the top tier firms, as there would be no credible threat of rivalry from the other grade 9 firms<sup>8</sup>. At the conclusion of the Commission's settlement process, there were settlements by 15 of the 18 construction firms that participated in the CSP, including these top tier firms<sup>9</sup>.

With reference to Table 1 it is clear that 160 (53%) of the uncovered projects were prescribed<sup>10</sup> and 140 (47%) were non-prescribed, which were subsequently considered for settlement. The value of the non-prescribed projects amounted to R37.1 billion (79% of total projects). Thus, in value terms, the Commission's investigation and settlements covered a substantial portion of the projects affected by the bid-rigging conspiracy. The construction of the FIFA World Cup Stadia, the Gauteng Freeway Improvement Plan (GFIP) as well as the Gautrain project were amongst the most important of these projects<sup>11</sup>.

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<sup>3</sup> Competition Commission. (2009). *Unleashing Rivalry: Ten Years of Enforcement by the South Africa Competition Authorities, 1999 – 2009*.

<sup>4</sup> Competition Commission. (2011). Invitation to Firms in the Construction Industry to Engage in Settlement of Contraventions of the Competition Act. Issued by the Competition Commission on 01 February 2011.

<sup>5</sup> Competition Commission of South Africa. Annual Report 2013/2014.

<sup>6</sup> Ibid.

<sup>7</sup> These are firms which does not have a limit as to the maximum contract amount they are allowed to tender on. See CIDB Guidelines for Contractor Registration for more information.

<sup>8</sup> Hekima Advisory. (2014). *The Role of CIDB in Limiting Construction Industry Cartels*. Regulatory Entities Capacities Building Project, undertaken by The Centre for Competition, Regulation and Economic Development.

<sup>9</sup> Competition Commission of South Africa. Annual Report 2013/2014.

<sup>10</sup> They were prescribed in the sense that they fell outside the prescription period within which a complaint can be brought against parties involved in prohibited anti-competitive practices. See Section 67 of the South African Competition Act for more details.

<sup>11</sup> Competition Commission of South Africa. Annual Report 2013/2014.

**Table 1: Projects affected by cartel activity, Prescribed vs. Non-prescribed**

	Prescribed	Non-prescribed	Total
Number of Projects	160	140	300
<i>Number of Projects (%)</i>	<i>53%</i>	<i>47%</i>	<i>100%</i>
Value of Projects	R 9.9 Billion	R 37.1 Billion	R 47 Billion
<i>Value of Projects (%)</i>	<i>21%</i>	<i>79%</i>	<i>100%</i>
<b>Total Projects Settled</b>	<b>57</b>		

Source: Hekima Advisory (2014)<sup>12</sup>

The largest amount of projects affected was in the public sector. With reference to Table 2, 75% of the total amount of projects affected was in the public sector. In terms of value, the affected projects for private and public sector constitutes 40% and 60% respectively.

**Table 2: Projects affected by cartel activity, Private vs. Public**

	Private	Public	Total
Number of Projects	75	225	300
<i>Number of Projects (%)</i>	<i>25%</i>	<i>75%</i>	<i>100%</i>
Value of Projects	R 19 billion	R 28 billion	R 47 billion
<i>Value of Projects (%)</i>	<i>40%</i>	<i>60%</i>	<i>100%</i>

Source: Hekima Advisory (2014)<sup>13</sup>

Shown in Table 3 are the 15 firms which settled with the Commission, as well as the administrative penalty to be paid. The terms of the settlements resulted in aggregate penalties amounting to about R1.46 Billion. WBHO Construction (Pty) Ltd incurred the highest administrative penalty of R311 288 311, comprising 21.27% of the total penalties. Combined, the top 6 firms in terms of administrative penalties (WBHO, Murray & Roberts, Stefanutti, Aveng, Basil Read and Raubex) constitute the bulk of the penalties, amounting to R 1 387 566 447 or almost 95% of the total.

**Table 3: Administrative Penalties by firm**

Firm	Administrative Penalty Paid	Percentage of Total Penalty
WBHO	R 311 288 311	21.27%
Murray & Roberts	R 309 046 455	21.11%
Stefanutti	R 306 892 664	20.97%
Aveng	R 306 576 143	20.94%
Basil Read	R 94 936 248	6.49%
Raubex	R 58 826 626	4.02%
Haw & Inglis	R 45 314 041	3.10%

<sup>12</sup> Hekima Advisory. (2014). *The Role of CIDB in Limiting Construction Industry Cartels*. Regulatory Entities Capacities Building Project, undertaken by The Centre for Competition, Regulation and Economic Development.

<sup>13</sup> Ibid

Rumdel	R 17 127 465	1.17%
Guiricich Bros	R 3 552 568	0.24%
Vlaming	R 3 421 662	0.23%
Tubular Technical	R 2 634 667	0.18%
Liverio & Son	R 2 011 078	0.14%
Hochtief	R 1 315 719	0.09%
Norvo	R 714 897	0.05%
Esofranki	R 155 850	0.01%
<b>Total</b>	<b>R 1 463 814 394</b>	<b>100%</b>

Source: Various Consent Agreements between firms and the Commission<sup>14</sup>

One of the many major public sector projects affected was the construction of the 2010 FIFA Soccer World Cup stadia. In the construction process, bid rigging agreements were concluded by Grinaker LTA, WBHO, Murray & Roberts, Group Five, Concor and Basil Read in 2006<sup>15</sup>. These firms met on two instances in order to allocate the construction of the World Cup stadia amongst one another. Furthermore, firms exchanged cover prices in their respective bids to ensure that the agreed allocations are realised. The firms also allegedly agreed to add a profit margin of 17.5% on the construction of the stadia<sup>16</sup>. This will serve as the basis for a practical example of how damages might be calculated in the context of the South African construction sector, discussed further in section 4.2.

While the Competition Commission and various parties involved have declared themselves satisfied with the outcome and agreed to pay the R1.46 Billion in administrative penalties, there are various organizations (such as SANRAL and certain municipalities) who are intent on pursuing civil damage claims such that they are compensated for the harm suffered. While these follow-on damages have been pursued in practice by various international jurisdictions (for instance the US, UK and EU), it is a very recent undertaking in South Africa, with only a single case of civil damages being pursued since the inception of the Act in 1998 (Nationwide Airlines' 2008 action for civil damages against SAA)<sup>17</sup>. As such, it is crucial that in the event that follow-on damages are to be pursued, the international experience is taken into account and applied to the South African case.

### 3 Theoretical Methodological Overview

A major difficulty faced by the relevant parties in a follow-on damage action, is that the harm suffered is difficult to quantify. As noted, this quantification is based on a comparison between the actual positions of the claimants after the infringement of the Act has occurred, with the counterfactual position within which

<sup>14</sup> Available on the Commission website, [www.compcom.co.za](http://www.compcom.co.za), as well as indicated in their 2012/2013 Annual Report

<sup>15</sup> Consent Agreement between the Competition Commission and Aveng (Africa) Ltd. Case No. 2009Feb4279/2009Sep4641, available in the public domain via [www.compcom.co.za](http://www.compcom.co.za)

<sup>16</sup> Ibid

<sup>17</sup> Smith, P. & Swan, A. (2013). *Quantifying Cartel Damages: South Africa Policy and Recent Developments*. Paper presented at the 7<sup>th</sup> Annual Conference on Competition Law, Economics and Policy. Johannesburg. September 2013.

claimants would have found themselves absent the infringement. In quantifying this counterfactual scenario, economic and legal issues often arise<sup>18</sup>. This paper considers relevant literature on the quantification of damages (both internationally and in South Africa) and proceeds to theoretically discuss the most widely applied methods of damage estimation.

### 3.1 Relevant Literature

In an attempt to address the difficulties surrounding the quantification of damages, a recent international undertaking is worth noting. The European Commission, through the publication of a Green Paper in 2005, a White Paper in 2008, a Draft Guidance Paper in 2011 and most recently a Commission Staff Working Document in 2013, provides insights into the methods and techniques that are available to quantify harm in follow on damage actions<sup>19</sup>. While this document has been developed within the framework of the European judiciary system, the methods used are of relevance in any jurisdiction considering quantification of harm in damage actions<sup>20</sup>.

Some authors assisted the European Commission in constructing these documents through studies regarding the quantification of cartel damages. Ashurst (2004)<sup>21</sup> were the first to compile a cartel damage quantification study for the European Commission, followed by Oxera (2009)<sup>22</sup>. Both these studies provide a structured overview of relevant quantification methods as well as elucidating the economic and legal perspectives as well.

In addition to the above, various authors have attempted to address the issues surrounding quantification of damages in anti-trust cases. Connor (2001)<sup>23</sup> examines the sensitivity of overcharges generated by the lysine cartel, which lasted from 1992 to 1995, to several factors such as the time period, seasonality of demand and the price absent collusion. Building on this, Connor (2007)<sup>24</sup> examines the antitrust litigation of the lysine cartel and points to potential quantification problems relating to cartel formation after recessions. Van Dijk and Verboven (2008)<sup>25</sup> distinguish between damage quantification methods that use comparator indicators and those which use information directly from the cartelized market. David and

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<sup>18</sup> European Commission, *Quantifying Harm in Actions for Damages Based on Breaches of Article 101 or 102 of The Treaty on The Functioning of The European Union*, Communication of the Commission, 2013

<sup>19</sup> Scallan, A., Mbikiwa, M. & Blignaut, L. (2013). *Compensating for Harm Arising from Anti-competitive Conduct*. Paper presented at the 7<sup>th</sup> Annual Conference on Competition Law, Economics and Policy. Johannesburg. September 2013.

<sup>20</sup> Ibid.

<sup>21</sup> Ashurst (2004). *Study on the Conditions of Claims for Damages in Case of Infringement of EC Competition Rules*. Study prepared by Emily Clark, Mat Hughes and David Wirth for the EC, Brussels.

<sup>22</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*, Study Prepared for the European Commission, December 2009

<sup>23</sup> Connor, J.M. (2001). *Our Customers are our Enemies: The Lysine Cartel of 1992-1995*. Review of Industrial Organization. 18:5-21.

<sup>24</sup> Connor, J.M. (2007). *Optimal Deterrence and Private International Cartels*. Purdue University: American Antitrust Institute. 09 April 2007.

<sup>25</sup> Van Dijk, T. & Verboven, F. (2008). *Quantification of Damages*. Issues in Competition Law and Policy. 3:2331-2348.



Garcés (2010)<sup>26</sup> study the same approaches, albeit from a more practical, econometric based perspective. Friederiszick & Röller (2010)<sup>27</sup> discuss different quantification methods and furthermore discuss the general trade-off between accuracy and practicability in cartel cases.

More recently, Inderst *et al.* (2013)<sup>28</sup> examine which types of damages can be caused by a cartel and in which direction on the upstream as well as the downstream level they have an impact. Maier-Rigaud & Schwalbe (2013)<sup>29</sup> also study the different types of damages caused by cartels and the upstream as well as downstream effects, in addition to discussing methods of damage quantification in both abuse of dominance as well as cartel cases.

While there is a rather extensive body of literature on the quantification of damages in general, relatively few studies have applied these quantification methods to the construction sector. Howard & Kaserman (1989)<sup>30</sup> are one of the first available studies. They employ regression-based comparator methods for estimating damages in bid rigging cases in the sewer construction industry in the US. Specifically, they consider a cost based approach that looks at the ratio between the winning bid and the professional's estimates of a competitive bid, based on the basis of sketch cost data. In addition, they also make use of a dummy variable as well as forecasting approaches.

Gupta (2001)<sup>31</sup> examines Florida State road-building construction contract auctions through the use of an econometric model which explains variation in price-cost margins. Lee & Hahn (2002)<sup>32</sup> employ a regression-based econometric model using a forecasting approach to estimate the potential damage of collusion in Korean public works contracts prior to the financial crisis of 1997. Bajari & Yi (2003)<sup>33</sup> makes use of a sophisticated econometric model incorporating Bayes' theorem and predicts cartel behaviour on bids where the two largest firms are bidders. Van den Heuvel (2005)<sup>34</sup> and Van Bergeijk (2008)<sup>35</sup> discuss the international bid-rigging of Dutch civil construction projects, however they do not provide much insight

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<sup>26</sup> Davis, P. & Garcés, E. (2010). *Quantitative Techniques for Competition and Antitrust Analysis*. Princeton University Press. Princeton and Oxford, 2010.

<sup>27</sup> Friederiszick, H.W. & Röller, L.H. (2010). *Quantification of Harm in Damages Actions for Antitrust Infringements: Insights from German Cartel Cases*. ESMT Working Paper, Number 10-001. Berlin.

<sup>28</sup> Inderst, R., Maier-Rigaud, F. & Schwalbe, S. (2013). *Quantification of Damages due to Anticompetitive Violations*. Handbook of Private Cartel Law Enforcement. Munich.

<sup>29</sup> Maier-Rigaud, F. & Schwalbe, U. (2009). *Quantification of Antitrust Damages*. IESEG Working Paper Series, Working Paper 2013-ECO-09.

<sup>30</sup> Howard, J. H. & Kaserman, D. (1989). *Proof of Damages in Construction Industry Bid-Rigging Cases*. The Antitrust Bulletin. 34:359-393.

Antitrust Bulletin 34 (1989): 359-393.

<sup>31</sup> Gupta, S. (2001). *The Effect of Bid-Rigging on Prices: A Study of the Highway Construction Industry*. Review of Industrial Organization. 19:453-467.

<sup>32</sup> Lee, I.K. & Hahn, K. (2002). *Bid-rigging in Auction for Korean Public-Works Contracts and Potential Damage*. Review of Industrial Organization. 21(1):73-88.

<sup>33</sup> Bajari, P. & Ye, L. (2003). *Deciding Between Competition and Collusion*. The Review of Economics and Statistics. 85(4):971-989.

<sup>34</sup> Van den Heuvel, G. (2005). *The Parliamentary Enquiry on Fraud in the Dutch Construction Industry*. Crime, Law, and Social Change 44: 133-151.

<sup>35</sup> Van Bergeijk, P. A. G. (2008). *On the allegedly invisible Dutch construction sector cartel*. Journal of competition law & economics, 4(1):115-128.

published in the Journal of Competition Law and Economics 2008]

into the methods employed. Connor & Kallioikoski (2014)<sup>36</sup> critically discuss the decision of damages in the Finnish asphalt cartel, operational from about 1994 – 2002, and also consider the role of economic analysis in this case. Connor (2014)<sup>37</sup> lays out the characteristics of bid-rigging cartels and also discuss a range of injury to buyers, focusing on Québec's construction cartels.

As noted before, quantification of cartel damages in South Africa is a field in its infancy and as a result, studies are very limited. Khumalo *et al.* (2012)<sup>38</sup> investigates the overcharge in the precast concrete cartel in South Africa, which operated for some 30 years. In their estimation, they employ price data and examine mark-ups in regions where the cartel operated against alternative measures of the competitive counterfactual. Smith & Swan (2013)<sup>39</sup> approach the topic from a broader policy perspective, considering the economic principles behind administrative penalties, as well as the estimation of damages, in light of the recent developments in both the EU (discussed above), as well as in the UK. Scallan *et al.* (2013)<sup>40</sup> provide an in depth discussion of some of the legal issues surrounding damage estimation, with reference to the approaches adopted in the EU and the US. They also give a brief discussion regarding methods of quantification of damages and how they apply to South Africa in general terms. No study has, to this author's knowledge, considered issues surrounding quantification of damages in the South African construction sector.

## 3.2 Methods

As noted, the primary purpose of an award for damages in South Africa, much like in the EU, is to compensate the individual or firm which suffered the harm and not to punish an offender. As such, quantification requires the estimation of a counterfactual world in which the infringement did not take place, which reflects the actual world “but for” the existence of the cartel. The spread between the realized and the “but for” prices or profits provide an estimate of the financial damages incurred<sup>41</sup>.

There are various methods available to construct such a “but-for” estimate, each with various underlying assumptions. Each of these methods and techniques has particular features, strengths and weaknesses that make them relatively more or less suitable for the situation at hand. Counterfactual prices or profits are often not observable, and it is difficult to find similar markets or periods that could serve as suitable benchmarks. Even if such markets or periods could be identified, a further complication is controlling for

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<sup>36</sup> Connor, J.M. & Kallioikoski, T. (2014). *The Finnish Asphalt Cartel Court Decision on Damages: An Important EU Precedent and Victory for Plaintiffs*. CPI Antitrust Chronicle. 2014(2).

<sup>37</sup> Connor, J.M. (2014). *Québec's Construction Cartels*. Testimony Before The Commission of Inquiry on Public Contracts in the Construction Industry of the Province Of Québec. Montreal, 28 October 2014.

<sup>38</sup> Khumalo, J., Mashiane, J. & Roberts, S. *Harm and Overcharge in the South African Precast Concrete Products Cartel*. Centre for Competition Economics Working Paper 6/2012. Johannesburg.

<sup>39</sup> Smith, P. & Swan, A. (2013). *Quantifying Cartel Damages: South Africa Policy and Recent Developments*. Paper presented at the 7th Annual Conference on Competition Law, Economics and Policy. Johannesburg. September 2013.

<sup>40</sup> Scallan, A., Mbikiwa, M. & Blignaut, L. (2013). *Compensating for Harm Arising from Anti-competitive Conduct*. Paper presented at the 7th Annual Conference on Competition Law, Economics and Policy. Johannesburg. September 2013.

<sup>41</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*, Study Prepared for the European Commission, December 2009

idiosyncratic demand and supply conditions in order to estimate the counterfactual scenario. As such, there are considerable limits regarding the degree of certainty and accuracy which the methods can provide in terms of quantification of damages<sup>42</sup>. As a result, the choice of method will depend crucially on the specific scenario at hand. The most important methods are discussed below.

### 3.2.1 Comparator Based Methods

Comparator based methods use data (such as prices, sales volumes or profit margins) external to the infringement in order to calculate the counterfactual<sup>43</sup>. Specifically, these methods estimate what would have happened absent the infringement by looking at other unaffected markets and/or unaffected time periods before and/or after the infringement. These methods broadly fall into three categories: cross sectional methods (comparing different geographic or product markets), time series methods (analysing prices before, during and/or after the infringement) or a combination of both, called difference-in-differences methods<sup>44</sup>.

#### 3.2.1.1 Cross Sectional Methods

**Cross sectional methods** aim to estimate the effect of the infringement by comparing data in the relevant market with data observed in different and unaffected geographic or product markets<sup>45</sup>. Cross sectional methods assume that a comparator market has been chosen in such a manner that any observed differences are the result of the infringement<sup>46</sup>. While comparisons could be made between geographic markets or even distinct but comparable product markets, comparisons could also be made between individual firms, depending on the extent of the infringement and data availability<sup>47</sup>. Pure cross sectional models do not take into account the effects over time, and are based on data in the same time period (refer to Figure 1).

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<sup>42</sup> Ibid.

<sup>43</sup> Gunnar Niels, *Economics for Competition Lawyers* (Oxford ; New York: Oxford University Press, 2011).

<sup>44</sup> European Commission, *Quantifying Harm in Actions for Damages Based on Breaches of Article 101 or 102 of The Treaty on The Functioning of The European Union*, Communication of the Commission, 2013.

<sup>45</sup> Ibid.; Niels, *Economics for Competition Lawyers*.

<sup>46</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*, Study Prepared for the European Commission, December 2009; European Commission, *Quantifying Harm in Actions for Damages Based on Breaches of Article 101 or 102 of The Treaty on The Functioning of The European Union*; David Ashton, *Competition Damages Actions in the EU: Law and Practice*, Elgar Competition Law and Practice (Cheltenham, UK ; Northampton, MA, USA: Edward Elgar, 2013).

<sup>47</sup> European Commission, *Quantifying Harm in Actions for Damages Based on Breaches of Article 101 or 102 of The Treaty on The Functioning of The European Union*; Ashton, *Competition Damages Actions in the EU*.

**Figure 1: Cross sectional Data**

Time	Company				
	A	B	C	D	E
			x		
			x		
			x		
			x		
			x		
			x		
	x	x	x	x	x
			x		

Source: Adapted from Oxera (2009)

A cross sectional analysis assumes that the market structure in a comparator geographic market is sufficiently comparable, i.e. exhibiting similar levels of concentration, technologies, cost structures as well as similar market conditions. In addition, such a market can only be considered a valid benchmark if no restrictions to competition exists<sup>48</sup>.

The above requirements are quite stringent, and can be one of the major drawbacks of using this method. Specifically, if the comparator market is a sufficient benchmark, the same incentives to cartelise should exist and as such prices in the comparator market may similarly deviate from prices under normal competitive conditions, potentially resulting in an underestimation of the actual damage<sup>49</sup>. Nevertheless, an advantage of a cross sectional analysis, unlike a comparison over time, is that the beginning and end phases of the cartel are determined endogenously<sup>50</sup>.

Estimation of the counterfactual price based on cross sectional comparisons can take the form of simple comparisons of averages (such as the arithmetic mean, median or mode price<sup>51</sup> in the comparator market) or more sophisticated regression techniques. The use of regression techniques is superior to simple averages insofar as they control for differences in market or firm characteristics in the relevant and comparator markets<sup>52</sup>. Using firm level data, the price (or winning bid) is estimated over both cartelised and non-cartelised markets and includes a binary indicator (dummy variable) which takes the value of 1 if the specific firm belongs to the cartelised market, and 0 if the firm belongs to the comparator market.

<sup>48</sup> European Commission, *Quantifying Harm in Actions for Damages Based on Breaches of Article 101 or 102 of The Treaty on The Functioning of The European Union*.

<sup>49</sup> Ibid.; Ashton, *Competition Damages Actions in the EU*.

<sup>50</sup> Ashton, *Competition Damages Actions in the EU*.

<sup>51</sup> The arithmetic mean is computed as the sum of all the observations, divided by the total number of observations. The median price refers to the price in the middle of a price ranked distribution. The mode price refers to the price observed with the highest frequency.

<sup>52</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*; Ashton, *Competition Damages Actions in the EU*; European Commission, *Quantifying Harm in Actions for Damages Based on Breaches of Article 101 or 102 of The Treaty on The Functioning of The European Union*.

Estimating the coefficient of this dummy variable then gives an indication of the overcharge and thus damages suffered as a result of the cartel<sup>53</sup>.

Such a cross-sectional analysis could be applied in the construction sector using, for instance, data from unrigged contracts from comparator markets or contracts. However, while this method is applicable in general, it is often the case that the specifics of any one case complicate the analysis. One of the main difficulties with using cross-sectional (as well as time series) methods in the construction sector is the availability and quality of data<sup>54</sup>. Very often the projects in the construction industry are once of projects with very little, if any viable geographic or product comparators. For instance, in a bid-rigging case, absent a sufficient number of unrigged contracts, standard statistical techniques would not yield reliable estimates. This complication does not apply to the rigged bids where a single observation is appropriate, but rather to the control group of unrigged bids used to construct the counterfactual<sup>55</sup>.

In addition, even if contracts awarded in a separate geographic market were available, there is generally a problem of verifying that these were indeed not affected by the bid-rigging schemes. The difficulty in identifying an adequate control group is one of the greatest difficulties in general and even more so in the construction sector<sup>56</sup>, and could take a considerable amount of time. This brings into question the cost and time involved in establishing an estimate of damages suffered, and how this relates to the potential size of the damage claim<sup>57</sup>.

### 3.2.1.2 Time Series Methods

An alternative method is the **time series** method. This method typically involves using the same market before, during and/or after the cartel period to estimate damages<sup>58</sup>. This method is especially useful when the whole market is affected by the infringement and other markets are not deemed to be robust comparators<sup>59</sup>. A time series model typically compares data on companies or markets during the period in which the infringement takes place with the same companies or markets in a period without the violation (refer to Figure 2).

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<sup>53</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*; Ashton, *Competition Damages Actions in the EU*; Howard, J. H. & Kaserman, D. (1989). *Proof of Damages in Construction Industry Bid-Rigging Cases*. The Antitrust Bulletin. 34:359-393.

<sup>54</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*; Scallan, Mbikiwa, and Blignaut, "Compensating for Harm Arising from Anti-Competitive Conduct."

<sup>55</sup> Howard, J. H. & Kaserman, D. (1989). *Proof of Damages in Construction Industry Bid-Rigging Cases*. The Antitrust Bulletin. 34:359-393.

<sup>56</sup> Ibid.

<sup>57</sup> Scallan, Mbikiwa, and Blignaut, "Compensating for Harm Arising from Anti-Competitive Conduct."

<sup>58</sup> Peter J. Davis and Eliana Garcés, *Quantitative Techniques for Competition and Antitrust Analysis* (Princeton, N.J: Princeton University Press, 2010); Ashton, *Competition Damages Actions in the EU*; European Commission, *Quantifying Harm in Actions for Damages Based on Breaches of Article 101 or 102 of The Treaty on The Functioning of The European Union*.

<sup>59</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*.

**Figure 2: Time series Data**

Time	Company				
	A	B	C	D	E
1			x		
2			x		
3			x		
4			x		
5			x		
6			x		
7	x	x	x	x	x
8			x		

Source: Adapted from Oxera (2009)

While a time series comparison can use data from before or after the infringement<sup>60</sup>, it is preferable that the comparison use information from both pre- and post-infringement periods. The use of both pre- and post-infringement data increases the amount of information used, and as such increases the likelihood of more robust findings, with the model only having to fill the gap for the period in between. This is likely to improve the performance of the model in providing an unbiased and accurate estimate of the path of the counterfactual price<sup>61</sup>.

Time series data in general has the advantage that the comparison involves like-for-like firms or market characteristics since it refers to the same firms and markets in both the infringement and counterfactual cases. One drawback of time series models in general is that the data over time often exhibit characteristics not observed in cross sectional data. For instance, there may be seasonality or serial dependence in the time series data which, if not controlled for through the use of econometric techniques, could lead to biased estimates<sup>62</sup>.

Time series based modelling techniques can be based on either a “pure” time series model (univariate) or a deterministic time series model (multivariate). A univariate time series model uses the historical value of the variable of interest itself to predict its future values, the aim being to remove predictable patterns from the data and incorporate them into the model. A multivariate time series model incorporates other explanatory variables and assesses the relationship between them to predict the relevant variable<sup>63</sup>. For instance, it is common to implement the before-and-after method within a multiple regression framework

<sup>60</sup> It is relevant to distinguish between three types of comparison that can be made using time-series data. First, a comparison before and during uses the unaffected period before an infringement and compares this to the period during the infringement. Second, a comparison during and after uses the unaffected period after the infringement and compares this to the period in which the infringement took place. Third, a comparison before, during and after uses data both before and after the infringement to compare to the period during the infringement.

<sup>61</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*.

<sup>62</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*; European Commission, *Quantifying Harm in Actions for Damages Based on Breaches of Article 101 or 102 of The Treaty on The Functioning of The European Union*.

<sup>63</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*.

which estimates the price over the entire period (both infringement and non-infringement) using a dummy variable to obtain an estimate of overcharges, as was discussed under cross sectional models<sup>64</sup>. Alternatively, a multivariate approach could also be used in order to forecast the variable of interest that would have prevailed during the infringement period absent the conspiracy. Techniques used to estimate this overcharge include comparison of averages, interpolation, ARIMA models, GARCH models, Structural time series models as well as Error Correction Models.

As noted, very often the projects in the construction sector have little or no historical information available to construct a time series. This is especially true in a bidding market, where there is no price history. Contracts that were awarded prior to the formation of the cartel, after the collapse of the cartel, or both, could potentially be used to construct a time series. However, historical data such as this are seldom available prior to the conspiracy and if the damage case is brought promptly, there may be very few observable data post the infringement as well<sup>65</sup>.

### 3.2.1.3 Difference-in-differences methods

A superior alternative to the above mentioned methods is the **panel data (difference-in-differences)** analysis which combines the cross sectional and time series comparator based methods for estimating the counterfactual price. This method is based on a simultaneous observation of price developments through time on the infringement market and on one or more comparable but geographically separated markets<sup>66</sup>. In essence, difference-in-differences estimators control for what would have happened absent the infringement through an examination of what changed over time in the infringement and non-infringement markets, followed by a comparison of those differences<sup>67</sup> (Figure 3).

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<sup>64</sup> Davis and Garcés, *Quantitative Techniques for Competition and Antitrust Analysis*; Ashton, *Competition Damages Actions in the EU*.

<sup>65</sup> Howard, J. H. & Kaserman, D. (1989). *Proof of Damages in Construction Industry Bid-Rigging Cases*. The Antitrust Bulletin. 34:359-393.

<sup>66</sup> Ashton, *Competition Damages Actions in the EU*.

<sup>67</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*.

**Figure 3: Panel Data**

	Company				
	A	B	C	D	E
Time	1		x		
	2		x		
	3		x		
	4		x		
	5		x	x	x
	6		x	x	x
	7	x	x	x	x
	8		x	x	x

Source: Adapted from Oxera (2009)

The estimation techniques used in a difference-in-differences estimation is similar to those often used in evaluating clinical trials and the effect of policy choices. One group has a ‘treatment’ applied to it (the infringement) while another group not treated is used as a control group. The difference-in-differences method then compares what happens to each group before and after the treatment. Specifically, it looks at the development of the relevant economic variable in the infringement market during a certain period and compares it to the development of the same variable during the same time period on an unaffected comparator market. The comparison shows the difference between these two differences over time and in doing so provides an estimate of damages<sup>68</sup>.

As noted, the difference-in-differences methods are an improvement on pure cross section and time series methods as it exploits both time- and firm-specific variations. This is advantageous as it aids in the estimation of the effect of the infringement and can also account for key factors which affect prices in the two markets. Nevertheless, this approach does have some drawbacks. For instance, it cannot distinguish between the infringement and that of a separate factor affecting the treatment group, but not the control group, in the same way and at the same time as the infringement. Also, the data requirement for the difference-in-differences method is much greater than for either the time series or cross sectional techniques<sup>69</sup> which is a very big constraint in the construction sector.

### 3.2.2 Financial Analysis based Methods

A further set of approaches to quantify damages is the so called **financial analysis based** approaches. These set of approaches rely on corporate finance theory and practical techniques used in financial analysis in order to assess the value of damages in anti-trust cases. In practice, it is often difficult to

<sup>68</sup> European Commission, *Quantifying Harm in Actions for Damages Based on Breaches of Article 101 or 102 of The Treaty on The Functioning of The European Union*.

<sup>69</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*; European Commission, *Quantifying Harm in Actions for Damages Based on Breaches of Article 101 or 102 of The Treaty on The Functioning of The European Union*.



differentiate between finance and non-finance based methods. For instance, in some cases, the financial analysis forms the basis of the analytical approach, whereas in other cases it is used to address specific issues such as discounting to arrive at a final value for damages<sup>70</sup>.

Some of the financial-analysis-based approaches can be seen as an application of comparator based methods, as counterfactual values are often derived from counterfactual markets or time periods. However, the difference lies in choice of comparator: whereas the comparator based approaches seek to estimate specific counterfactual parameters such as price, volume or market share, the financial-analysis-based approaches are concerned with estimation of parameters relating to financial performance, which can be translated into a damage value, such as profitability or share prices. Financial methods can also be used to estimate counterfactual prices or profits, by considering information such as cost of production, cost of capital and profit margins of market participants. Used in this sense, the financial methods differ from the comparator based methods as they do not use comparator markets or time periods but rather a combination of theory, assumptions and market specific information to arrive at a counterfactual<sup>71</sup>.

One advantage of the use financial analysis based methods is that the data is more readily available. The importance of financial data to companies, investors and governments necessitates the generation of data at a high frequency. Data such as statutory accounts, periodic financial reports, public accounts as well as share prices is often readily available for companies listed on the stock exchange. A disadvantage of the use of financial data, as was the case with cross-sectional and time-series comparator based methods, is that it is often difficult to distinguish between the impact of external factors and that of the infringement on financial performance<sup>72</sup>.

While the financial-analysis-based approach entails various different techniques, this paper provides a list of three of the most relevant techniques. First, an **analysis of profitability**<sup>73</sup> involves comparing the actual returns earned by parties with returns that would have been realised but-for the infringement<sup>74</sup>. Second, the counterfactual scenario could be obtained through an accounting approach which uses the variable cost of production and adds to it an appropriate mark-up in a **bottom-up** way. This mark-up could be measured as an absolute increase or a percentage profit margin on the costs<sup>75</sup>, using information on margins in comparable competitive markets, theoretically determined information or from

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<sup>70</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*.

<sup>71</sup> Ibid.

<sup>72</sup> Ibid.

<sup>73</sup> While there are various profitability metrics than can be used in the analysis (such as the Net Present Value, Internal Rate of Return, Return on Capital Employed, Return on Sales, Gross Margins and other industry specific metrics), their discussion falls outside the scope of this text.

<sup>74</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*; Ashton, *Competition Damages Actions in the EU*; European Commission, *Quantifying Harm in Actions for Damages Based on Breaches of Article 101 or 102 of The Treaty on The Functioning of The European Union*.

<sup>75</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*; European Commission, *Quantifying Harm in Actions for Damages Based on Breaches of Article 101 or 102 of The Treaty on The Functioning of The European Union*.

the insights from industrial organisation models (discussed in section 3.2.3)<sup>76</sup>. Third, for businesses listed on the public stock exchange, a **share price event study** could be conducted which measures the difference in observed share price performance over the period in which the infringement occurred with the performance which would have prevailed but-for the infringement<sup>77</sup>.

These types of methods might be more applicable in the construction sector than the above mentioned comparator based methods. As noted, the data (such as costs and profits) required for using these methods are often more readily available than was the case under the comparator based methods, due to the strategic nature thereof. Such data is also more readily available from public sources and for a longer time period than would be the case with, for instance, bids or engineering estimates data. In addition, the use of a combination of theory, assumptions and market specific information to arrive at a counterfactual also makes this method more applicable in a sector, such as the construction sector, with a lack of adequate time series as well as cross sectional data.

### 3.2.3 Market structure based Methods

In some instance, the methods discussed above will be unable to yield useful results. In such cases, the use of an artificially constructed counterfactual through **market structure based** methods might be warranted<sup>78</sup>. To this end, IO theory has developed a range of models of competitive interaction and firm behaviour that predict a variety of outcomes, ranging from a monopoly market to a perfectly competitive market. These models can be employed in order to estimate or simulate market outcomes such as prices or volumes in either the factual or counterfactual scenario (or both) and in doing so provide information used to quantify the damage<sup>79</sup>.

These models can range from purely theoretical (providing information to understand market outcomes conceptually) to the empirical (calibrated models which can estimate the counterfactual value)<sup>80</sup>. Taking into account factors such as the nature of cartelised goods, the central competition parameters and the allocation mechanism, one can resort to some of the standard oligopoly models. One such model, the Cournot oligopoly model, describes a market with a relatively small number of firms (and high barriers to entry) producing homogeneous goods that compete on the amount of output produced. Another model,

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<sup>76</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*; Davis and Garcés, *Quantitative Techniques for Competition and Antitrust Analysis*; European Commission, *Quantifying Harm in Actions for Damages Based on Breaches of Article 101 or 102 of The Treaty on The Functioning of The European Union*.

<sup>77</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*; Davis and Garcés, *Quantitative Techniques for Competition and Antitrust Analysis*.

<sup>78</sup> Ashton, *Competition Damages Actions in the EU*.

<sup>79</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*; Ashton, *Competition Damages Actions in the EU*; European Commission, *Quantifying Harm in Actions for Damages Based on Breaches of Article 101 or 102 of The Treaty on The Functioning of The European Union*.

<sup>80</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*; European Commission, *Quantifying Harm in Actions for Damages Based on Breaches of Article 101 or 102 of The Treaty on The Functioning of The European Union*.

the Bertrand oligopoly model, describes a market with a relatively small number of firms (and high barriers to entry) producing differentiated goods that compete on price not output quantity<sup>81</sup>.

The models described above are particularly relevant in auctions and bidding markets<sup>82</sup>, because the market structure and nature of interaction between firms is often well defined and as such they are more conducive to modelling than traditional markets. Specifically, the outcome of bidding and auction markets can be modelled by probabilistic models, augmented with game theoretic principles (a more sophisticated application of the above models, which allows for repeated interaction). In the context of damages actions, these models can be used to either simulate the effect on price and output of removing a competitor (e.g. exclusionary conduct) or of changing the bidding behaviour of different players (e.g. bid-rigging).

Within the construction sector, this type of method could be especially useful. As noted, the structure of auction and bidding markets are well known, and as such they are more conducive to modelling than other markets. For instance, for a given type of auction and market structure, competitive bids could be modelled and then compared with outcomes in the presence of bid-rigging in order to quantify damages suffered as a result of the antitrust violation<sup>83</sup>.

In general, there are certain specific techniques that one might be able to apply in the construction sector. First, the simplest approach would use direct evidence from the case as a basis for the overcharge, from for instance consent agreements. In other words, if it is uncovered that conspirators met and agreed to increase the winning bid by X%, this could be used as the basis for a damage estimate. Second, one would be able to make use of the engineering cost analysis of rigged and unrigged bids that are similar enough in design for the basis of a comparison. However, this method is only viable to use when comparing bids *actually* received on similar contract that is unrigged to bids *actually* received on one that is rigged<sup>84</sup>.

When considering the above methods, it is plausible to argue that comparator based methods are the least likely to be useful in the construction sector, while financial analysis based and market structure based methods are more useful. It is now considered how one might apply these methods in a practical sense.

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<sup>81</sup> Ashton, *Competition Damages Actions in the EU*; European Commission, *Quantifying Harm in Actions for Damages Based on Breaches of Article 101 or 102 of The Treaty on The Functioning of The European Union*.

<sup>82</sup> Note that there is a distinction between auction and bidding markets. While bidding markets tend to be more narrowly defined, the definition of an auction is somewhat wider.

<sup>83</sup> Oxera, *Quantifying Antitrust Damages Towards Non-Binding Guidance for Courts*.

<sup>84</sup> Howard, J. H. & Kaserman, D. (1989). *Proof of Damages in Construction Industry Bid-Rigging Cases*. The Antitrust Bulletin. 34:359-393.

## 4 Practical Examples

While the above discussion serves to illustrate how cartel damages can be quantified, it is relevant to also consider what the outcomes are when these methods are applied in practice. To this end, this paper first considers the outcome of a meta-study conducted by Connor (2014) and then moves on to a practical example in the South African construction sector.

### 4.1 Connor (2014) Meta-study

In order to comprehend the magnitude of damages that arise from anti-competitive conduct in the construction sector, this paper considers data from a meta-study conducted by Connor (2014)<sup>85</sup>. The data contained in the study has detailed information on about 1 100 hard-core international cartels. The number of such cartels in the construction industry is about 55, almost all of which are bid-rigging cartels<sup>86</sup>. On his own account, using the most up-to-date version of this database (February 2014<sup>87</sup>), Connor estimates a mean overcharge in the construction industry of 23.4%. Connor goes on to note that *“Construction industry cartels achieve lower overcharges than many other industries because competitive industry profits are low. Collusion typically doubles or triples competitive profits.”*<sup>88</sup>

Using the database contained in Appendix Table 2 of Connor (2014)<sup>89</sup>, which is understood to have information on cartels up until October 2013, an average overcharge in the construction sector of 21.9% is obtained<sup>90</sup>. Figure 4 shows the distribution of the overcharge estimates.

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<sup>85</sup> Connor, J.M. (2014). *Price Fixing Overcharges: Revised 3<sup>rd</sup> Edition*. Purdue University, American Antitrust Institute (AAI). 24 February 2014.

<sup>86</sup> Connor, J.M. (2014). *Québec's Construction Cartels*. Testimony Before The Commission of Inquiry on Public Contracts in the Construction Industry of the Province Of Québec. Montreal, 28 October 2014.

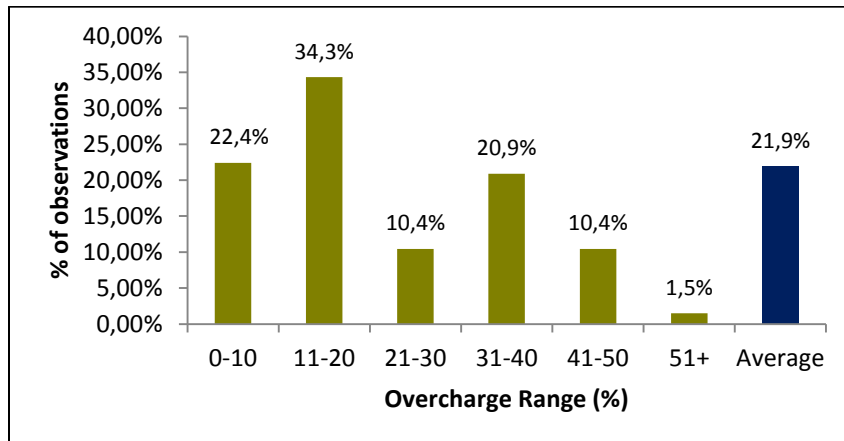
<sup>87</sup> Connor, J.M. (2014). *The Private International Cartels (PIC) Data Set: Guide and Summary Statistics, 1990 – 2013*. SSRN Working Paper, 09 August 2014.

<sup>88</sup> Connor, J.M. (2014). *Québec's Construction Cartels*. Testimony Before The Commission of Inquiry on Public Contracts in the Construction Industry of the Province Of Québec. Montreal, 28 October 2014.

<sup>89</sup> Connor, J.M. (2014). *Price Fixing Overcharges: Revised 3<sup>rd</sup> Edition*. Purdue University, American Antitrust Institute (AAI). 24 February 2014.

<sup>90</sup> The constructed table is available upon request.

**Figure 4: Distribution of Overcharge Estimates from Connor (2014)**



*Source: Connor (2014), Author's calculations*

Clearly, the estimated overcharge varies quite considerably between different cases, with the bulk of overcharges falling in the 0 – 10% and 11 – 20% categories combined. Note that, while a useful indication, such a meta-study could never be a substitute for a case-by-case estimation of damages, due to the diverse nature of projects in the construction sector. As such, a practical example of quantifying overcharges in the South African construction sector is presented below.

## 4.2 South African Example: Construction of World Cup Stadia

To illustrate how one might quantify damages in a South African context, this paper considers the bid-rigging in construction of the 2010 World Cup Stadia, discussed in section 2. Using evidence from the consent agreement of Aveng<sup>91</sup>, it is possible to provide a high-level estimate of the damages caused by the construction companies who rigged bids in the construction of the stadia. Note that what follows is only a high level exercise in an attempt to illustrate what is possible with public data in a South African context. A more robust analysis would need to be augmented with case and firm specific documentation and data pertaining to the details of the contract between the construction firm(s) and the city in which the stadium was built.

In order to calculate the damages resulting from the collusion in this sector, publically available financial data is analysed. The financial approach employed in this paper can be described as a ‘top-down’ method of damages calculation based on an analysis of profit margins. In general, one would prefer to use a combination of methods to calculate the damages. However, in the current case the only publicly available information and industry profit margins are published by Statistic South Africa. While this limits the analysis, it is nevertheless a valuable first step in calculating damages.

<sup>91</sup> Consent Agreement between the Competition Commission and Aveng (Africa) Ltd. Case No. 2009Feb4279/2009Sep4641, available in the public domain via [www.compcom.co.za](http://www.compcom.co.za)

Note that according to the consent agreement of Aveng, the firms implicated in the bid-rigging of the 2010 World Cup Stadia agreed to all aim to obtain a 17.5% profit margin<sup>92</sup>. In order to draw a reasonable comparison between this collusive profit margin and the profit margins which prevailed in the market at that time, one needs to study to what extent the margins observed in the industry during the time of the contravention was reflective of true economic conditions rather than anti-competitive conduct. One way of doing this would be to use econometric modelling to construct “but-for” prices, using a before-and-after approach, which compares the prices before and after the collusion period with prices that prevailed during the collusive period, taking into account demand and supply conditions.

In order to construct such a “but-for” price, this paper uses the forecasting approach. This method involves forecasting the “but-for” price that would have prevailed during the collusion period. The impact of the determinants of demand and supply factors on price can be estimated using data from before the collusion period. These parameter values can then be used to predict the “but-for” price during the collusive period. As a robustness check, the dummy variable approach is also employed. This method entails the inclusion of a dummy variable for the collusion period, which is intended to capture the magnitude of any unexplained price increases that occurred during that period. The specifics of the model are discussed in the appendix, where the full results are also reported.

Data from 1994Q1 to 2013Q4 are employed and the “collusive period” is defined as the period starting in 2007Q1 and ending in 2009Q4. It is in this period which most of the World Cup Stadia contracts were awarded, and in which the stadium was built. As a proxy for tender bid prices, the Building Cost Index (BCI hereafter) which is jointly constructed by the Bureau of Economic Research (BER) and Medium-Term Forecasting Associates (MFA) is obtained<sup>93</sup>. As a proxy for input costs into construction, a index which forms a subset of a larger collection of indices calculated and published by Statistics South Africa (StatSA) on behalf of the Joint Building Contractors Committee (JBCC) for use in conjunction with the Haylett formula is obtained<sup>94</sup>. As a proxy for demand in the construction industry, the RMB/BER Business Confidence Index for Building Contractors which shows the gross percentage of building contractors rating prevailing business conditions satisfactory is utilised<sup>95</sup>. The historical evolutions of these indices are shown in the appendix.

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<sup>92</sup> Consent Agreement between the Competition Commission and Aveng (Africa) Ltd. Case No. 2009Feb4279/2009Sep4641

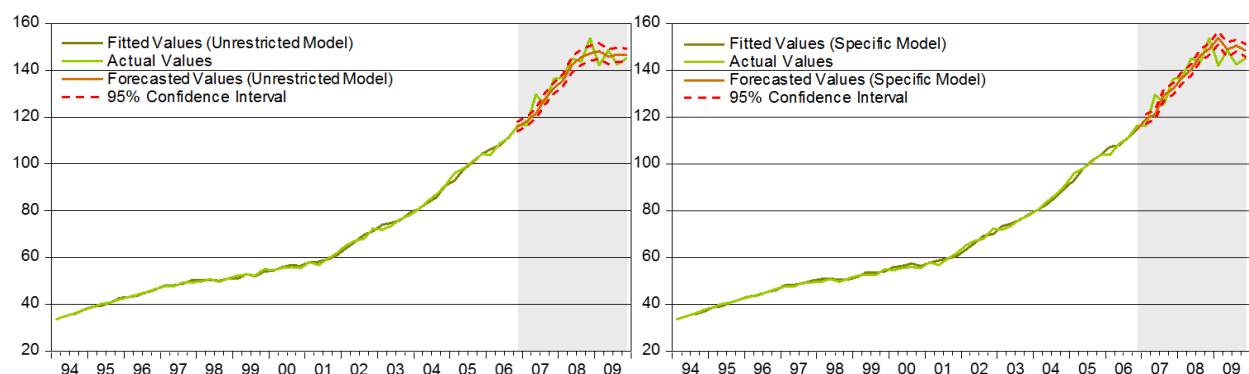
<sup>93</sup> The information from which the index is calculated is supplied on a quarterly basis by registered quantity surveyors throughout South Africa. Once a tender has been accepted, the quantity surveyors take the rates of a selected 22 items in the bills of quantities and supply these to the BER on Building Cost Index forms. See for instance “Medium-Term Forecasting Associates in association with the BER, *Report on Building Costs*, First Quarter 2014” or “Ursula Segalla, The BER Building Cost Index - An Overview, *Studies in Economics and Econometrics* 15, no. 1 (1991): 43–58” for further information.

<sup>94</sup> These indices are derived from changes in the cost structures prevailing in 37 different sectors of the building industry. The indices represent components of various cost inputs of building contracts, i.e. labour, materials, plant and fuel. For present purposes, only the index derived from Workgroup 181 which represents Commercial/Industrial buildings is employed. See CPAP Committee, *CPAP Indices Application Manual for Use with P0151 Indices Published by Statistics South Africa*, January 2013 for further information.

<sup>95</sup> The index ranges between 0 and 100. A value of 50 is indicative of neutrality, a value of 100 indicates extreme confidence and a value of 0 indicates extreme lack of confidence. As such, this index would capture both present and expected future market sentiment in the construction industry.

Using this data, the model is estimated from 1994Q1 to 2006Q4, and then used to forecast “but-for” prices over the collusive period. The procedure starts with unrestricted models and then reduces them to specific models to obtain the most robust and parsimonious specification<sup>96</sup>. Figure 5 below show the results for the unrestricted and specific models respectively. The forecasted period is shaded in the figure. The dashed lines represent 95% confidence intervals around the forecasted values.

**Figure 5: BER BCI Actual, Fitted and Forecasted Values - Unrestricted Model (Left) and Specific Model (Right)**



From the figures it is clear that the actual tender prices fall, for the most part, inside the confidence intervals. As such, based on market relationships between tender prices, input costs and demand drivers, the forecasts do not suggest that prices were any higher during the collusive period. This is also evident when considering Table 4, which shows the (very small and not statistically significant) average percentage deviation of the forecasted values from actual values.

**Table 4: Average Deviation of Forecasted Value from Actual Values**

Model	Average Deviation
Unrestricted Model	-0.44%
Specific Model	0.65%

Source: Author's calculations

Over the collusive period, it is found that forecasted prices differ by less than one percent from actual values. As such, it is concluded that tender prices were, *on aggregate over the entire construction industry*, not significantly higher than would have been expected during the collusion period. This result is also confirmed when using the dummy variable approach. Note that this is not to say that the bid prices in the projects affected by bid-rigging were not higher than they should have been. Instead, this result implies that the projects on aggregate were not pervasive enough to influence the industry tender prices.

One possible explanation as to why, during a period in which there was collusive conduct in the construction industry, the prices do not seem to be any higher than would have been otherwise expected

<sup>96</sup> For a discussion regarding restricted and unrestricted models and how the procedure works, refer to the appendix.

is that the value of the affected projects are not pervasive in the construction industry *on aggregate*. As noted, the value of total affected projects amounted to about R47 billion worth of projects for (at least) the period between 2000 and 2009<sup>97</sup>. When considering these amounts in relative terms, one finds that the R47 billion only represents about 11.01% (using current prices) of the total Gross Domestic Product (GDP<sup>98</sup>) for construction between 2000 and 2009. Even when only considering the period between 2007 and 2009, one still finds that the R47 billion only represents 21.79% of GDP created during that period.

It is therefore clear that although the value of the collusive projects were cumulatively very high, its relative size in comparison to the whole sector, means that it would have not significantly affected the levels of average tender prices. This does not mean that the FIFA stadia collusion was not significant. In fact, these projects constitute a large part of the total value of non-prescribed projects. In sum, while the construction of the World Cup Stadia was not pervasive enough to influence margins in the construction sector in general, it played a major role in the anti-competitive allegations.

Based on the foregoing analysis, therefore, it is found that the aggregate tender prices, as proxied by the BER BCI, were not any higher during the collusive period than a naïve economic model would suggest. By implication, the profit margins which were prevalent in the industry during this period are in line with what could be expected in a competitive market and could therefore serve as “but-for” estimates with which the profit margin added by the construction companies can be compared.

The 17.5% profit margin agreed to by the construction companies can be compared to overall profit margins for the construction sector. In order to do this, annual financial data compiled by Statistics South Africa is used to calculate various profit margins in the construction industry. The data is collected through the annual financial statistics survey (AFS), previously published as the economic activity survey (EAS) and contains estimates of financial data for several industries<sup>99</sup>.

The profit margin depends on how one specifies profit to be calculated. The appropriate margin to use is a further point of debate, which falls outside the scope of this paper. For the sake of completeness, a range of different estimates is provided. Specifically, the net profit margin (before tax), the EBITDA margin as well as the operating profit margin is calculated. Also note that the nature of the data allows one to distinguish between companies of varying sizes (based on thresholds of annual turnover calculated by the Department of Trade and Industry) as well as type of construction activity.

A summary of relevant margins for the entire construction industry, for large firms as well as for firms engaged in building of complete constructions or parts thereof and civil engineering is shown in Table 5

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<sup>97</sup> Hekima Advisory, *The Role of CIDB in Limiting Construction Industry Cartels*.

<sup>98</sup> GDP represents the total value of all goods and services produced within a specific territory during a certain year

<sup>99</sup> For more information, refer to Statistical Publication P0021 published by Statistics South Africa.



below. Note that the margins shown in the table are the average between 2007 and 2010<sup>100</sup>. For the complete tables of all margins, refer to the appendix.

**Table 5: Relevant average profit margins, 2007 - 2010**

Date	Net Profit Margin (before tax)	Profit before interest, tax, amortization and depreciation margin	Profit before interest and tax margin
<b>Total: Entire Construction Industry</b> <i>(from table 7 in Appendix)</i>	7.16%	9.70%	7.54%
<b>Firm Size according to revenue: Large</b> <i>(from table 8 in Appendix)</i>	5.83%	7.57%	5.85%
<b>Construction Activity:</b> <b>Building of complete constructions or parts thereof and civil engineering</b> <i>(from table 9 from Appendix)</i>	6.37%	8.17%	6.54%

*Source: Author's Calculations*

As such, and based on the specific measure of profit, it seems that an average profit margin of between 5.83 – 9.70% is applicable as a “but-for” estimate to determine damages resulting from the bid-rigging by the implicated firms. Having shown with the above econometric model that overall construction profit margins (based on tender prices) were not significantly different during the collusion period than during the competitive period, these aggregate industry profit margins can be used to compare with the 17.5% added by the construction firms. This equates to an overcharge estimate of between 7.8 and 11.67%. Note that this overcharge estimate *applies to each of the construction projects individually*. In order to arrive at a financial value of the cartel damage, these overcharge margins should be compared to each of the final contract amounts paid by interested parties, taking into account the amount of time having elapsed since then.

## 5 Conclusion

This paper set out to investigate the different methods of quantification of cartel follow-on damages, both in general and applied to the construction sector in South Africa. It was shown that while various studies have addressed this issue internationally, it is a more recent undertaking in the construction sector and has as yet not been applied to the South African economy.

It was noted that, due to the nature of the various underlying assumptions of the methods, their applicability is case dependent. The comparator based methods, while applicable in some international jurisdictions, is somewhat limited by the amount of comparable and reliable data available from the South

<sup>100</sup> This is the period relevant to the construction of the stadium and also takes into consideration the accounting lag after the stadium was finished.

African construction sector. Specifically, the projects involved are often large, once-off projects with little or no comparator prices or products. Furthermore, it was noted that the financial analysis based methods have data that is more readily available (due to its strategic function) as well as simpler to obtain from public sources. Finally, it was noted that the structure of auction and bidding markets are conducive to the use of market structure based methods and as such these methods could possibly be very useful in the construction sector.

In addition to the above, it has been shown, both through the investigation of a meta-study as well as a practical example in the South African construction sector, what range of damage estimates one might expect in this sector. The meta-study showed that, when taking into account various different damage estimates internationally, an average overcharge of 23.4% is to be expected. However, the bulk of these estimates lie in the 0 – 20% range. This fits in with this paper's estimate of damages suffered as a result of bid-rigging in construction of the 2010 World Cup Stadia using a financial analysis based approach, amounting to between 7.8 and 11.67%. This finding also fits in with the finding that construction industry cartels achieve lower overcharges than many other industries.

When considering the estimation of damages, economists always face a trade-off between accuracy and practicability. Such a trade-off between accuracy and practicability of the estimation should, however, not deter damage claims when harm was caused<sup>101</sup>. Once an anti-trust infringement has occurred, the evidentiary burden for the quantification of the damages should not be so high that it would impede the victims' right of effective compensation. Ultimately, what will be deemed acceptable depends on the specificities of the judiciary system and data availability<sup>102</sup>. None of the methods described above claim to provide anything more than an estimation of the damage suffered, and as such the South African courts should take a pragmatic approach to the calculation of damages and be weary of the fact that there is a trade-off between accuracy and practicability<sup>103</sup>.

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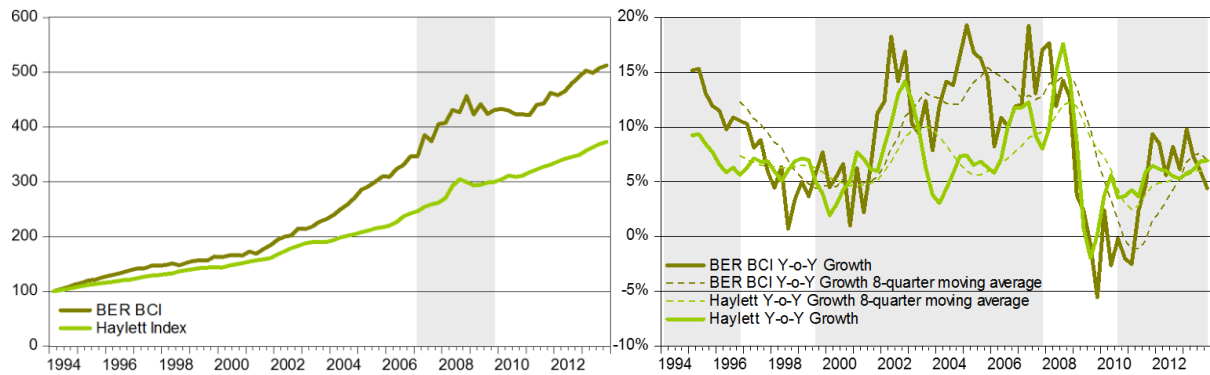
<sup>101</sup> Scallan, A., Mbikiwa, M. & Blignaut, L. (2013). *Compensating for Harm Arising from Anti-competitive Conduct*. Paper presented at the 7<sup>th</sup> Annual Conference on Competition Law, Economics and Policy. Johannesburg. September 2013.

<sup>102</sup> De Coninck, R. (2011). *Quantifying Antitrust Damages in Civil Proceedings: A Pragmatic Approach*. Paper Presented at the New Frontiers in Antitrust Conference, Paris, 11 February 2011

<sup>103</sup> Ibid; Doose, A.M. (2013). *Methods for Calculating Cartel Damages: A Survey*. Ilmenau Economics Discussion Papers. 18(83):1-33.

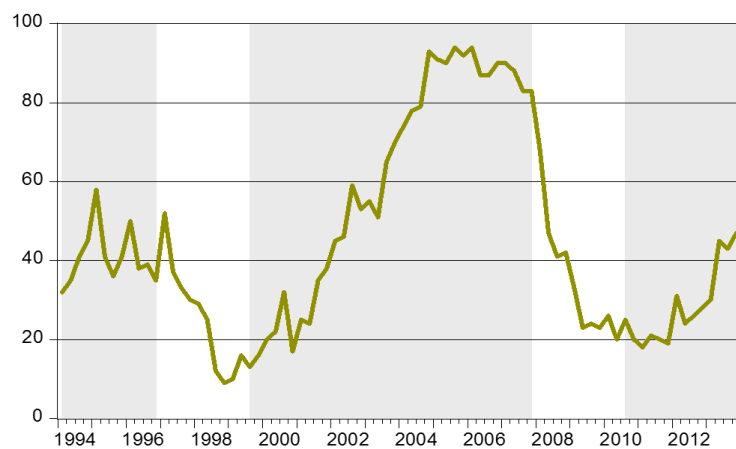
## Appendix A: Data for Model

**Figure 6: Historic BER BCI and Haylett Indices (left) and Y-o-Y Growth (right)**



Source: Author's Calculations, Medium-Term Forecasting Associates (2014), SARB

**Figure 7: RMB/BER Business Confidence Index for Building Contractors**



Source: BER, SARB

## Appendix B: Estimation of Model and Results

### Forecasting and “But for” Analysis

The regression models in this paper are based on the autoregressive distributed lag (ARDL) model, which is a conditional regression model derived from a larger multiple-equation vector autoregressive (VAR) model. The ARDL model has gained in popularity over the past decade, especially following the bounds testing approach suggested by Pesaran, Shin and Smith (2001). Under their approach, the unit root properties of the data do not have to be verified, which eliminates the uncertainty associated with pre-testing the order of integration. The ARDL model also enables testing for unique long-run relationships with a significantly lighter modelling burden than conventional techniques. It is also more reliable in small sample sizes than the Engle-Granger and Johansen procedures.

The bounds test methodology involves two steps for estimating long-run relationships. The first step is to examine the existence of a long-run relationship among all the variables in the equation. If cointegration is confirmed, the second stage involves estimating the long-run and the short-run coefficients using the associated ARDL and ECMs. To test for cointegration, the following conditional Unrestricted ARDL model of lag order  $p$  is estimated:

$$\begin{aligned}\Delta BCI_t = & \beta_0 + \sum_{i=1}^p \beta_{1,i} \Delta BCI_{t-i} + \sum_{i=0}^p \beta_{2,i} \Delta Haylett_{t-i} + \sum_{i=0}^p \beta_{3,i} \Delta Building\_Confidence_{t-i} + \alpha_1 BCI_{t-1} \\ & + \alpha_2 Haylett_{t-1} + \alpha_3 Building\_Confidence_{t-1} + \gamma' Z_t + \varepsilon_t\end{aligned}$$

where, in period  $t$ ,  $BCI_t$  is log of the BER Tender Prices;  $Haylett_t$  is log of construction input costs;  $Building\_Confidence_t$  is a demand proxy, which is the BER/RMB Building Confidence Index for building contractors;  $Z_t$  is a vector of dummy variables dealing with seasonality, data outliers and the collusive period; and  $\varepsilon_t$  is assumed a serially uncorrelated series.

One starts with an “unrestricted model” which includes all of the variables deemed relevant *a priori*, and also includes a set of dummy variables to control for seasonality. The models are unrestricted in the sense that they have not yet been restricted by removing irrelevant variables or reducing the number of lags. Unrestricted models can therefore provide biased estimates. In order to obtain more accurate estimates, one proceeds to so-called “specific models”. A specific model is a parsimonious version of the unrestricted model, which only contains statistically relevant variables, but which still passes standard diagnostic tests for regression models. In order to reduce the models, the automated general-to-specific

(GETS) algorithm programmed into the OxMetrics software is employed. This reduction strategy is well known in the econometric literature.

The ARDL results depend critically on the choice of lag structure. Various metrics suggested that a lag length of one quarter was sufficient for the main models. The models also started failing their diagnostic tests when more lags were included in the specifications. The specific models that emerge from the GETS reduction process also contained only the lags of a first order. Other models which included more lags were also tested, but did not perform any better than the model with only one lag. Furthermore, the bounds test methodology (see Pesaran, Shin and Smith (2001)) is used and it is found that the null could be rejected in all of the cases, i.e. there was a cointegrating relationship present between the regressors.

## Model Results

### Model 1: GUM for restricted sample period, forecasting from 2007Q1 to 2009Q4

EQ(03) Modelling DLBCI by OLS

The dataset is: new04.in7

The estimation sample is: 1994(3) - 2006(4)

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
DLBCI_1	-0.341662	0.1409	-2.42	0.0202	0.1340
Constant	-0.142537	0.09654	-1.48	0.1480	0.0543
DLHAY	0.447919	0.2862	1.56	0.1259	0.0605
DLHAY_1	-0.0173562	0.3012	-0.0576	0.9544	0.0001
DLBUILDCONF	0.0388015	0.01022	3.80	0.0005	0.2752
DLBUILDCONF_1	-0.0136334	0.01123	-1.21	0.2321	0.0374
LBCI_1	-0.108845	0.05831	-1.87	0.0697	0.0840
LHAY_1	0.126796	0.07500	1.69	0.0991	0.0699
LBUILDCONF_1	0.0217838	0.005387	4.04	0.0002	0.3009
s1	-0.0130277	0.007330	-1.78	0.0835	0.0767
s2	-0.0108420	0.006481	-1.67	0.1026	0.0686
s3	-0.0165791	0.006250	-2.65	0.0116	0.1562

sigma	0.014951	RSS	0.00849424805
R^2	0.544533		
Adj.R^2	0.412687	log-likelihood	146.063
no. of observations	50	no. of parameters	12
mean(DLBCI)	0.0241176	se(DLBCI)	0.019509

AR 1-4 test:	F(4,34)	=	1.7333	[0.1654]
ARCH 1-4 test:	F(4,42)	=	0.41035	[0.8002]
Normality test:	Chi^2(2)	=	0.68024	[0.7117]
Hetero test:	F(19,30)	=	1.4092	[0.1953]
RESET23 test:	F(2,36)	=	0.00037507	[0.9996]

**Model 2: Specific Model for restricted sample period, forecasting from 2007Q1 to 2009Q4**

EQ(06) Modelling DLBCI by OLS

The dataset is: new04.in7

The estimation sample is: 1994(3) - 2006(4)

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
DLBCI_1	-0.351135	0.1310	-2.68	0.0101	0.1326
DLBUILDCONF	0.0336020	0.01003	3.35	0.0016	0.1928
LBUILDCONF_1	0.00883972	0.001068	8.28	0.0000	0.5931
sigma	0.0164616	RSS		0.0127361983	
log-likelihood	135.936				
no. of observations	50	no. of parameters		3	
mean(DLBCI)	0.0241176	se(DLBCI)		0.019509	
AR 1-4 test:	F(4,43) =	0.86253	[0.4941]		
ARCH 1-4 test:	F(4,42) =	1.0148	[0.4107]		
Normality test:	Chi^2(2) =	0.14686	[0.9292]		
Hetero test:	F(6,43) =	0.50391	[0.8019]		
Hetero-X test:	F(9,40) =	0.39308	[0.9313]		
RESET23 test:	F(2,45) =	0.20474	[0.8156]		

**Model 3: General Unrestricted Model for entire sample period with dummy for collusion**

EQ(01) Modelling DLBCI by OLS

The dataset is: new04.in7

The estimation sample is: 1994(3) - 2013(4)

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
DLBCI_1	-0.527463	0.09872	-5.34	0.0000	0.3052
Constant	-0.200417	0.09664	-2.07	0.0421	0.0621
DLHAY	0.647728	0.2006	3.23	0.0019	0.1382
DLHAY_1	0.0271272	0.2117	0.128	0.8984	0.0003
DLBUILDCONF	0.0407170	0.01051	3.87	0.0003	0.1875
DLBUILDCONF_1	-0.0115454	0.01142	-1.01	0.3156	0.0155
LBCI_1	-0.154866	0.06369	-2.43	0.0178	0.0834
LHAY_1	0.180227	0.08028	2.24	0.0282	0.0720
LBUILDCONF_1	0.0270529	0.004929	5.49	0.0000	0.3167
dum_col	0.00916597	0.007867	1.17	0.2482	0.0205
s1	-0.0149738	0.007118	-2.10	0.0393	0.0637
s2	-0.0107800	0.006430	-1.68	0.0984	0.0414
s3	-0.0197455	0.006175	-3.20	0.0021	0.1359
sigma	0.0181936	RSS		0.0215154464	
R^2	0.633692				
Adj.R^2	0.566065	log-likelihood		208.955	
no. of observations	78	no. of parameters		13	
mean(DLBCI)	0.0204818	se(DLBCI)		0.0276189	

AR 1-5 test:	F(5, 60)	=	0.74591	[0.5923]
ARCH 1-4 test:	F(4, 70)	=	0.34228	[0.8485]
Normality test:	Chi <sup>2</sup> (2)	=	2.1021	[0.3496]
Hetero test:	F(20, 57)	=	1.8146	[0.0411] *
Hetero-X test:	F(48, 29)	=	1.3364	[0.2041]
RESET23 test:	F(2, 63)	=	2.9363	[0.0604]

#### Model 4: Specific Model for entire sample period with dummy for collusion

EQ(02) Modelling DLBCI by OLS

The dataset is: new04.in7

The estimation sample is: 1994(3) - 2013(4)

	Coefficient	Std.Error	t-value	t-prob	Part.R <sup>2</sup>
DLBCI_1	-0.591814	0.08839	-6.70	0.0000	0.3904
DLHAY	0.671651	0.1795	3.74	0.0004	0.1667
DLBUILDCONF	0.0467083	0.009926	4.71	0.0000	0.2403
LBCI_1	-0.0104685	0.002793	-3.75	0.0004	0.1672
LBUILDCONF_1	0.0220223	0.003529	6.24	0.0000	0.3575
s1	-0.0173533	0.006367	-2.73	0.0081	0.0959
s2	-0.0132032	0.006191	-2.13	0.0365	0.0610
s3	-0.0195957	0.006068	-3.23	0.0019	0.1297
sigma	0.0183372	RSS		0.0235376336	
log-likelihood	205.451				
no. of observations	78	no. of parameters		8	
mean(DLBCI)	0.0204818	se(DLBCI)		0.0276189	

AR 1-5 test:	F(5, 65)	=	0.67663	[0.6427]
ARCH 1-4 test:	F(4, 70)	=	0.62700	[0.6448]
Normality test:	Chi <sup>2</sup> (2)	=	4.7966	[0.0909]
Hetero test:	F(13, 64)	=	1.0327	[0.4326]
Hetero-X test:	F(23, 54)	=	1.1528	[0.3256]
RESET23 test:	F(2, 68)	=	2.2617	[0.1120]

**Table 6: Coefficients for the Variables in Levels**

	Unrestricted Model	Restricted Model
Tender Prices (BER/MFA BCI)	-0.154866**	-0.0104685***
Input Costs (Haylett Index)	0.180227**	
Demand (BER/RMB Business Confidence Index for Building Contractors)	0.0270529***	0.0220223***

Note: \*, \*\* and \*\*\* indicate a significance level of 0.1, 0.05 and 0.01 respectively

## Appendix C: Profit Margins derived from StatsSA data

**Table 7: Profit margins according to different measures: Total Construction Industry**

Date	Net Profit Margin (before tax)	Profit before interest, tax, amortization and depreciation margin (EBITDA margin)	Profit before interest and tax margin (EBIT margin/Operating Profit Margin)
2001	3.32%	2.44%	2.44%
2002	3.15%	2.32%	2.32%
2003	5.02%	7.58%	5.59%
2004	4.06%	6.70%	4.62%
2005	5.25%	7.88%	5.80%
2006	5.98%	8.36%	6.38%
<b>Average: 2001 – 2006</b>	<b>4.46%</b>	<b>5.88%</b>	<b>4.53%</b>
2007	5.05%	7.39%	5.25%
2008	7.58%	9.92%	8.01%
2009	8.22%	10.83%	8.69%
2010	7.77%	10.65%	8.22%
<b>Average: 2007 - 2010</b>	<b>7.16%</b>	<b>9.70%</b>	<b>7.54%</b>
2011	4.52%	7.16%	4.53%
2012	4.70%	7.10%	4.83%
<b>Average: 2001 – 2012</b>	<b>5.39%</b>	<b>7.36%</b>	<b>5.56%</b>

*Note: EBITDA was calculated as the net profit before tax, adding interest paid, amortization and depreciation and subtracting interest received. EBIT was calculated as the net profit before tax, plus the interest paid less the interest received.*

*Source: Author's calculations, StatSA Data*

**Table 8: Profit margins according to different measures, disaggregated according to company size**

Date	Net Profit Margin (before tax)	Profit before interest, tax, amortization and depreciation margin	Profit before interest and tax margin
Small Firms			
2006	2.98%	6.78%	3.66%
2007	1.45%	5.49%	2.18%
2008	4.85%	8.85%	5.76%
2009	22.30%	26.82%	24.00%
2010	22.47%	26.65%	23.50%
<b>Average: 2007 - 2010</b>	<b>12.77%</b>	<b>16.95%</b>	<b>13.86%</b>
2011	3.37%	7.33%	3.69%
2012	4.43%	7.63%	4.89%
Medium Firms			



2006	7.48%	10.76%	8.22%
2007	6.58%	9.28%	6.97%
2008	4.96%	7.77%	5.63%
2009	17.25%	20.09%	17.91%
2010	16.08%	21.69%	18.12%
<b>Average: 2007 - 2010</b>	<b>11.22%</b>	<b>14.71%</b>	<b>12.16%</b>
2011	7.96%	10.58%	8.06%
2012	5.83%	8.51%	5.98%
<b>Large Firms</b>			
2006	6.63%	8.47%	6.88%
2007	6.06%	7.53%	6.00%
2008	9.02%	10.57%	9.12%
2009	4.80%	6.94%	4.88%
2010	3.43%	5.25%	3.41%
<b>Average: 2007 - 2010</b>	<b>5.83%</b>	<b>7.57%</b>	<b>5.85%</b>
2011	3.64%	6.13%	3.55%
2012	4.47%	6.57%	4.50%

*Note: The company size refers to the size of the annual turnover as determined by the Department of Trade and Industry in the National Small Business Amendment Bill and adjusted by StatsSA for the relevant year. For calculation of the EBITDA margin, amortization information was only available from 2010 in the financial statistics. EBITDA was calculated as the net profit before tax, adding interest paid, amortization and depreciation and subtracting interest received. EBIT was calculated as the net profit before tax, plus the interest paid less the interest received.*

*Source: Author's Calculations using StatsSA data*

**Table 9: Profit margins according to different measures, disaggregated according to type of construction activity**

<b>Date</b>	<b>Net Profit Margin (before tax)</b>	<b>Profit before interest, tax, amortization and depreciation margin</b>	<b>Profit before interest and tax margin</b>
<b>Site Preparation</b>			
2006	4.61%	12.50%	6.03%
2007	5.71%	13.84%	6.74%
2008	9.00%	17.76%	9.91%
2009	15.81%	24.58%	17.39%
2010	8.95%	18.53%	11.17%
<b>Average: 2007 - 2010</b>	<b>9.87%</b>	<b>18.68%</b>	<b>11.30%</b>
2011	8.02%	14.81%	9.03%
2012	4.94%	10.76%	6.06%
<b>Building of complete structures and civil engineering</b>			
2006	6.18%	8.12%	6.54%
2007	5.00%	6.58%	5.10%
2008	6.63%	8.34%	6.84%

2009	8.63%	10.47%	8.74%
2010	5.22%	7.29%	5.49%
<b>Average: 2007 - 2010</b>	<b>6.37%</b>	<b>8.17%</b>	<b>6.54%</b>
2011	4.39%	6.19%	4.09%
2012	3.75%	5.62%	3.71%
<b>Building Instillation</b>			
2006	6.95%	8.76%	7.03%
2007	6.35%	8.21%	6.56%
2008	11.50%	13.66%	11.90%
2009	9.33%	11.11%	9.42%
2010	20.70%	21.95%	20.15%
<b>Average: 2007 - 2010</b>	<b>11.97%</b>	<b>13.73%</b>	<b>12.01%</b>
2011	6.75%	9.03%	6.77%
2012	5.50%	7.60%	5.45%
<b>Painting and Decorating</b>			
2006	4.10%	7.17%	4.82%
2007	3.55%	7.32%	3.85%
2008	5.01%	7.73%	5.79%
2009	6.30%	9.17%	7.12%
2010	11.67%	15.39%	13.09%
<b>Average: 2007 - 2010</b>	<b>6.63%</b>	<b>9.90%</b>	<b>7.46%</b>
2011	3.58%	5.57%	3.34%
2012	8.91%	10.51%	9.10%
<b>Renting of construction or demolition equipment with operators</b>			
2006	12.35%	29.70%	15.44%
2007	11.39%	26.78%	13.84%
2008	12.50%	28.99%	15.57%
2009	14.04%	32.24%	18.60%
2010	5.53%	27.37%	11.57%
<b>Average: 2007 - 2010</b>	<b>10.87%</b>	<b>28.85%</b>	<b>14.90%</b>
2011	-1.49%	19.17%	4.27%
2012	3.66%	16.35%	6.30%

*Note: For calculation of the EBITDA margin, amortization information was only available from 2010 in the financial statistics. EBITDA was calculated as the net profit before tax, adding interest paid, amortization and depreciation and subtracting interest received. EBIT was calculated as the net profit before tax, plus the interest paid less the interest received.*

*Source: Author's Calculations using StatsSA data*