

**Working Paper 6/2017****OVERCHARGE ESTIMATES IN THE SOUTH AFRICAN REINFORCING BAR CARTEL<sup>1</sup>****Pamela Mondliwa and Reena das Nair****Centre for Competition Regulation and Economic Development**[pamelam@uj.ac.za](mailto:pamelam@uj.ac.za) , [reenadn@uj.ac.za](mailto:reenadn@uj.ac.za)**Abstract**

The South African competition authorities have successfully prosecuted a number of cartels in various markets since their inception, particularly since the introduction of the Competition Commission's Corporate Leniency Policy in 2004. There is growing pressure on competition and regulatory bodies to undertake impact assessments of their interventions in markets, and authorities around the world are increasingly attempting to quantify the benefits of interventions for consumers, or conversely, the harm caused by anticompetitive conduct. However, estimates of cartel overcharges have only recently been calculated by the South African authorities and only in a small number of cases. This may explain the low levels of damages claims even though the Competition Act makes provision for such, limiting the strong potential deterrence effect damages claims could have. In this paper, we measure the cartel overcharge in percentage terms and the consequent damages in rand terms in the reinforcing steel bar (rebar) market, a market in which a cartel operated between 1999 and 2008. We do this by applying the 'difference-in-difference' methodology, with our primary comparison being the cartelised rebar domestic price over the export rebar price. The results are presented for two counterfactual scenarios based on Bertrand competition and a leader-follower model of competition. We debate the pass-through effect and its impact on the calculated damages. Finally, we highlight the inherent difficulties in interpreting results of such analyses, particularly in industries where there are cartels in multiple levels of the value chain, where there is considerable 'noise' given external shocks, and where cartel behaviour is so entrenched that conduct may persist well after the 'formal' cartel ends.

**JEL classification**  
**L13, L41, L61**

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<sup>1</sup> The views in this paper are solely the authors' own. The paper is based on work previously done by the authors in collaboration with Andrew Sylvester.

## 1. Introduction

The South African Competition Commission has had much success in uncovering and prosecuting cartels in various markets since their inception and particularly since the introduction of the Competition Commission's Corporate Leniency Policy (CLP) in 2004. The public is however more interested in whether successful prosecution of these cartels translates to more competitive outcomes in markets. Hence there is pressure on competition authorities to quantify the impact of their interventions in markets and authorities around the world are increasingly attempting to quantify the benefits of interventions for consumers, or conversely, the harm caused by anticompetitive conduct. As the Competition Act regards cartels as *per se* violations there has been little written on the harm caused by South African cartels. Cartel overcharges thus far have only been estimated for the concrete pipes, wheat flour, cement and bitumen cartels and all studies have been done in the last five years.<sup>2</sup> Cartel overcharge estimates are not only important to quantify the impact of the Commission's work in markets but also serve as useful indicators for victims of cartel conduct to claim damages against the cartelists.

In South Africa, there have been very few, if any, damage claims even though the Act makes provision for these. This limits the strong potential deterrence effect that damages claims could have on anticompetitive conduct. One of the ways that competition authorities contribute to improved competitive outcomes is by deterring companies from engaging in anticompetitive conduct such as cartels. The ability to deter future engagement in anticompetitive conduct and to eliminate financial gain or benefit from non-compliance is key to successful competition policies (Darji, Grimbeek and Muzata, 2011). Deterrence is to a large extent based on the threat of costs of engaging in cartels vis-à-vis the expected benefits of the conduct. For the threat of the cost of engaging in the cartel to be credible, it requires that there is a high probability of detection and that the sanctions outweigh the benefits.

The Corporate Leniency Policy and general investigative procedures have made headway in increasing the likelihood of detection and reducing the duration of cartels. However, when it comes to the sanctions, the focus has largely been limited to the appropriate design of administrative penalties. Though the penalties are a very important tool for deterrence they are unlikely to completely remove the gains from anticompetitive conduct, particularly when the penalties are capped. Literature on optimal deterrence emphasises the need to reclaim the net cartel gains, once the cartel has been detected (Connor, 2014). Damage claims are a useful mechanism for victims of the cartel conduct to reclaim the overcharge and the threat of damage claims over and above the administrative penalties will likely mean that the cost of engaging in anticompetitive conduct such as cartels outweighs the gains from the conduct.

The size of the cartel harm is positively related to the size of the cartelised market, the duration of the conduct and the size of the cartel overcharge. Two of these factors are readily available when the cartel case is finalised, however the size of the overcharge is not. The legal costs associated with damage claim actions and the uncertainty on the size of the overcharge may leave cartel victims unsure of the benefits of pursuing these actions. Thus, the estimations of the cartel overcharges will encourage firms to pursue damages.

This paper attempts to calculate cartel overcharges and damages in the previously cartelised reinforcing steel bar (rebar) market in South Africa, where a cartel operated between 1999 and 2008. It explores the possible counterfactual scenarios used to determine what prices would be in a non-collusive setting and applies the 'difference-in-difference' methodology to determine what the overcharge may be. The paper is structured as follows. Section 2 reflects on theoretical approaches to estimating cartel overcharges, damage and impact assessments. Section 3 gives the background to the rebar cartel in South Africa and in Section 4, we

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<sup>2</sup> The Competition Commission may have conducted more impact assessments but these listed studies are the only ones available in the public domain.

estimate actual overcharge and associated damages. Section 5 highlights the inherent difficulties in interpreting results of such analyses. Section 6 concludes.

## **2. Approaches to damages estimations and impact assessments**

A cartel is an explicit agreement between a group of similar, independent firms to jointly fix prices, limit production or to share markets or customers between them. The expectation is that such agreements will raise prices above the competitive level. The difference between the cartel price and the competitive or counterfactual price is known as the cartel overcharge or mark-up.

Cartel overcharges are calculated to estimate the harm that the cartel causes and, as stated before, are used as a basis for calculating fines and damages. There are a number of methodologies that can be used to calculate cartel overcharges and there is extensive literature on the various methods of calculations, including the pros and cons of each (Davies and Ormosi, 2010; van Dijk und Verboven, 2008 and OXERA, 2009).

These methods can be grouped into three main categories: comparator based, financial performance based and market structure based (OXERA, 2009). The comparator based method is often adopted by competition authorities. It uses either cross-sectional comparisons, time-series comparisons, or a combination of both approaches in so-called 'difference-in-differences' models (Hüschelrath, Müller and Veith, 2013).

Cross sectional comparisons conduct the assessment by comparing different geographic or product markets, while time series comparisons analyse prices before, during and/or after an infringement, often referred to as the before-and-after method. The difference-in-difference method assesses the change in price for a cartelised market over time, and compares this change against the change in price in a non-cartelized market over the same time period. Financial performance based models use financial information and could include event studies where financial market data is used to measure the effect of an economic event on the market valuation of a firm (Davies and Ormosi, 2010). Market structure methods apply industrial organisation structural models to simulate the counterfactual price. There is no one-size-fits-all method and when selecting a method for a study, careful consideration must be given to the input requirements versus data availability, conceptual complexity, technical complexity and the applicability of the underlying assumptions to a particular case.

Recently there have been a number of studies that seek to give an impression of "typical" cartel overcharges. These studies are often in the form of surveys of cartel overcharges over different countries and products. The international averages are widely reported on and typically range from 0% to 70% with the median at 18% of the cartel price and the mean/average at 20% of the cartel price (Hüschelrath *et al*, 2013). Though the South African Competition Commission has successfully prosecuted a number of cartels since its inception the cartel overcharge has only been calculated in very few cases. Khumalo, Mashiane and Roberts (2014) estimated cartel overcharges between 21 and 57% for concrete pipes in Kwa-Zulu Natal and 16.5% in Gauteng. Mncube (2014) calculated the white bread flour cartel overcharge at 23.7% in the Western Cape and 13.1% in Gauteng province. Boshoff (2015) conducted his assessment for bitumen and found that the cartel overcharge was between 18 and 20%. These are all cartels that took place around the same time as the rebar cartel.

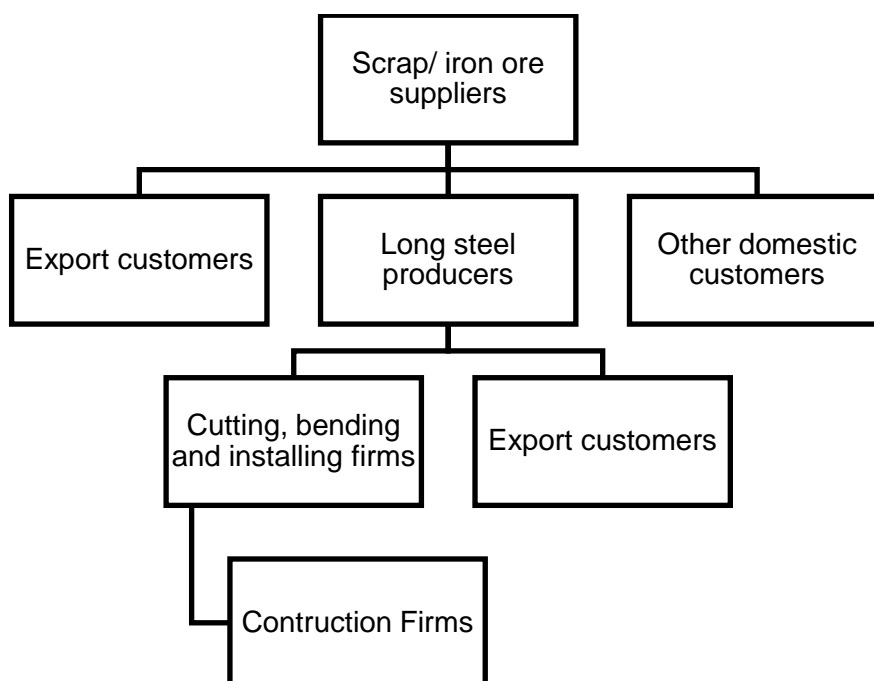
## **3. Background to the cartel**

### **3.1 Rebar market**

Historically there have been only four producers of rebar in South Africa: ArcelorMittal (AMSA), Cape Gate (PTY) Ltd, Scaw Metals Group, and Cape Town Iron and Steel Works (Cisco), jointly referred to as the "steel mills". In 2011 (after the explicit cartel presumably ceased operating), Cisco exited the market and SA Metal Group entered the market for the production

of rebar. The steel mills were involved in more than one level of the value chain. Rebar is produced in a two-step process, scrap or iron ore is converted into billets and the billets are cut in the form of the reinforcing bars. Once the rebar is produced it is then sold to downstream firms who further cut, bend and install the rebar to reinforce concrete in construction projects (Figure 1).

**Figure 1: Rebar Industry Structure**



All the producers of rebar except for AMSA process scrap steel in an electric arc furnace, AMSA uses both iron ore and scrap processed in a blast furnace in the Newcastle plant and an oxygen furnace in the Vereeniging plant. As a consequence of conversion methodologies, AMSA has a different cost structure to the rest of the producers.

Estimated rebar production capacity for the steel mills are 200 000 tons per annum for AMSA and 180 000 tons per annum each for Scaw, Cape Gate and Cisco, SA Metals entered at 54 000 tons per annum. However, it is noteworthy that the mills can substitute between rebar and wire rod production with relative ease. Thus the rebar production capacity could be a construct of the cartel. There is excess capacity of rebar production in South Africa resulting in exports of approximately 30% of total production.

The industry was relatively stable during the cartel period, with entry and exit only occurring after the cartel presumably ceased. Also, there appears to have been little change in production capacity of the existing mills, aside from debottlenecking efforts. In 2001, Scaw built a new furnace which increased its output by 20% to its present capacity. One would expect more competitively priced input costs due to the excess supply of scrap steel.

### **3.2 Rebar cartel**

The alleged cartel began in 1999 and presumably ended after the Commission's dawn raid in June-2008. The cartel was primarily a price fixing cartel in contravention of section 4 (b) (i) of the Competition Act, however, it had elements of market allocation (4(b) (ii)), and the mills had vertical agreements with the steel merchants that induced merchants not to import cheaper steel into the country (Njisane, 2011). The Commission found that representatives of the long

steel mills attended formal and informal meetings where levels of prices and discounts were discussed and agreed upon. The steel mills had a long-standing arrangement that AMSA as the market leader would announce the prices for various long steel products and other mills would follow the price increases (Nontombana and Lesofe, 2010). There was effectively one delivered price in the domestic market, despite the different locations of the rebar producers and other long steel products such as sections being priced on an ex-works basis. Cape Gate has plants in Johannesburg and Vanderbijlpark, AMSA has long steel plants in Newcastle and Vereeniging, Scaw has a plant in Germiston and Cisco had a plant in Cape Town. Johannesburg, Vanderbijlpark, Germiston, Vereeniging are in the inland region and Newcastle is approximately 280 km and Cape Town approximately 1400km from this region.

In addition to the price fixing there was a general understanding between the mills that certain customers belonged to certain mills and that targeting a “traditional” customer of another mill would result in retaliation against the offender. This constituted dividing markets by allocating customers.

The Commission also found that the steel mills reached agreements regarding the supply of long steel products to downstream contractors/ merchants who had been awarded contracts to supply such products to three large construction projects. In this regard, the mills agreed to allocate to each other equal shares of the steel required for each project.

The stability of a cartel is dependent on the ability of the members to monitor each other to ensure that all parties were adhering to the agreement and detect cheaters so as to punish. The rebar cartel members are likely to have overcome this challenge by exchanging information through the industry association, South African Iron and Steel industry Association (SAISI). The association operated in such a manner that all its members submitted highly disaggregated information on output which was combined by SAIISI and then supplied monthly to all members in an aggregated form. The information disseminated by SAIISI to long steel producers was broken down by product by Harmonised System (HS) tariff code.<sup>3</sup> The members also supplied information regarding the programmes on capital expenditure twice a year. From this, individual members were able to keep track of their market share and could easily detect cheating.

The exchange of detailed information through the SAIISI platform may have allowed mills to monitor market shares of their competitors and along with market intelligence, permitting mills to see who had deviated from the collusive agreements. The information exchange through SAIISI thus may have facilitated the various agreements reached by the mills.

The leniency process revealed that there were punishment mechanisms for players that did not adhere to the agreements. If it was found that a steel mill was selling to a customer of another mill, the other mill would retaliate by targeting a customer of the cheating mill. This sort of behaviour would persist for a period of time until the mills would meet and attempt to sort out the issue. At times the mills would engage in price wars in an attempt to take customers from the cheating mill. The above interactions show that there seemed to be the constant threat of price wars if the mills did not stick to agreed prices or allocated/traditional customers.

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<sup>3</sup> This is the Harmonised System used in trade data to categorize products to a high degree of specificity.

## 4. Estimating the cartel overcharge

### 4.1 *The counterfactual*

In our view, the appropriate method used to estimate the counterfactual price during the cartel period is a comparison with the export price rather than the actual costs of production. This is because the decision is not between producing the rebar or not, it is between selling it into the domestic market or the export market. Importantly, it is not assumed that the domestic market would have been as competitive as the 'world' market for rebar but for the cartel, rather the export price is used as the opportunity cost and thus the comparator for a difference-in-difference analysis. In other words, we do not simply assume that because this industry exports product that the domestic price should be the export price. If the market behaves in a fashion similar to aggressive price or Bertrand competition, then it is indeed possible that the domestic price would have been very similar to the export price. If, however, the competitive dynamics in the domestic market are better approximated by Cournot competition, then a premium above the export price can be expected to have existed during the cartel.

The deepsea export price is the opportunity cost of domestic sales because South African rebar producers can divert sales volumes from one market to the other. The product specifications are exactly the same and South African rebar producers are already exporting significant volumes. Thus the product is both acceptable on the world markets and customer or trader relationships already exist. Also, it is the deepsea export price as opposed to Africa overland export prices that is the opportunity cost of domestic sales because the overland exports are more akin to the domestic market with the only difference being that they cross political boundaries.

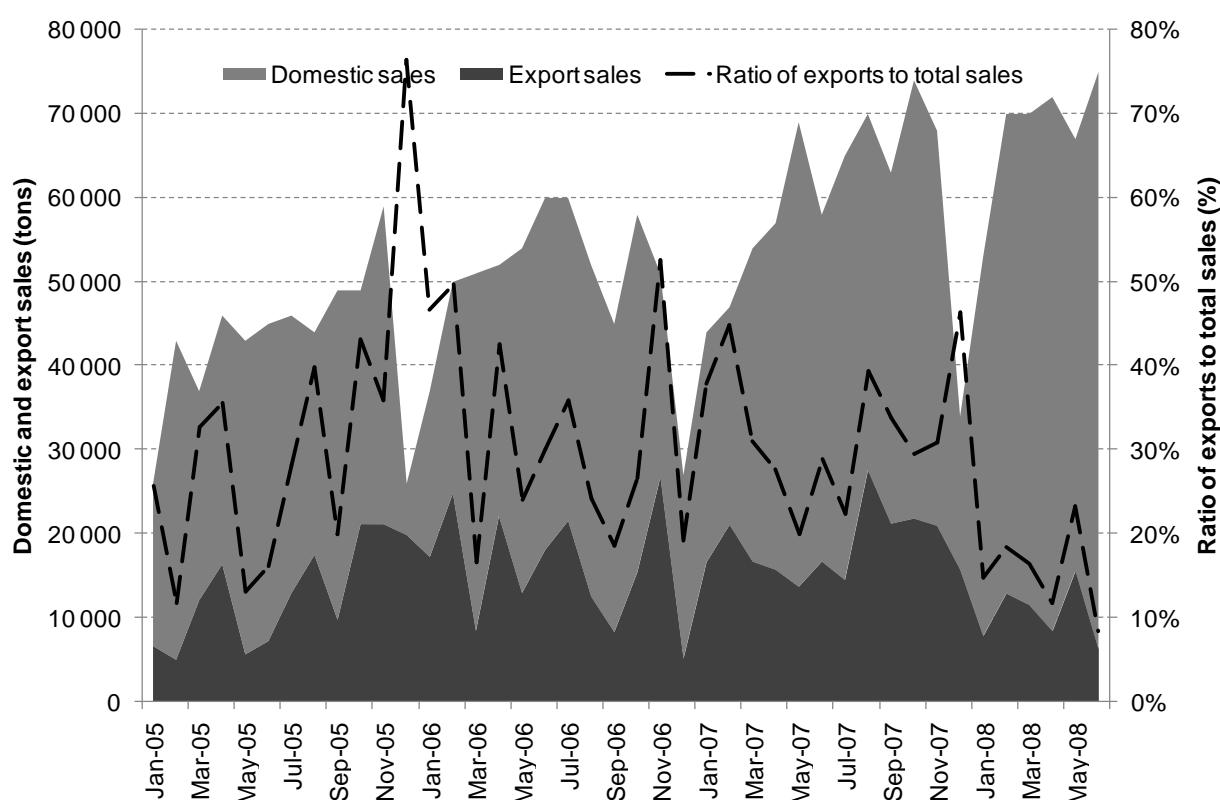
For the deepsea export price to be a legitimate opportunity cost, it should always be at most equal to the domestic price. If this were not the case and there were many instances where the export price was higher than the domestic price without simple explanations, then it is likely that there are differences between the two markets in respect of product characteristics such as quality or transaction characteristics such as contractual terms or requirements. Firms may also be willing to offer a firm a price at a discount to what they might be able to receive elsewhere in order to earn goodwill with that company which will yield returns in the long run.

The only times when the export price was above the domestic price in the South African rebar market was when a price war broke out between cartel members at the end of 2001 and beginning of 2002, and when domestic price increases were unable to keep up with unprecedented increases in the world price in 2008. This first instance, the price war, supports the use of the export price as the opportunity cost because the domestic price would have been dropped to a very low level in order to punish the firm suspected of cheating on the cartel agreement. The second instance can be a combination of contractual price stickiness as well as rebar suppliers not wanting to alienate construction firms with whom they have long term relationships. The second instance of relatively low domestic prices thus does not undermine the use of the export price as the opportunity cost.

Figure 2 shows the total volumes of rebar output by South African producers divided into domestic and export sales. The data used to produce this were the total output data collected by SAISI which was ended in June 2008, and the export volumes from Quantec. Total output grows steadily over the period with the only significant deviation coming with the shut down for the December holidays each year. Exports as a percentage of total output fluctuates somewhat, but is above 10% of output in every month of the period but one, and is on average 30% of total output. It seems then that domestic producers are able to, and have, changed the actual and relative export volumes month to month. During the cartel this was likely to be done to ensure that the agreed domestic price was achieved. In a counterfactual competitive market, however, firms would just as easily have moved sales between domestic and export

customers in order to maximise profits whichever form of competition is assumed. The use of the deepsea export price rather than a build-up of the costs of production thus seems to be a credible basis for calculating the counterfactual price.

**Figure 2: Rebar domestic and export sales volumes, January 2005 – June 2008**



*Source: Authors' calculations with underlying data from Quantec and SAISI*

Given that the relevant benchmark has been selected to be the opportunity cost of deepsea exports, the question of the counterfactual price then turns to whether or not there would have been a premium charged above this price in the domestic market. The issue here is that the competitive dynamics in the domestic market are likely to be very different to those of the export market, and thus the prices which result in these markets may be somewhat different (see for example Baker and Ignjatovic [2011]). Indeed, it has been argued in excessive prices cases such as Harmony/Mittal<sup>4</sup> and Sasol Polymers<sup>5</sup> that such price differentiation is necessary where there are high fixed costs and the domestic market is too small for the firm to achieve economies of scale (see for example Calcagno and Walker [2010]). While this latter argument doesn't seem to be plausible given that there are a number of firms supplying the market rather than a 'struggling' monopoly, economic theory would suggest that our *a priori* expectations cannot be that prices would necessarily fall to the export price.

As described, during the cartel there were 4 firms of similar capacity, 3 of which had the same production process. AMSA used a different production process which allowed them to combine scrap and virgin steel in varying proportions depending on prevailing prices. AMSA was also the largest corporate in the industry with various other iron and steel products and the ability, or perhaps just the perceived ability, to expand rebar output without much difficulty.

<sup>4</sup> Competition Tribunal case no. 13/CR/FEB04

<sup>5</sup> Competition Tribunal case no. 48/CR/AUG10

There is thus some evidence that the counterfactual dynamic might have been a Cournot oligopoly or tacit collusion with a price leader.

There are also very good arguments in support of using Bertrand competition in the construct of the counterfactual. The cartel operated primarily as a price fixing cartel which would suggest that the strategic variable of interaction might be price and hence a form of Bertrand competition might have existed but for the cartel. However, there were elements of quantity fixing or market allocation and the behaviour of the cartelists appeared to be monitored through the information exchange of sales volumes. Thus quantity could also be regarded as an important variable for interaction, suggesting that Cournot competition may have existed but for the cartel. We note that Cournot competition is predicated upon firms' ability to accurately predict their competitors' supply into the market in order for them to decide on their own profit maximising quantity to supply. Given that product sold onto the export market is identical to that sold on the domestic market, it is difficult to predict a competitor's supply into the domestic market even if capacity and total output information is perfectly known. If the degree of volatility in the supply to the export market during the cartel is indicative of what the volatility might have been in the counterfactual world, then it is difficult to see how firms would have been able to make these predictions accurately.

We do, however, also know that firms tended to follow AMSA's pricing during the cartel. It is possible then that this would have continued after the end of the cartel. This conscious price parallelism might be thought of as a form of tacit collusion. Though the information exchange framework maintained by SAISI, was ended in June 2008 with the end of the cartel itself, firms might still be incentivised to price in a similar way to existing arrangement by following AMSA. Post cartel there may be discounting, however, this may not result in vigorous price competition between firms that would drive all the way to the export price.

We acknowledge that the firms' ability to discount on certain projects or to certain customers without being monitored by competitors or having to offer the same discounts to other customers may impede the firms' ability to maintain some infinite Bertrand type game but the same could be argued for price leadership model. Discounting will make any infinite Bertrand game reduce to the same result as a one-shot game for as long as firms have excess capacity.

Firms indeed had excess capacity during the cartel even after taking exports into account. The industry only started producing at capacity in some months in 2007 and 2008. Even in these months, however, there were exports that could have been diverted to the domestic market. These exports can be thought of as excess capacity to supply the domestic market when considering the Bertrand model of competition. Although it is not, and cannot be, a definitive conclusion, it seems that the counterfactual form of competition would have been tacit collusion with price-leadership with AMSA as the price leader. However, given that this conclusion cannot be definitive, we present markups for both the price leadership model and Bertrand competition with excess capacity of a homogenous product as a robustness check.

In the Bertrand counterfactual it would be expected then that the price would have been very close to costs or, in our analysis, very close to the opportunity cost of the deepsea export price.

## **4.2 Data used**

The estimates of the cartel overcharge are based on comparisons of domestic prices with those of export prices. The domestic price is sourced from producer data net of volume and settlement discounts and cross checked against customer data. These data were obtained through various investigations by the Competition Commission of South Africa and hence the underlying individual data are confidential. The domestic price data are monthly measures of rebar in Rands per ton.



The export price data were calculated from volume and value of rebar exports collected by Quantec. It was assumed that the products recorded as H72142000 and H72131000 according to the harmonised system were all rebar exports. The data were collected and aggregated for export destinations which would require seaborne trade. This thus excluded exports to Namibia, Botswana, Zimbabwe, Mozambique, Lesotho, Swaziland, Malawi and Zambia from the data. The reason for this exclusion was that suppliers from South Africa have transport advantages that allow them to price in these destinations similarly to their South African prices. Put differently, these destinations are in the same relevant competition market as South Africa despite political boundaries. Indeed, many are even within the SADC free trade region. The accuracy of the Quantec data were cross checked against various producers' export prices as well as historic confidential data collected from the Harmony Mittal<sup>6</sup> case. The export data are in Rands per ton and monthly for the period January 2005 to June 2012 and annual prices from 1999 to 2004 (monthly data were not available from Quantec before January 2005).

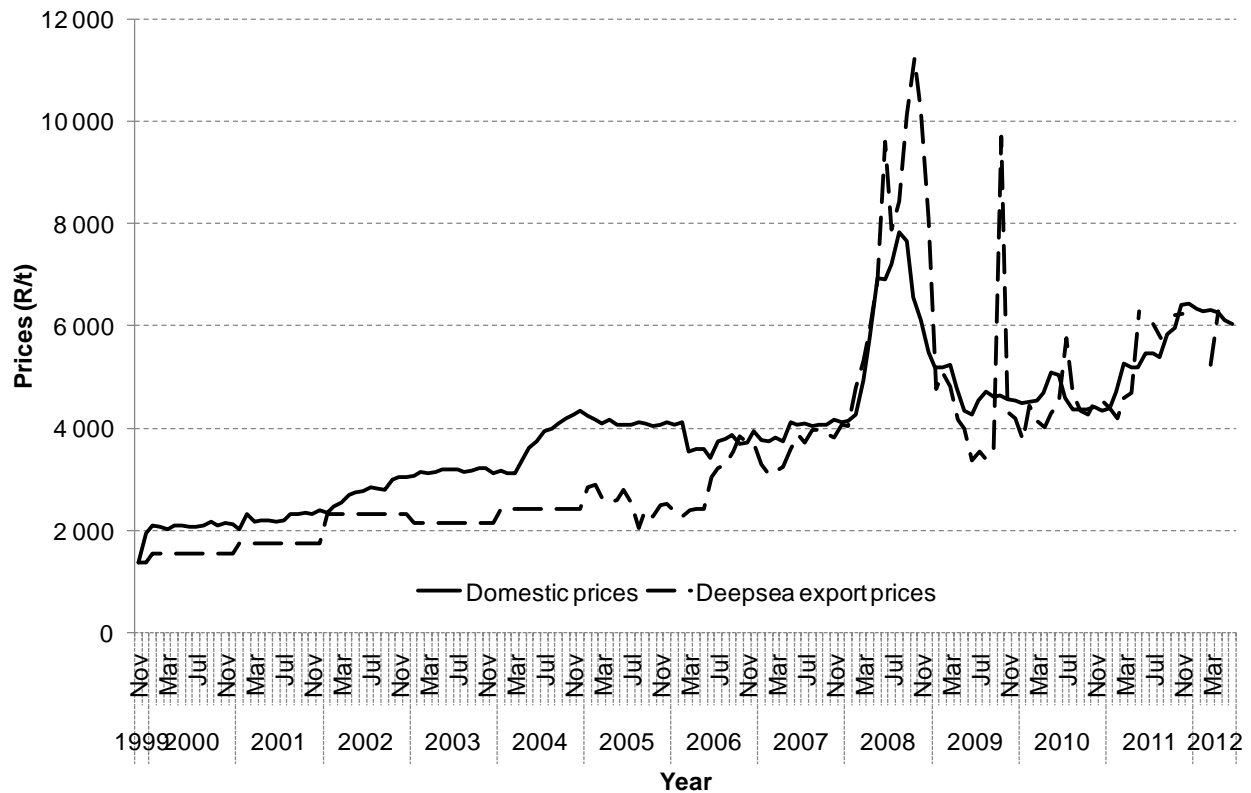
#### **4.3      *Description of the data and preliminary observations***

Figure 3 shows the domestic and deepsea export prices for the period from November 1999 to June 2012. It seems that the domestic price was consistently above the export price until late 2006 and 2007 when they seem to be broadly similar. For most of 2008 the domestic price was below the export price. For the period after 2009 it seems that the export price and the domestic price were on average very similar. There are distinct short periods where one is larger than the other in this later period, however no pattern seems to emerge.

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<sup>6</sup> Competition Tribunal case no. 13/CR/FEB04

**Figure 3: Rebar domestic and deepsea export prices, November 1999 – June 2012**



*Source: Authors' calculations with underlying data from rebar suppliers and customers as well as Quantec trade data*

The first interesting observation to make from Figure 3 is a price war that occurred in late 2001 and early 2002. The export data available for exports are only annual data, but even so it is evident that the domestic price is low relative to the export during these few months. Confidential monthly data from the Harmony Mittal case shows that export prices peaked in late 2001 and early 2002 with domestic prices, rather uncharacteristically, did not follow suit. In fact, the export price was significantly above the domestic price, a fact which has been lost with the annual export price in Figure 3. This was the only instance where the export price was above the domestic price before late 2006.

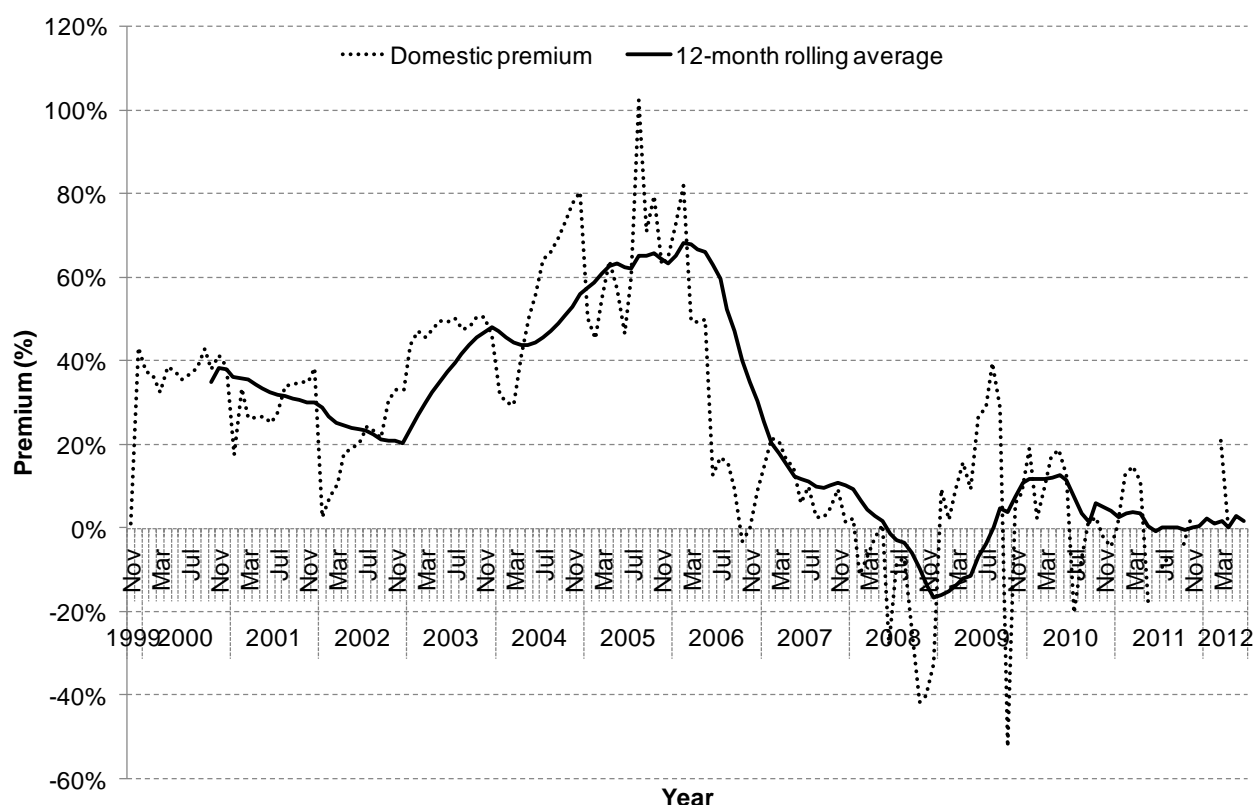
Various industry participants recollect that the price war was triggered when Scaw expanded its furnace capacity in 2001. AMSA interpreted this as an aggressive move by Scaw and, as price leader in the market, immediately punished them. The price war ended almost as quickly as it had begun because Scaw never produced the volumes made possible by their investment. This may be because they were dissuaded from doing so by AMSA's actions, or that they had never intended to disrupt the cartel in the first instance. The latter reason would make a capacity expansion seem irrational, however, Scaw's reasons for the investment were to increase efficiency in the heating process for steel rather than to increase the output of rebar. Thus, it seems likely that the price war was more a result of poor communication between cartelists rather than indicative of there being a sufficiently strong incentive to cheat on the cartel.

The second event partially evident from Figure 3, and the focal point for this paper, is the ending of the cartel in June 2008. It is only partially evident because there are a number of other forces acting on the market in and around this period. The first is a somewhat prolonged spike in the world price of rebar for most of 2008. Domestic prices also spiked in the same period, but to a lesser extent. The reason for this may be because of price fluctuation limits in

domestic contracts along with a weakening cartel which was then discovered in the middle of the year. There had also been a boom in the construction sector which ended after 2008. In addition to these changes in the market, the competition authorities had put an end to a number of cartels in the construction industry.

The problems involved in interpreting Figure 3 are somewhat resolved in Figure 4 which shows the proportional difference between the domestic and export prices (the domestic price premium). Also, presented in Figure 4 is the 12 month rolling average of the domestic price premium. This was done to smooth out the volatility in the monthly data.

**Figure 4: Rebar domestic price premium, domestic prices over export prices, November 1999 – June 2012**



*Source: Authors' calculations with underlying data from rebar suppliers and customers as well as Quantec trade data*

Figure 4 shows that a large premium was enjoyed by the cartel until 2006 when the premium declined markedly. In 2007 the premium was also very low indicating that the cartel was losing its effectiveness prior to the leniency application. Going into 2008 the premium continued to fall, however, this must be viewed in light of large increases in actual prices. The world price was at record highs and the domestic price likewise. Firms would have been making significant profits even though the domestic price was at a discount to the export price. Firms would have known that the spike would be short lived and hence may have been somewhat accommodating to large domestic customers with whom a long term relationship was more valuable than extra short term profits.

The world price plummeted from its highs in late 2008 and bottomed out in mid-2009. The domestic price also fell sharply, however, in early and mid-2009 it was once again at a premium to the export price. This continued on aggregate for most of 2009 and the first half of 2010, however, there seems to have been a large degree of instability over this period. The average premium during this time is similar to the premium enjoyed in 2006 and 2007 when

the cartel seems to have lost its potency. By the latter half of 2010 to the end of our dataset in June 2012 the premium normalised to marginally above zero on aggregate.

The result that domestic prices were above their benchmark immediately following the break-up of the cartel is not an unusual finding. Cartelists are able to use information learned during the cartel to achieve a certain degree of coordination. In the absence of effective monitoring and punishment mechanisms, however, these post cartel premiums disappear. This is in the least a plausible explanation for the evolution of the rebar price premium in this instance.

#### 4.4 *Cartel overcharge estimates*

We argue that the cartel was only truly effective until mid-2006 and that the counterfactual price during the cartel would have the deepsea export price. The cartel overcharge would then be calculated as the average premium of the domestic price over the deepsea export price for the period to May 2006. This produces an average premium of 43.2% as our estimate of the cartel overcharge.

Table 1 presents a number of results based on alternative assumption. This is done because we may be wrong, but also because certain users of this information may be interested in a conservative estimate.

**Table 1: Cartel overcharge estimate with sensitivities\***

	Cartel mark-up (Bertrand)	Cartel mark-up (PL)
Strict definition	34.2%	31.4%
Dropping 2008	36.8%	29.2%
Dropping June 2006 to Dec 2008	43.2%	35.7%

*\*The October 2009 premium of -52% was conservatively dropped as an outlier*

*Source: Authors' calculations*

The two forms of competition presented in Table 1 are Bertrand competition where prices fall to cost and price leadership (PL) where firms are able to maintain some positive margin by following AMSA as the price leader. The assumptions made in the Bertrand calculations is that price would fall to deepsea export prices, and so estimates in that column are the average of the domestic premium above deepsea exports for the relevant period. The assumption made in the price leadership column is that the post cartel period is indicative of the counterfactual market-up that would have been achieved through price leadership as opposed to through the cartel. The estimates in this column are thus the difference between the average premium during the cartel and the average premium after the cartel.

The "strict definition" defines the cartel as ending in June 2008. The Bertrand estimate is thus for the period from November 1999 to June 2008. The price leadership estimate is the premium from November 1999 to June 2008 less the average premium from July 2008 to June 2012.

The row called "Dropping 2008" treats the 2008 year as an anomaly year given the spike in the world price and the less than commensurate spike in the domestic price. The Bertrand estimate is thus ended at December 2007 and the price leadership estimate is the difference between the premium to December 2007 and the premium from January 2009 to June 2012.

The row called "Dropping June 2006 to Dec 2008" treats the 2008 year as an anomaly year as well as the June 2006 to December 2007 period as a period in which the cartel was ineffective. This is no strong evidence that the cartel was losing effectiveness other than the

fact that margins diminished as a result of domestic prices not increasing while export prices did increase. The Bertrand estimate is calculated as the average premium to May 2006 and the price leadership estimate is calculated as the difference in the average premium to May 2006 and the average premium from January 2009 to June 2012.

Note that in all the price leadership estimates presented in Table 1 the October 2009 premium was dropped as an outlier. This has the effect of increasing the estimate of the average premium in the post-cartel period and hence reducing the price leadership estimates by 1.3% for the strict definition and 1.6% for the other two estimates. For this reason, we believe this to be the conservative approach. The treatment of this outlier has no effect on the Bertrand estimates because this method does not take into account any post cartel mark-up.

#### **4.5     *Valuing the cartel overcharge***

The economic literature is comfortable with estimating cartel overcharges in percentage terms. This is because it is the best means of understanding the cartel's effectiveness in increasing prices. A damages estimation then takes the overcharge results and applies this to the transactions that took place during the cartel period. A fully comprehensive (but near impossible) damages analysis would also take into consideration those transactions that never took place by virtue of the price premium but would have taken place at the but for price. A second complication arises where the cartel output is sold to end consumers via one or a number of intermediate customers. These may be firms that use the product as an input in their own production process or simply distributors and retailers. The issue here is that some of the cartel overcharge is absorbed by the intermediary firms and consumers don't pay the full brunt of the overcharge.

We have conveniently, but we think reasonably, assumed away both these complicating factors for the purposes of our rebar damages estimation. Rebar demand is derived from demand for large construction projects and is a relatively minor cost component in the overall cost of a project. It seems unlikely then that demand for rebar would be significantly diminished, or even diminished at all, by the cartel overcharge. As such the quantity sold under the cartel is likely to be a good proxy for the quantity sold in the counterfactual.

Again, our dismissal of pass-through effects stems from the nature of transactions in this industry. Suppliers of large construction projects price projects to fully pass through input costs. Where projects are forecasted to take a long time to construct the contract includes escalation clauses for input costs to mitigate the risk that input prices such as rebar increase within the construction period. Admittedly these clauses are not only to protect the construction firm from increasing input costs, but also protect the customer from construction firms' attempts to add margin onto inputs used in the construction process. It seems likely then that construction firms are able to pass through the entire cartel price to the end consumer. The full burden of the rebar cartel thus fell on consumers of construction projects

Given the simplifying assumptions explained above, we performed a straight forward calculation of quantity multiplied by overcharge to estimate the damages shown in Table 2. The domestic volume data was collected by SAISI until June 2008, and actual data was used for Jan 2005 onwards. Volume data from Jan 2000 to December 2004 was estimated using supplier data and assumed that market shares remained at the same levels as those observed between Jan 2005 and June 2008. The overcharge estimates were based on the two scenarios presented in Table 1: Bertrand where the counterfactual price during the cartel is the deepsea export price; and a price leadership scenario where the counterfactual price is estimated as the average premium in the post cartel period. The values shown are normalised to December 2012 prices using the PPI (Reinforcing steel) index produced by Statistics South Africa.

**Table 2: Valuations of cartel overcharge, real Dec 2012 prices (PPI Reinforcing steel)**

	<b>Domestic volumes (t)</b>	<b>Bertrand (Rm)</b>	<b>Leader-follower (Rm)</b>
2000	194 331	289	254
2001	268 388	351	309
2002	296 356	499	439
2003	321 373	559	492
2004	360 212	604	532
2005	387 792	675	594
2006 (Jan – May)	153 672	260	229
<b>Total</b>	<b>1 982 124</b>	<b>3 237</b>	<b>2 850</b>

*Source: Authors' calculations*

The results above should be read in the wider industry context. First of all, rebar is one of a number of products which formed part of the long steel cartel. Other products which were marked up but did not form part of this estimate include sections, angles and rods. Secondly, various other inputs into the construction process were cartelised. These include cement, wire mesh, bitumen, and precast concrete products. Finally, the downstream construction sector, which used all these cartelised products as inputs, itself operated as a cartel. The rebar damages estimate of between R2850m and R3237m is simply one, relatively small, component of the overall damages ultimately paid by customers of construction projects.

## **5. Problems with interpretation<sup>7</sup>**

As is the case in a number of other intermediate industrial product markets in South Africa, different levels of the long steel product value chains have been characterised by collusive activity. A network of mutually reinforcing agreements and relationships has historically existed between members of the long steel value chain, ranging from input material scrap to end use of rebar and reinforcing mesh in construction projects. Further, many of the players in the long steel value chain are vertically integrated from the level of rebar production right through to construction. The Competition Commission has referred at least five cases in the long steel value chain to the Competition Tribunal.

In scrap, a key input into long steel production in South Africa, the same long steel producers implicated in the cartel that is the subject of this paper were part of a cartel that fixed purchase prices of scrap and allocated which scrap suppliers they would buy from. Agreement was reached between the long steel producers and five of the largest scrap suppliers (New Reclamation Group, Universal Recycling, Ton Scrap, Ben Jacobs and Rand Scrap) which effectively resulted in the exclusion of the smaller scrap producers.

In a further downstream level the rebar produced by the long steel producers is cut, bent into the desired shape and installed in construction projects. A number of corporate leniency applications were brought to the Commission by Murray and Roberts, implicating companies in cartel activity in rebar and reinforcing mesh for construction projects. The firms implicated

<sup>7</sup> This section draws from das Nair, R., J. Khumalo and S. Roberts, 2012, "Steel, cement and fertiliser: Corporate cartels in intermediate industrial products", New Agenda, *South African Journal of Social and Economic Policy*, Issue 45, First Quarter 2012

in the rebar related cartel included Reinforcing Steel Contractors (a subsidiary of construction firm Murray and Roberts), Reinforcing Mesh Solutions (a subsidiary of construction firm WBHO), Steeledale (a subsidiary of construction firm Aveng) and a number of smaller players that were not affiliated with large construction firms. These firms allocated construction projects, fixed prices and discount bands, and allocated customers in a number of regions in South Africa. Allocations were mainly based on market share and cover pricing was used as a means of ensuring the selected member wins the project it is allocated. Similarly, in the mesh cartel case, for which there has been a Tribunal finding, reinforcing mesh producers BRC Mesh (a subsidiary of construction firm Murray and Roberts), Steeledale (a subsidiary of construction firm Aveng), Reinforcing Mesh Solutions (a subsidiary of construction firm WBHO) and a producer unaffiliated with a construction company, Vulcania Solutions, were found to have fixed price lists, discounts to customer groupings and allocated customers and projects.

Yet another cartel in mining roof bolts reveals participation by the same main players (Murray and Roberts' affiliate RSC Ekusasa and Aveng's affiliate Duraset) and other players (Dywidag Systems International and Videx Wire Products). Here, the firms rigged tenders from mines such that each player maintained their traditional customer base.

These pervasive and multilevel cartels, often with firms from the same group implicated, raise two important issues.

First, it would appear somewhat unusual and indeed counter-intuitive that cartel members at one level of the value chain would allow and, from what is evident in the long steel value chain, actively participate in agreements and arrangements at other levels. After all, an upstream monopolist would want to ensure a competitive customer base in downstream markets so as to maximise his profits, with as little buyer power constraining his pricing as possible. From the perspective of downstream firms, the ideal situation is a number of suppliers of input products competing down the price. But the widespread cartel conduct at almost every level of the long steel value chain, anchored by key vertically integrated players, suggests that the motive for such behaviour is likely to be a desire to ensure overall governance of the value chain by these players. By tying up key inputs and key customers in a web of cartel activities, new entrants would find it very hard to enter the long steel value chain thus ensuring the market positions of existing main players.

Second, and of significance to the results in this paper, is the 'noise' these multiple cartels create when interpreting estimates of overcharges. Given the numerous cartels, both upstream and downstream from rebar production, it is hard to attribute changes in market dynamics following the end of rebar cartel solely to this event. The scrap, mesh and installation of rebar in construction projects cartels all allegedly came to an end around the same time as the rebar production cartel. The effects evidenced may be as a combination of these dynamics. For example, evidence of new entry in long steel production may be as a result of easier access to scrap following the desolation of the scrap cartel.

In addition to the above, clean interpretation of the evidenced results is made difficult due to the following simultaneous events:

- The end of the cartel was during the crescendo of the construction boom which began in 2007 and turned sharply down in early 2009.
- Electricity load shedding by utility company Eskom would have meant that plants could not run at full capacity throughout the year (Tyrer, 2008)
- The mothballing of Cisco in 2011 with the simultaneous entry of SA Metals which had a net reduction in industry capacity of approximately 130,000t per annum.

- AMSA had plant shutdowns at the beginning of 2011 and in August 2011 which resulted in a massive reduction in domestic supply<sup>8</sup>.
- The long term nature of contracts in the industry, which are typically 12 to 18 months, would exacerbate the lagged outcome. The difference in lead times on orders placed and actual delivery, alternatively, the difference between when contracts were won and when revenue was booked against them (which may be some time after the contract is done) may also be a reason for observing some lagged effects.

## 6. Conclusion

Deterrence is an important aspect of the work of competition authorities and much has been done to refine the investigative procedures, the design of administrative penalties and the corporate leniency policy in order to detect and deter cartels. However, the opportunity for deterrence from damage claims has not been fully exploited in South Africa. Thus far no South African court has awarded damage claims for harm suffered from anticompetitive conduct even though there have been some attempts to seek compensation. There is a need to provide support and encouragement to victims of anticompetitive conduct to successfully claim damages. Traditionally in competition law administrative penalties are viewed as a deterrence mechanism while damage claims are regarded as compensation mechanism to victims of anticompetitive conduct. However, damage claims do assist competition authorities with deterrence as an appropriately calculated cartel overcharge and damage claim can reclaim most of the cartel profits. Thus if there is a high likelihood of being caught and damages being awarded, cartels will be less attractive to firms and there will be more vigilance with compliance.

The calculation of cartel overcharges assists the victims of anticompetitive to take decisions about seeking compensation. There is some miscommunication about the harm of cartels in markets, for example, in the construction industry where cover pricing was prevalent and the understanding by most customers was that it was necessary to allow the construction firms to plan projects and stay on supplier lists and that this type of conduct did not result in overcharges. However, the parties to the conduct effectively substituted practical cooperation for the risks of competition and consequently distorted competition in the tender process. Such conduct undermines the benefits to the clients of receiving competitively priced bids (Khumalo, Njisane and Nqojela, 2010). These overcharge calculations are also not just useful to those harmed by anticompetitive conduct but are a useful way of showing the impact of the work done by competition authorities on the wider economy.

In this paper, we measure the cartel overcharge in percentage terms and the consequent damages in rand terms in the reinforcing steel bar (rebar) market, a market in which a cartel operated between 1999 and 2008. We do this by applying the 'difference-in-difference' methodology, with our primary comparison being the cartelised rebar domestic price over the export rebar price. The results are presented for two counterfactual scenarios, the leader-follower model of competition and Bertrand competition as a robustness check. We find that the cartel mark ups were as high as 43.2% for the Bertrand counterfactual and 35.7% for the price leadership counterfactual. The leader-follower overcharge is calculated by taking the difference between the prices during and after the cartel. This speaks directly to the impact of the interventions of the Competition Commission.

We apply the overcharge results to the transactions that took place during the cartel to get a valuation of the overcharge, in other words an estimate of the damages that could be claimed from the cartelists. This value amounts to R3.2 billion under the Bertrand counterfactual and

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<sup>8</sup> See

<http://www.intranews.co.za/clippings/Mittal%20furnace%20shutdown%20hits%20industry%20hard.pdf>



R2.8 billion under the leader-follower counterfactual. Given that the demand for rebar is a derived demand and the cost thereof is a small proportion of the construction projects it is unlikely that the higher prices dissuaded customers from new construction projects. So the quantity that was consumed under the cartel is a good proxy for the quantity that would have been sold without the cartel.

We acknowledge the inherent difficulties in interpreting results of the analyses, particularly in industries such as steel, where there are cartels in multiple levels of the value chain, considerable 'noise' given external shocks, and where cartel behaviour is so entrenched that conduct may persist well after the 'formal' cartel ends. However we note that to address some of these issues we show result for the strict cartel period as well as the cartel period taking out the years with anomalies.

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