On measuring the economic impact: savings to the consumer post cement cartel burst

Hariprasad Govinda†, Junior Khumalo‡ and Siphamandla Mkhwanazi§

Abstract

One of the goals of the South African Competition Act is “to provide consumers with competitive prices and product choices”. In this article, we estimate the direct financial benefits to consumers, by deriving estimates of the impact of the Competition Commission's (Commission's) intervention following the uncovering of the South African cement cartel. To do this, we estimate the avoided price (overcharge) as a result of the uncovering of the cartel over the avoided duration in years (the avoided duration is the estimated expected future duration of a cartel, using case specific information). Econometric estimation having accounted for cost and demand shifters shows that overcharges were between 7.5% - 9.7% during the cartel period compared to post-intervention period. Based on this, we find that the total savings to the South African consumers due to Commission’s intervention starting from 2010 to 2013 calendar year are approximately in the range of R4.5 to R5.8 Billion (USD 424.5 Million to USD 547.1 Million). Moreover, had the Commission been successful in its first intervention of 2000 dawn raids, the total savings to the South African consumers would have been approximately in the range of R14.9 to R19.3 Billion (USD 1.4 Billion to USD 1.8 Billion). Apart from these financial benefits, we find that the market has generally become more competitive, as evidenced by firms penetrating into regions (provinces) that they were previously not active in.

Keywords: Cartel, Overcharge, Market Allocation, Information exchange, 2SLS

† Senior Economist, Policy & Research, Competition Commission, SA, e-mail HariprasadG@compcom.co.za
‡ Divisional Manager, Enforcement & Exemption, Competition Commission, SA, e-mail JuniorK@compcom.co.za
§ Economist, Policy & Research, Competition Commission, SA, e-mail SiphamandlaM@compcom.co.za

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1. Introduction

One of the goals of the South African Competition Act is “to provide consumers with competitive prices and product choices”. This goal places the consumer at the centre, and aims to protect them from cartels and other forms of collusive outcomes. Cartels are generally understood to be undesirable in that they illegally transfer income or wealth from buyers to the members of the cartel, resulting to a reduction of consumer welfare. This transfer can be in the form of higher prices and/or lower quantity, than socially optimal. In this article we quantify the financial benefits to consumers, by deriving estimates of the impact of the Competition Commission’s (Commission’s) intervention, following the uncovering of the South African cement cartel. To do this, we estimate the avoided price (overcharge) as a result of the uncovering of the cartel over the avoided duration in years (the avoided duration is the estimated expected future duration of a cartel, using case specific information). We estimate the annual impact on consumers by multiplying the sales of the affected goods by the price increase caused by the agreement. We then estimate the total consumer savings by aggregating annual impact over the number of years we believe the cartel may have remained operational, but for the Commission’s intervention.

The South African cement cartel involved price fixing and market allocation through the allocation of market shares and territories by the main cement producers (Pretoria Portland Cement (“PPC”), Lafarge, AfriSam and NPC-Cimpor). The cartel members had devised ways of continuing to coordinate their behaviour after the Government disbanded an officially sanctioned cartel in 1996. Before 1996, the cartel had been exempt from competition legislation. In anticipation of the disbandment of the cartel in 1996, cement producers agreed in 1995 that each producer would continue to hold a market share they enjoyed during the official cartel period.

After conducting a scoping study in the markets for construction and infrastructure inputs, the Commission initiated an investigation into the cement industry in June 2008. Subsequently, PPC, the largest cement producer in South Africa, applied for leniency around August 2009 and agreed to fully cooperate with the Commission by providing information on the cement cartel. Importantly, PPC also agreed to stop sharing detailed sales information through the industry association- the Cement and Concrete Institute (“C&CI”) - an important instrument that had been used by the cartel to sustain its operations.

The Commission concluded settlement agreements with AfriSam in November 2011 and Lafarge in March 2012. The two firms also confirmed the existence of the cartel and its modus operandi. The two firms paid settlement fines of approximately R125 million and R149 million, respectively. As part of the settlements, the Commission ruled that the C&CI could only release sales data on a national basis, rather than the region specific product data that it had historically released. Also, rather than monthly statistics, cementitious sales figures could only be released on a quarterly basis with a three-month delay.

It is against this background that we estimate the avoided price, which we then use to estimate the financial impact of the Commission’s intervention. Econometric estimation having accounted for cost and demand shifters shows that the avoided price is between 7.5% and 9.7% higher than the “competitive” price seen post cartel. Based on this, we find that the total savings to the South African consumers due to the Commission’s intervention starting from 2010 to 2013 calendar year are approximately in the range of R4.5 to R5.8 Billion. Moreover, had the Commission been successful in its first intervention of 2000 dawn raids, the total savings to the
South African consumers would have been approximately in the range of R14.9 to R19.3 Billion. Apart from these financial benefits, we find that the market has become somewhat more competitive, as evidenced by firms penetrating into regions (provinces) that they were previously not active in.

The paper is structured as follows: section 2 gives a brief literature review on stability of cartels and the estimation of counterfactual price. We then give a modus operandi of the South African cartel in section 3, and a brief overview of the international experience in cement cartels. In section 4 we compare non-pricing dynamics pre and post cartel. We then calculate the avoided price, and quantify the financial benefit to consumers as a result of intervention in section 5. Section 6 then concludes.

2. Review of literature

This section reviews economic literature on factors that facilitate cartel stability and also literature on the estimation of cartel overcharges.

2.1 Formation and Stability of cartels

Economic theory indicates that individuals and companies will be motivated to engage in cartel conduct if their expected gain in terms of larger profits is higher than the costs associated with the probability of detection and punishment. Companies engage in such conduct to maximise their joint profits. Industries where collusion is likely are those that are characterised by high entry barriers, high market concentration, homogeneity of product, inelastic demand, the small size of buyers, frequent transactions, short information lags, stable demand, cost symmetry and multimarket contact (Levenstein and Suslow, 2006). In order for a cartel to succeed, participants need to overcome some challenges. Levenstein and Suslow (2006) argue that cartel members need to select and coordinate their behaviour on mutually consistent and collusive strategies. Second, they need to monitor the behaviour of members to detect and deter defections from these collusive strategies. Third, they need to prevent entry (or expansion) by non-cartel firms. Failure to overcome these challenges results in bargaining problems, entry and opportunistic behaviour which undermine the stability of the cartel.

Bargaining problems arise when firms fail to reach a mutually beneficial agreement. These problems may also arise during the operation of the cartel and require renegotiation of the cartel agreement. Levenstein and Suslow (2006) reviewed nineteen case studies and found entry and bargaining power to be the two most common causes of cartel failure. They argue that bargaining problems decline overtime as the cartel develops. They further argue that the likelihood of entry increases overtime as outsiders have more opportunity to respond to high cartel prices.

Opportunistic behaviour arises when an individual cartel member has an incentive to deviate from the agreement to gain higher individual profits at the expense of lower joint profits. Such behaviour has been found to account for between one third and one half of cartel breakdowns (Eckbo, 1976, and Griffin, 1989, as cited in Levenstein and Suslow, 2006: 75-76). The risk of opportunistic behaviour creates a need for an effective mechanism to monitor the behaviour of cartel members to detect any deviations from the agreement. The cartel also needs to design an effective mechanism to punish members who are found to have deviated from the cartel agreement.
There are various strategies that cartels have employed to deal with the challenges of opportunistic behaviour and entry, particularly in economic environments where some of the facilitating factors are found to be weak. Cartel members can use collective predation (colloquially known as a price war) to fight cheating and new entry (Morton, 1997). The threat of a price war itself, if credible, may be self-fulfilling. The creation of excess capacity can be used as an entry deterrence mechanism and to lend credibility to punishment threats, thereby stabilise collusive agreements (Lübbers, 2009).

In some cartels, such as the Lysine cartel, a new entrant was accommodated and became a member of the cartel (Connor, 1997). Others have a compensation mechanism to punish defectors. For instance, in the German coal cartel, severe fines were imposed on members that produced in excess of their allocated quota (Lubbers, 2009). Others use vertical exclusion to prevent entry by non-members and also cheating by members (Levenstein and Suslow, 2006).

Cartels also invest in monitoring mechanisms such as industry trade associations. Industry associations usually engage in the collection and dissemination of information, which may be used to facilitate collusion. This deters cheating and allows cartels to avoid costly price wars. Between a quarter and a half of the cartels in US cross-section studies report the involvement of trade associations in cartel organisation (Levenstein and Suslow, 2006).

### 2.2 Estimating cartel overcharge

#### 2.2.1 Theoretical framework

Cartel overcharge, more appropriately avoided price in our case, is the difference between the observed collusive price charged and revenue earned during the cartel period and what would have been charged in the same period in the absence of the unlawful conduct. Thus, calculating the overcharge often involves comparing the price actually paid by buyers during the anticompetitive period (“cartel period”) to estimates of the price that would have prevailed in the absence of such conduct but where conditions are otherwise the same (the “counterfactual” condition). Following Harrington (2004), for a given cartel period $t$, this can be expressed mathematically as:

$$ [P_c(t) - P_{bf}(t)] D (P_c(t)) $$

Where: $P_c(t)$ is the observed (collusive) price, $D (P_c(t))$ is the number of units sold, and $P_{bf}(t)$ is the "counterfactual" price; that is, the price that would have been charged but for collusion. $P_c(t) - P_{bf}(t)$ is referred to as the "overcharge". Thus, two crucial elements to the calculation of an overcharge are identifying the periods during which firms were colluding and estimating the counterfactual price.

It should be noted, however, that this analogy does not (and is not intended to) take into account the additional effect of the cartel such as the deadweight losses associated with the artificially elevated prices. For example, the effect of the higher sales that would have been sold if prices had been at the lower, competitive level is not included (Khumalo et al., 2012). The price paid by buyers and the volume of output are observable. However, the counterfactual price is not observed but needs to be estimated.
2.2.2 Empirical approach: During-and-after method

In this study, during-and-after approach is used. The choice of this approach is informed by the data at our disposal, being time series and due to the fact that there is no credible comparator to allow for the use of difference-in-difference approach. As such, we characterise the before-and-after approach in more detail.

In essence, the during-and-after approach compares the price during the cartel period with the price in the same market before and/or after the cartel period. There are two ways of doing this. One is simply comparing the price averages between these periods. Alternatively, the price overcharge can be estimated by multivariate models that take into account relevant control variables. In this case, we employ the latter. The ability to measure the overcharge accurately depends upon how reliably and precisely the analysis can distinguish the collusive effect on prices from other influences that are unrelated to the anticompetitive conduct (Nieberding, 2006). Thus, the attractive feature of multivariate models is that they allow for the inclusion of other determinants of price in the cartel and non-cartel periods, such as seasonal effects, technological effects or structural changes.

Multivariate comparison of the cartel period with the non-cartel period can be implemented by two distinct approaches: the dummy variable ("DV") approach and the forecasting approach. The dummy variable approach introduces an indicator variable for the cartel period and takes value 1 during the cartel period and 0 otherwise. The coefficient parameter of this variable is thus the cartel overcharge. The forecasting approach involves predicting the price during the cartel period on the basis of the prices in the non-cartel period given the structural changes in the market.

The principal difference between the DV approach and the forecasting approach is that the former uses data for the entire time period as the estimation sample whilst a forecasting model uses data only from the benchmark period (which can be before or after the cartel period). There are several important assumptions that are implicitly being made when one approach is selected over the other. For instance, in using the forecasting approach, one assumes that the same relationship among price and the independent variables that exists in the benchmark period also holds in the cartel period. However, if this relationship does appreciably change during these two periods, the forecast model may not reliably predict counterfactual prices vis-à-vis an approach that accounts for this. Under the DV approach, one also must maintain the assumption that the same relationship between price and the independent variables exists in the benchmark and cartel period. If the influence of supply and demand factors affects equilibrium price differently in these two periods, then the DV approach may not reliably measure overcharges vis-à-vis an approach that accounts for such a change (Nieberding, 2006).

The "before-and-after" method has certain key advantages that explain its frequent application in overcharge estimations. First, data requirements are limited to time series of the cartelized product. Second, the economic concept behind the approach is quite straightforward, thereby easing its application in court proceedings. Third, an estimation of the overcharge is technically relatively easy to implement and therefore suitable for implementation in a relatively short time window for the analysis. Fourth, it is not necessary to make any assumptions on industry conduct absent the cartel (Hüschelrath et al, 2013).

However, a trade-off is that the performance of this approach rests on the degree to which the period before or after the cartel provides a good approximation of the competitive price in the
long-run equilibrium (Hüschelrath et al, 2013). One reason why this might not be the case is the possible persistence of cartel prices after the cartel has been uncovered. This is referred to as the transition period, in which prices continue to follow the cartel period price trend. One of the factors that may explain the occurrence of the transition period is residual collusion. Firms may no longer be meeting formally to discuss price fixing and output allocation strategies, but they may have developed shared understanding regarding each other’s businesses in ways that facilitate tacit collusion. Also, information sharing arrangements that continue after the uncovering of a cartel may also explain the persistence of collusive outcomes (Harrington, 2004). In this case, the counterfactual would be above the competitive level and the cartel overcharge would be under estimated. On the other hand, it is possible to overestimate the cartel overcharge if former cartel members reduce prices below the competitive level due to either price war that may emanate after the cartel (Connor, 2008) or to calm down angry customers (Connick, 2010 as cited in Hüschelrath et al, 2013). Therefore, ignoring the transition period from the cartel period to non-cartel period would likely lead to biased estimates of the price overcharge of the cartel.

2.3 Some empirical evidence

Empirical evidence suggests that cartel overcharges vary depending on duration, legal environment, organisational characteristics of the cartel and to a lesser extent, method of overcharge calculation (Connor and Bolotova, 2005). Studies have generally found cartel mark-ups or overcharges to vary around a 15% to 25% range of the cartel price. For instance, Posner (2001) reviewed overcharges for 12 cases and found a median overcharge of 28%. Similarly, Werden (2003) reviewed 13 studies and arrived at a median of 15%. A study by the OECD (Organisation for Economic Cooperation and Development) surveyed cartel cases of its members and found a median overcharge of 13% to 16% (OECD, 2002). Connor and Lande (2008) from a data set of 200 cartel studies, found a median overcharge of 20%.

For the South African flour cartel, Mncube (2013) provides an overcharge estimation by using comparator based methods. He finds that the overcharges to independent bakeries range from 7% to 42%. He also shows that the cartel profits were approximately two times higher during the cartel than the price war period or the post collusion period. For the precast concrete products cartel, Khumalo et al (2012) estimate the cartel overcharge to be in the range of 16.5% to 28% for the Gauteng region and 51% to 57% for the KwaZulu-Natal region.

3. Modus operandi of the cement cartel

A precondition of an economic assessment of a cartel is the understanding of the industry, market dynamics and the cartel agreement/s. To this end, this section deliberates on the background of the cartel conduct in this market as well as characterisation of the Commission’s investigation of the industry.

3.1 Background of the South African cement cartel

An official, and legal, cement cartel operated in South Africa from the 1940s until its disbandment in 1996. It involved the four primary producers of cement; PPC, Afrisam, Lafarge and NPC-Cimpor. During that period, the cement cartel was exempted from competition regulation. The cement manufacturers, regulated by the South African Cement Producers Association (“SACPA”), agreed that each firm’s market share would be proportional to their production capacities. Initially, the country was divided into the Southern Region and the...
Northern Region, with the former being the territory of PPC as the only producer with plants in the Western Cape and the latter shared between all producers. Whilst the KwaZulu-Natal province was shared between all producers, it was a special case where NPC-Cimpor, then jointly and equally owned by the other 3 producers, had exclusive reign in the territory. Accordingly, the KwaZulu-Natal volumes would effectively be shared equally between the 3 independent primary producers of cement, albeit indirectly through NPC-Cimpor.

A company known as Cement Distributors (South Africa) (Pty) Ltd (“CDSA”) was formed and took responsibility for all cement sales and distribution and the balancing of the cartel members’ interests. All producers had to market their product through the CDSA, which covered all of the Northern Regions of the country. In the Southern Region, where only PPC operated, a company called Cape Sales performed a similar role as CDSA.

Pricing of cement was done using a model called the Twycross pricing model that optimised rail transport. This model used Lafarge’s Lichtenburg plant as the base pricing point of which all sales in the CDSA market area were priced by adding the transport costs from the Twycross pricing model. Indeed, it was this very function that was notionally the raison d’être for the cartel: optimising the rail transport of cement so as to minimise the distribution cost. At the end of each accounting period, there was a system of quota balancing in accordance with the agreed market shares. As such the legal cartel was both a market allocation agreement as well as a price fixing agreement: market allocation because it set a rule to allocate fixed market shares within a territory; and, price fixing because it set a rule on delivered prices to customers.

Ultimately, the cartel was given until 1996 to disband and each producer to operate independently. Operating independently not only meant that each producer would set prices independently, but that they would also market and distribute their product independently. In anticipation of the disbandment of the cartel in 1996, cement producers had agreed in 1995 that each producer would continue to hold a market share they had enjoyed during the official cartel period. However, this did not happen, as immediately after the cartel was disbanded a brief price war ensued lasting until 1998 when all the cement producers (showing poor financial performance as a result) held a two-day meeting in the town of Port Shepstone in the KwaZulu-Natal province to attempt to bring the market back to stability.

This 1998 meeting culminated in agreements on:

- Market shares in line with those under the legal cartel for the SACU (Southern African Customs Union) market, being South Africa, Lesotho, Botswana, Namibia and Swaziland, although often referred to by the cement companies as the ‘national’ market;
- Market shares for each company per province, which provincial market shares added up to the previous ‘national’ cartel market shares;
- The pricing parameters for different types of cement;
- The scaling back of marketing and distribution activities, with agreed closure of certain depots in certain regions; and,
- Cartel members not offering special discounts on higher quality cement.

In order to police the agreement and deal with the cartel problem of cheating, the cement producers devised an elaborate scheme of sharing detailed sales information through the industry association (known as the Cement and Concrete Institute or “C&CI”). The information sharing saw individual firms submitting their monthly sales figures to the association’s auditors along the following lines; by geographic region, packaging and transport type, end user
(customer type), product characteristics and imports. There was also a cross category of geographic area and end use, other categories for cement only and for extenders only. The data was then aggregated by the auditors, before being disseminated to the cement producers by the association.

Given the high concentration level of the cement industry, firms could use the aggregated data received from the association to monitor their own market share. If there were any changes (above or below a particular target), a firm could discern from the data exactly where the changes came from. Therefore targeted punishment or volume shedding could be undertaken without causing a price war or in any way destabilising the market.

As indicated, the Commission granted PPC immunity from prosecution under its corporate leniency policy in 2009. As a condition to this immunity, the Commission required that the company stop submitting data to the association in late 2009. As PPC is by far the biggest cement producer in South Africa, this effectively meant halting the information exchange given the proportion of PPC data. The information exchange regime was undoubtedly the single most important tool of the cement cartel and therefore the Commission expected that without it, the cartelists would find it difficult to monitor compliance with the cartel arrangement. Logically, the cartel would breakdown as a result of the reduced transparency in the market, thus bring about more volatility and competition on price.

Prior to the 2008 investigation, the Commission had an earlier investigation under-which it conducted raids on the premises of PPC and Slagment as early as 2000. PPC and Slagment challenged the raid successfully resulting in the return of the raided documents. It is probable that these documents contained details of the 1998 agreement, and therefore it is likely that the cartel could have been uncovered then but for the legal challenge.

In the following subsections we describe the market allocation, price fixing and information exchange arrangements of the cartel.

3.1.1 Price fixing

An agreement on market shares effectively reduces price competition as it enables any firm to identify where there is competitive discounting, as this is a manifest in loss of market share. However, the cement cartel members also saw it fit to fix prices in the market. Before the Port Shepstone agreement in 1998, a decentralised pricing system was in place where discounting at regional level was common practice. Price increases took place twice yearly, in January and June. The amount by which prices were to increase every six months still had to be determined and continuous forums facilitated this determination.

The initial meetings took place in 1998, 1999 and 2000 to discuss pricing (as well as market shares). The cement producers then maintained contact on a bilateral basis after these main meetings. These bilateral interactions typically took place around the time of price increases, where representatives from each of the players would seek to find out what the others were likely to do in relation to pending price adjustments. This price-monitoring it seems was also amplified by a nodal pricing strategy adopted by PPC and Lafarge, and followed by others, from 2001 onwards. Prices were determined at executive level for ‘nodes’, which were geographic regions or zones of supply. Thus towns in any given node would pay the same price irrespective of distance from the plant.
3.1.2 Information shared through the industry association, C&CI

The information exchanged through the industry association facilitated the collusive agreements between the cement producers. The C&CI operated in such a manner that all its members submitted highly disaggregated information on output, which it combined and then supplied to all members monthly in an aggregated form.

Sales volumes in the different provinces (and sub-provinces and countries) were concentrated among a few or even a single producer. This meant that cement firms who were present within a region could calculate the residual by subtracting their own volumes from the total received from the C&CI. Where there were two firms present, this then equated to data that is disaggregated to the firm level. This gave firms the ability to identify quickly when rival firms, had increased their market share.

The information also included data on volumes per end use sector per province which allowed firms to determine in which customer groupings rival firms had increased their market share. This made it easier for firms to monitor rivals’ deviations from the agreement. For example, if PPC observed that its market share in the Eastern Cape dropped, PPC would not only know that it was because AfriSam increased market share, but PPC could also identify the sector into which AfriSam increased its market share. If it was for example in the mining sector, then PPC could quickly find out if it was because AfriSam won the market share by some competitive action (cheating on an agreement) or perhaps a long term customer of AfriSam required volumes greater than what they would ordinarily purchase.

3.2 International experiences

Table 1A (See Appendix A) gives a summary of international experience with cement cartels. Apart from usual market allocation, price fixing and information exchange, we have come across other distinct types of cartel formations as seen from the experiences of Mexico, Taiwan and Australia. In Mexico, it was basically cartelists blocking customers from importing cement from Russia; in Taiwan, it was an agreement to set up a joint venture to acquire a silo at the harbour in order to prevent international cement groups from establishing domestic marketing channels and also negotiated the retreat of some enterprises from the market whenever there were oversupply; and in Australia, cartelists behaved like a monopoly and prevented a competitor from entering the market by obtaining direct access (purchase agreement) to a source of fly-ash in South East Queensland.

Another interesting observation from the international experience is recently Pakistan, where raids were conducted into cement cartel recidivists. This enlightens the possibility of reformation of cartels post-intervention or weak deterrence effects of penalty/intervention itself. It is also observed that cartel breakdowns induce mergers. Hüschelrath and Smuda (2013) investigate the impact of cartel breakdowns on merger activity in European Commission (EC) between 2000 and 2011 with a detailed data set of worldwide merger activity. They find that the average number of all merger transactions increase by up to 51 percent when comparing the three years before the cartel breakdowns with the three years afterwards; for the subset of horizontal mergers, merger activity is found to increase even more – by up to 83 percent – after the cartel breakdowns.
4. Pre and Post cartel behaviour

The Commission alleged that the four producers had a geographical market sharing arrangement, through which they had divided South Africa into territories. The KwaZulu-Natal Province was divided into northern KwaZulu-Natal where all four producers were present, and the southern KwaZulu-Natal which was NPC-Cimpor’s exclusive territory. Following from the legal cartel, the Eastern Cape Province was divided into the separate “Border and Transkei” region which was mostly Afrisam’s territory and the “Eastern Cape” region which was PPC’s territory. The Western Cape Province belonged to PPC and the Northern Cape was split between PPC and AfriSam. The remaining regions (North West, Limpopo, Gauteng, Mpumalanga, and Free State) had the 3 producers (PPC, AfriSam and Lafarge) (see Table 1 below).

In addition, the neighbouring countries were split as follows; Lesotho, Namibia and Swaziland were allocated to AfriSam. Further, PPC confirmed that it was allocated the Botswana market.
Table 1: The geographic spread of cement producers in terms of market shares during cartel and post-intervention period (2012) by region

<table>
<thead>
<tr>
<th>Region</th>
<th>Active players and approximate market shares</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PPC Cartel Period</td>
</tr>
<tr>
<td>Western Cape</td>
<td>100%</td>
</tr>
<tr>
<td>Eastern Cape</td>
<td>90%</td>
</tr>
<tr>
<td>Border/Transkei</td>
<td>10%</td>
</tr>
<tr>
<td>Northern Cape</td>
<td>25%</td>
</tr>
<tr>
<td>North West</td>
<td>40%</td>
</tr>
<tr>
<td>Limpopo</td>
<td>40%</td>
</tr>
<tr>
<td>Gauteng</td>
<td>35%</td>
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<tr>
<td>Mpumalanga</td>
<td>45%</td>
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<tr>
<td>Northern KZN</td>
<td>25%</td>
</tr>
<tr>
<td>Southern KZN</td>
<td>10%</td>
</tr>
<tr>
<td>Free State</td>
<td>15%</td>
</tr>
</tbody>
</table>

Source: Commission report, case number 2008JUN3769 and Own calculations from data collected during the merger investigation.

Note: a now includes both Eastern Cape & Border/Transkei; b now includes both Northern & Southern KZN. Post intervention market share figures are confidential.
Table 1 illustrates the market structure pre- and post-intervention, in different regions.

**Western Cape**

Pre intervention, Western Cape was solely allocated to PPC, that is, PPC had 100% market share. Post intervention, it is noted that Afrisam has penetrated into market. This is likely to increase in the future as it is understood that Afrisam is in the process of constructing a depot to service the Western Cape. Thus, the intervention has brought about some change in behaviour in the Western Cape region.

**Eastern Cape**

Previously, this region was divided into two regions, the Eastern Cape and Transkei and allocated to PPC and Afrisam, with NPC having negligible sales. The post cartel data aggregates volumes from these sub-regions, and therefore cannot make a convincing comparison. However, since these two regions were allocated to two companies, it is possible to assess entry. In 2012, it is apparent that NPC has more than negligible market share and Lafarge has also entered the fray. Overall, while we cannot make a compelling conclusion, it seems there is increased competition in that region, on the basis that there are more firms competing, with Lafarge entering whereas it was previously not active at all in these regions.

**Northern Cape**

This region was split 75% and 25% between Afrisam and PPC. In 2012, however, it is evident that Lafarge had eaten significantly into the market shares of these two firms. Thus, the intervention brought about more rigorous competition in this region, with Lafarge penetrating the market which it previously did not operate in.

**North West**

During the cartel, the firms agreed to split the market shares 40% to PPC and 30% each to Afrisam and Lafarge respectively. By 2012, the market looked more competitive, with both PPC and Lafarge eating into Afrisam’s market share.

**Limpopo**

Pre intervention, the market was allocated such that PPC had 40%, Afrisam 25% and Lafarge 35%. By 2012, the picture had changed and it seems that PPC and Lafarge are eating into Afrisam’s market share in this region, implying increased level of competition.

**Gauteng**

Gauteng was equally split between PPC and Afrisam controlling 35% market share respectively, and Lafarge controlling 30%. By 2012, both Afrisam and Lafarge had lost market shares to PPC. While there is no new entry, evidence suggests that companies are eating into each other’s market shares.
Mpumalanga

According to the cartel arrangement, PPC had been allocated 45% market share, and Afrisam and Lafarge had 35% and 20% respectively. By 2012, Lafarge had significantly eaten into PPC’s market shares.

KwaZulu Natal

Pre intervention, cement companies divided the province according to Southern and Northern KwaZulu Natal. The common notion was that NPC is the main supplier in the greater KwaZulu Natal region, followed by Lafarge, PPC and Afrisam. The post intervention data is not disaggregated according to the Southern and Northern region, but submitted as one KwaZulu Natal figure. Thus, it is not possible to compare like for like. However, it can be stated that NPC still appears to be the dominant company with the rest of the companies controlling more or less the same share of the market.

Free State

The cartel arrangement had allocated Afrisam 60%, and PPC and Lafarge controlling 15% and 25% market shares respectively. NPC had negligible market share in the region. Post cartel, Afrisam is still dominant however, has lost market shares marginally. NPC still sell negligible volumes in Free State. The change in market shares suggests that companies compete for sales.

5. Comparison of actual and counterfactual outcomes

5.1 Estimation of the avoided price

Estimating the avoided price invariably involves comparing the outcomes in a world in which there is a cartel to those where there is no cartel. This involves constructing a counterfactual price and comparing it to the observed price. Holding everything constant, the difference between the two is attributable to the intervention. There are various methods to estimate ‘counterfactual’ prices and each differ with respect to their conceptual complexity and underlying assumptions. In this case, we used the during-and-after approach which basically compares the price during the cartel period with the price in the same market after the cartel period.

To do this, we model the cement price during and after the cartel using a multivariate econometric model that takes into account relevant control variables. These control variables include a set of determinants of the price in the cartel and non-cartel periods such as cost of production, raw materials that go into the production process of cement and variables that account for demand.

The model estimates the cement price at time $t$ as a function of the price of coal, limestone, iron ore, energy, oil$^1$ and construction$^2$. The cost shifters are selected based on the inputs that go into the production process of cement. The price index of construction, which measures the

---

1 Lag of 3 months are allowed to adjust the industry response to exchange rate and availability of oil for domestic consumption.
2 Lag of 4 months are allowed to adjust industry response to twice a year price revision by the cement companies. Lag of 6 months could have been appropriate however, construction data are quarterly and hence lags of 4, 5 and 6 could have had same impact on the dependent variable.
construction activity in the economy, is used as a proxy for the demand of cement. Thus, in this model, cement price is determined by cost and demand shifters, which resonates with the real world. In order to estimate the effect of the cartel, we include the dummy variable in the regression equation, which takes a value of ‘1’ during the cartel period and a ‘0’ otherwise. The corresponding coefficient captures the difference of the price between the cartel period and the non-cartel period. It is noted that the accuracy of the estimation, depends on how well the model can explain the observed variation in actual prices in the market.

5.1.1 Econometric model

We model cement prices as follows:

\[ p_{t}^{Cement} = \beta_0 + \beta_1 D^C + \beta_2 p_{t}^{Coal} + \beta_3 p_{t}^{LS} + \beta_4 p_{t}^{IO} + \beta_5 p_{t}^{E} + \beta_6 p_{t-3}^{Oil} + \beta_7 p_{t-4}^{Const} + \epsilon_t \]  

Where,

- \( p_{t}^{Cement} \) = Ex-work price indices in period \( t \) of South African 42.5N Cement in bulk sales category
- \( D^C \) = Dummy variable taking value 1 for cartel period and 0 otherwise
- \( p_{t}^{Coal} \) = Price indices of Coal in period \( t \) for South Africa
- \( p_{t}^{LS} \) = Price indices of Limestone in period \( t \) for South Africa
- \( p_{t}^{IO} \) = Price indices of Iron ore in period \( t \) for South Africa
- \( p_{t}^{E} \) = Price indices of Energy in period \( t \) for South Africa
- \( p_{t-3}^{Oil} \) = Price indices of Oil in period \( t-3 \) for South Africa
- \( p_{t-4}^{Const} \) = Price indices of Construction in period \( t-4 \) for South Africa
- \( \epsilon_t \) = Error term

The cement price index at time \( t \) is modelled as a function of the price indices of coal, limestone, iron ore, energy, oil and construction. These variables are selected based on the inputs that go into the production process of cement in South Africa. The price index of construction is used as a proxy for the demand of cement. Using construction as an independent variable also solves the problem of endogeneity between price of cement and demand for cement. From an econometric perspective, having included the construction variable in the regression equation avoids the possible biased coefficients and erroneous estimates of the impact of cement demand on cement prices. In order to estimate the effect of the cartel, we include the dummy variable \( D^C \) in the regression equation. The corresponding coefficient shows the difference of the price index between the cartel period and the non-cartel period and \( \epsilon_t \) is the error term. Table 2 below shows the results of simple OLS regression based on data from January 2008 to December 2012.

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3 We found no evidence of the existence of a transition period, as the transition period dummies proved to be statistically insignificant.
4 Ex-work prices of 42.5N in bulk sales of cement manufacturers are averaged to represent South African cement prices in the OPC bulk sales category. Considering January 2008 price as base, rest of the period data are converted to price indices of cement. Similarly, price indices of all the independent variables are also converted to January 2008 constant prices for regression purposes.
5 Lag of 3 months are allowed to adjust the industry response to exchange rate and availability of oil for domestic consumption.
6 Lag of 4 months are allowed to adjust industry response to twice a year price revision by the cement companies. Lag of 6 months could have been appropriate however, construction data are quarterly and hence lags of 4, 5 and 6 could have had same impact on the dependent variable.
Table 2: Data description and Data Source

<table>
<thead>
<tr>
<th>Variable</th>
<th>Source</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement Price index⁷</td>
<td>Cement Producers</td>
<td>Ex-work price indices in period t of South African 42.5N Cement in bulk sales category PL924101-</td>
</tr>
<tr>
<td>Coal Price</td>
<td>Statssa</td>
<td>PPI for selected materials: Coal, Large nuts - grade B (Index 2012=100)</td>
</tr>
<tr>
<td>Limestone and Shale</td>
<td>Statssa</td>
<td>P-0152: PPI for selected materials: Aggregated crushed stone (Index 2012=100)</td>
</tr>
<tr>
<td>Iron Ore</td>
<td>Index Mundi (via IMF)</td>
<td>Iron Ore Monthly Price - US Dollars per Dry Metric Ton</td>
</tr>
<tr>
<td>Energy</td>
<td>SARB</td>
<td>KBP7139N-Producer prices of domestic output: Electricity, water, steam and gas (PPI)</td>
</tr>
<tr>
<td>Oil</td>
<td>SARB</td>
<td>Brent crude oil price in US Dollar</td>
</tr>
<tr>
<td>Construction GDP</td>
<td>SARB</td>
<td>Gross Value Added at basic prices of construction (contractors) (GDP), constant 2005 prices</td>
</tr>
</tbody>
</table>

Table 3: Overcharge Estimation – Equation 1

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.570</td>
<td>0.43</td>
<td></td>
</tr>
<tr>
<td>D⁷</td>
<td>0.072</td>
<td>2.63</td>
<td>***</td>
</tr>
<tr>
<td>Coal</td>
<td>0.016</td>
<td>0.23</td>
<td></td>
</tr>
<tr>
<td>Limestone</td>
<td>-0.468</td>
<td>-2.15</td>
<td>**</td>
</tr>
<tr>
<td>Iron Ore</td>
<td>0.070</td>
<td>2.07</td>
<td>**</td>
</tr>
<tr>
<td>Energy</td>
<td>0.241</td>
<td>2.92</td>
<td>***</td>
</tr>
<tr>
<td>Oil</td>
<td>-0.103</td>
<td>-3.45</td>
<td>***</td>
</tr>
<tr>
<td>Construction</td>
<td>1.134</td>
<td>3.54</td>
<td>***</td>
</tr>
</tbody>
</table>

No of Observation | 56
F(7, 48) | 28.99 | ***
R-Sq | 0.80
Adj R-Sq | 0.78

Note: ***, **, * are 1%, 5%, 10% statistical significance respectively.

The table shows the estimation results for the case of the natural logarithm of the respective variables. Except coal and constant term, all the other independent variables are statistically significant. It can be drawn from the dummy coefficient that the price difference between the cartel period and the non-cartel period (i.e., the avoided price) is exp(0.072)-1 = 7.5% which is statistically significant at 1%. If we assume an average cement price of R1000 per ton, the price overcharge can be calculated to be R75 per ton. Interestingly, we find construction variable is positive and statistically significant at 1% indicating a 1% increase in construction leading to 1.13% increase in the price of cement. It is noted that the period under consideration coincides

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Note that the independent variables considered in the model are national figures and hence it was necessary for us to convert actual cement prices to cement price index to represent South Africa. Though the cartel was regional in nature, a region-wide econometric estimation could have been biased as the independent variables are national and no region was operated by all the 4 firms in any point in time effectively.

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⁷ Note that the independent variables considered in the model are national figures and hence it was necessary for us to convert actual cement prices to cement price index to represent South Africa. Though the cartel was regional in nature, a region-wide econometric estimation could have been biased as the independent variables are national and no region was operated by all the 4 firms in any point in time effectively.
with the period for preparation and hosting of the FIFA™ World Cup in 2010, where cement demand was at an all-time high due to construction activity. Iron ore and energy indices are found to be other important determinants of cement price. Surprisingly, Limestone and oil, though are statistically significant at 5% and 1% respectively, are negatively related to cement price indices showing some amount of inconsistency in the data. Overall, the model fit is good with Adjusted R-sq of 0.78.

5.1.2 Extension of econometric method: 2SLS

The estimation period coincides with the global financial meltdown, whose effects were witnessed between July 2008 and May 2009. Evidently, cost shifters, particularly oil prices, might suffer from exogenous shock. In an attempt to purge this effect, we extended our model 1 to account for financial crisis by creating a dummy for global financial crisis and instrumenting this dummy to oil price indices. For this purpose, we use the following econometric model and perform 2SLS. Table 4 below shows the results of 2SLS regression based on data from January 2008 to December 2012.

\[
p_t^{\text{Cement}} = \beta_0 + \beta_1 D_C^t + \beta_2 P_t^{\text{Coal}} + \beta_3 P_t^{\text{LS}} + \beta_4 P_t^{\text{IO}} + \beta_5 P_t^{\text{E}} + \beta_6 IV D_{FC}^t + \beta_7 P_{t-4}^{\text{Const}} + \epsilon_t \tag{3}
\]

Where,

\begin{align*}
p_t^{\text{Cement}} & \quad \text{= Ex-work price indices in period } t \text{ of South African 42.5N Cement in bulk sales category} \\
D_C^t & \quad \text{= Dummy variable taking value 1 for cartel period and 0 otherwise} \\
P_t^{\text{Coal}} & \quad \text{= Price indices of Coal in period } t \text{ for South Africa} \\
P_t^{\text{LS}} & \quad \text{= Price indices of Limestone in period } t \text{ for South Africa} \\
P_t^{\text{IO}} & \quad \text{= Price indices of Iron ore in period } t \text{ for South Africa} \\
P_t^{\text{E}} & \quad \text{= Price indices of Energy in period } t \text{ for South Africa} \\
IV D_{FC}^t & \quad \text{= Price indices of Oil instrumented by Global Financial Crisis dummy taking value 1 for crisis period and 0 otherwise} \\
P_{t-4}^{\text{Const}} & \quad \text{= Price indices of Construction in period } t-4 \text{ for South Africa} \\
\epsilon_t & \quad \text{= Error term}
\end{align*}
Table 4: Overcharge Estimation – Equation 2 (2SLS)  

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-2.760</td>
<td>-0.71</td>
<td></td>
</tr>
<tr>
<td>DC</td>
<td>0.093</td>
<td>2.54</td>
<td>***</td>
</tr>
<tr>
<td>Coal</td>
<td>0.084</td>
<td>0.80</td>
<td></td>
</tr>
<tr>
<td>Limestone</td>
<td>-0.142</td>
<td>-0.34</td>
<td></td>
</tr>
<tr>
<td>Iron Ore</td>
<td>0.100</td>
<td>2.08</td>
<td>**</td>
</tr>
<tr>
<td>Energy</td>
<td>0.034</td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td>IV DFC</td>
<td>0.005</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>1.521</td>
<td>2.82</td>
<td>***</td>
</tr>
</tbody>
</table>

No of Observation 56
Wald Chi-sq (7) 174.97 ***
R-Sq 0.75

Note: ***, **, * are 1%, 5%, 10% statistical significance respectively.

The cartel dummy is statistically significant at 1%, and so is the demand variable. Iron ore is significant at 5%. All other cost shifters do not appear to be statistically different. Despite this, goodness of fit does not suffer much as R-sq is still 0.75. Using these estimates, the price difference between the cartel period and the non-cartel period is now 9.7% (exp(0.093)-1) which is statistically significant at 1%. The overcharge is calculated to be R97 per ton if we assume the average cement price to be R1000 per ton.

5.2 Quantifiable savings to the consumers

As it was evident from 2SLS regression estimates that the price difference between the cartel period and the non-cartel period was 9.7% which was statistically significant at 1%. This indicates that prices were 9.7% higher during the cartel period. At this stage, we can simulate two scenarios using estimated cartel overcharge. We simulate a scenario where the cartel continued and a scenario where there were no cartel in the South African cement cartel.

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8 We also tested for multicollinearity by conducting Variance Inflation Factor (VIF) test. Mean VIF calculated for all the independent variables considered is 9.10 which is below rule of thumb of 10. Note that VIF of 9.10 can also emerge for simple reason that all the raw material price indices are moving in the same direction and despite the fact that each of these variables are independently constructed indices. However, when VIF reaches these threshold values researchers often attempt to reduce the collinearity by eliminating one or more variables from their analysis; using Ridge Regression to analyse their data; or combining two or more independent variables into a single index. These techniques for curing problems associated with multicollinearity can create problems more serious than those they solve. Because of this, there is a need for these rules of thumb threshold values of the VIF (and tolerance) to be evaluated in the context of several other factors that influence the variance of regression coefficients.

9 Note that this is based on the assumption of “other things constant” for simulation exercise. The simulated counterfactual scenarios are based on estimated cartel dummy and hence it only captures the parametric shift in the curve that exactly equals cartel overcharge. However, forecasting as a technique can be used to simulate both parametric shift and slope of the overcharge which this study has not considered due to insufficient data points post-intervention.
Using these parameters, the estimated total savings to the South African consumers due to Commission’s intervention are approximately in the range of R1.1 to R1.4 billion per annum. We estimate the annual impact on consumers by multiplying the sales of the affected goods by the price increase caused by the agreement. To get to the estimate of total consumer savings, we aggregating annual impact over the number of years we believe the cartel may have remained operational, but for the Commission's intervention. Hence total savings to the South African consumers are approximately in the range of R4.5 to R5.8 million. Moreover, had the Commission been successful in its first intervention of early 2000 dawn raids, the total savings to the SA consumers could have been approximately in the range of R14.9 to R19.3 million.

6. Conclusion

The study aimed at assessing the impact of the Commission’s intervention in the cement cartel. We focused on consumer saving. In doing this, we constructed an econometric model to estimate the avoided price (cartel overcharge), as a result of the Commission’s intervention.

Estimating the avoided price invariably involves comparing the outcomes in a world in which there is a cartel to those where there is no cartel. This requires constructing a counterfactual price and comparing it to the observed price. Holding everything constant, the difference between the two is attributable to the intervention. There are various methods to estimate ‘counterfactual’ prices and each differ with respect to their conceptual complexity and underlying assumptions. In this case, we used the ‘during and after’ approach which basically compares the price during the cartel period with the price in the same market after the cartel period.

Econometric estimation having accounted for cost and demand shifters shows that the overcharges were between 7.5 - 9.7% during the cartel period compared to post-intervention period. Note, however, where hard core anti-competitive practices involve, for example, price-fixing and market sharing, recent academic evidence by Connor (2009) supports a median overcharge of between 17 to 30%. Hence, our estimates are conservative and if we were to go
by Connor’s (2009) median overcharge or Competition Tribunals’ standard of 15% overcharge, total savings to SA consumers will arguably be enormous than what is estimated. We find that the total savings to the South African consumers due to Commission’s intervention between 2010 and 2013 calendar year are approximately in the range of R4.5 to R5.8 billion. Moreover, had the Commission been successful in its first intervention of 2000 dawn raids, the total savings to the South African consumers would have been approximately in the range of R14.9 to R19.3 billion. Apart from these financial benefits, we find that the market has generally become more competitive, as evidenced by firms penetrating into regions (provinces) that they were previously not active in.

References


Office of Fair Trading (OFT) The deterrent effect of competition enforcement by the OFT OFT 963.


Annexure A

Table 1A: Summary of international experience in cement cartels

<table>
<thead>
<tr>
<th>Country/Agency</th>
<th>Participants</th>
<th>Cartel Form</th>
<th>Complaint/Initiation</th>
<th>Period of Cartel</th>
<th>Agency’s Intervention</th>
<th>Penalty</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egypt Egyptian Competition Authority (ECA)</td>
<td>9 players</td>
<td>Price fixing Direct agreement on market share allocation in terms of capacity</td>
<td>Request from Minister of Trade &amp; Industry</td>
<td>2002 - 2005</td>
<td>2006&lt;sup&gt;10&lt;/sup&gt;</td>
<td>10 Million Egyptian pounds Each</td>
<td>The average sales price overcharge were 33% given that the average production costs had increased by 10% during 2003 to 2004. In 2006, average sales prices increased by 14% notwithstanding a decrease in production costs by 3%.</td>
</tr>
</tbody>
</table>

<sup>10</sup> The ECA limited the study to the period between May 2005, which is the date when the Egyptian Competition Law on the Protection of Competition and the Prohibition of Monopolistic Practices officially came to force, and July 2006 when the report was referred to them from the minister requesting the study. However, they took the period between 2002 and 2005 and the period after the referral of the request as indicatory periods.
<table>
<thead>
<tr>
<th>Country</th>
<th>Players</th>
<th>Price Fixing</th>
<th>Leniency</th>
<th>Investigation Period</th>
<th>Lafarge - %</th>
<th>Others - €</th>
<th>Others appealed the decision at Court of Competition &amp; Consumer Protection (SOKiK) - Fines reduced to 81 Million EUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>7</td>
<td>Price fixing Information exchange Market share agreement Minimum resale price</td>
<td>Leniency</td>
<td>1998 - 2009</td>
<td>Lafarge - 0%</td>
<td>Gorazdze Cement - 5%</td>
<td>Others - 98 Million (EUR)</td>
</tr>
<tr>
<td>Germany</td>
<td>6</td>
<td>Market allocation Quota agreement</td>
<td>Leniency</td>
<td>1990-2002</td>
<td>Initial search – July 2002 Further Search – January 2003</td>
<td>Total of 660 Million EUR</td>
<td>Cartel overcharge of 10-15% of average price per ton. German court slashed those fines to nearly €330 million, citing problems with the data used to set the fines</td>
</tr>
<tr>
<td>Country</td>
<td>Number of Players</td>
<td>Description of Agreement</td>
<td>Complainant</td>
<td>Year of Agreement</td>
<td>Competition Verdict</td>
<td>Other Information</td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------</td>
<td>---------------------------</td>
<td>-------------------------------------------</td>
<td>-------------------</td>
<td>---------------------</td>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td>India Competition Commission of India (CCI)</td>
<td>11 Players + cement manufacturers association</td>
<td>Price fixing, Market allocation, Information exchange</td>
<td>Complainant: Builder’s Association of India</td>
<td>2000-2010</td>
<td>2012</td>
<td>60 billion rupees (€836 million)</td>
<td>Cartel overcharge of up to 40%. All have appealed the decision at Competition Appellate Tribunal</td>
</tr>
<tr>
<td>China State Administration for Industry commerce (SAIC)</td>
<td>16 players</td>
<td>Direct agreement to divide sales market, Rules on penalties for non-compliance</td>
<td>Leniency</td>
<td>-</td>
<td>2011</td>
<td>RMB 200,000 ($30,000; €22,000), 11 of 16 players received immunity for cooperating with investigation</td>
<td></td>
</tr>
</tbody>
</table>

11 The companies repeatedly insisted on meeting all at once with the commission instead of dealing with the agency one-on-one, which it described as "symptomatic of how the cartel members watch ... over each other’s shoulders to ensure no one falls out of line," according to the commission.
<table>
<thead>
<tr>
<th>Brazil Council for Economic Defense (Cade)</th>
<th>6 Players</th>
<th>Price fixing</th>
<th>Leniency</th>
<th>23 January 2014</th>
<th>Brazil's Votorantim Cimentos would be fined US$657m and Switzerland's Holcim would receive a penalty of US$214m. Itabira Agro Industrial would be fined US$173m, Cimpor Cimentos would receive a penalty of US$126m and InterCement, a subsidiary of Camargo Corrêa group, would be fined US$102m. In addition, Itambe would receive a fine of US$37.1m. Votorantim Cimentos will be compelled to divest 35% of its assets that represent 11Mt/yr of cement capacity, equivalent to 15% of the cement demand in Brazil. Holcim is required to sell 22% of its assets. Itabira will be required to sell 22% of its assets. Cimpor faces a sale of 25% of its assets. InterCement will be required to sell 25% of its assets. Itambé will not have to sell any assets, as the company operates just one cement plant.</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brazil’s Votorantim Cimentos would be fined US$657m and Switzerland’s Holcim would receive a penalty of US$214m. Itabira Agro Industrial would be fined US$173m, Cimpor Cimentos would receive a penalty of US$126m and InterCement, a subsidiary of Camargo Corrêa group, would be fined US$102m. In addition, Itambe would receive a fine of US$37.1m. Votorantim Cimentos will be compelled to divest 35% of its assets that represent 11Mt/yr of cement capacity, equivalent to 15% of the cement demand in Brazil. Holcim is required to sell 22% of its assets. Itabira will be required to sell 22% of its assets. Cimpor faces a sale of 25% of its assets. InterCement will be required to sell 25% of its assets. Itambé will not have to sell any assets, as the company operates just one cement plant.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Mexico Federal Competition commission (CFC) | Cemex + Comercio para el Desarrollo Mexicano (CDM), which A group of customers that was blocked from importing cement from Russia in 2004 | Complainant: A group of customers | 2004 | Feb 2012 | US$800,000 | Cemex to appeal the decision. |
had been formed by local entrepreneurs and several foreign partners

**Taiwan The Fair Trade Commission (TFTC)**

<table>
<thead>
<tr>
<th>Players</th>
<th>Agreement to set up a joint venture to acquire the silo of harbor in order to prevent the international cement groups from establishing domestic marketing channels. Negotiated the retreat of some enterprises from the market. Price fixing Market allocation</th>
<th>Complained by downstream manufacturers and industry associations of raising jointly the list prices of their products since 2001</th>
<th>1997 - 2005</th>
<th>Dec 15 2005 After forming international cement cartel in East-Asia countries, they had reached an agreement or arrived at an understanding that the oversupply of cement in that area would be exported to America, Middle East and Africa, rather than to cut down its home market price to compete with one another. It is worth observing the continuous hiking of cement price due to the international cement cartel designed to 210 million New Taiwan Dollars (NTD) (USD$ 6.3 million)</th>
</tr>
</thead>
</table>

In order to build a competitive cement market at home and abroad, the FTC appealed that competition authorities in each country and international organizations concerned should scrutinize the emerging problems of international cement cartel and co-operate with each other to crack down on these illegal infringements.

Chinese Taipei earnestly emphasized again that it would be glad to share its information on international cartels and would work together with those countries willing to cooperate.
Fly-ash is a by-product of burning black coal at power stations, and can be used as a cheap partial substitute for cement in ready-mix concrete.

12 Fly-ash is a by-product of burning black coal at power stations, and can be used as a cheap partial substitute for cement in ready-mix concrete.