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COMPETITION COMMITTEE**

**Global Forum on Competition**

**SERIAL OFFENDERS: WHY SOME INDUSTRIES SEEM PRONE TO ENDEMIC COLLUSION**

**Background note by the Secretariat**

-- Session IV --

*This document was prepared by the OECD Secretariat to serve as a background note for Session IV of the Global Forum on Competition to be held on 29-30 October 2015.*

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**SERIAL OFFENDERS: WHY SOME INDUSTRIES SEEM PRONE TO ENDEMIC COLLUSION****-- Background Note \*--****1. Introduction**

1. Some industries have been repeatedly investigated and sanctioned for collusion by competition authorities, sometimes involving repeated offences by the same firms. Empirical studies find that many cartels are in industrial intermediate inputs, such as chemicals, as well as in construction services and certain building materials. Some of this pattern arises from the same firms engaging in cartel activity repeatedly in different markets and even across countries.

2. Economic theory has developed guidelines on the factors that are considered conducive to collusion and these could help explain also *repeated* cases of collusion. These factors include concentration, limited innovation, barriers to entry, frequent and regular transactions, market transparency and symmetry among competitors. Not all factors may be equally relevant in all sectors and there is no commonly-agreed weighting of the relative importance of the different factors, for instance if they do not happen to point to the same direction. The importance of an individual factor varies depending on the product under consideration and it is therefore valuable to analyse specific examples of industries to look at how competition authorities assess the different factors.

3. Repeated collusion by the same companies could also have other explanations, such as the interplay between firm-specific factors and sector-specific factors. For instance there could be hysteresis effects: once cartels do form (perhaps because of sectoral characteristics), collusion becomes more accepted in the sector as a way of doing business, so that cartels become more likely to form again, even after antitrust action. This could reflect a bad business culture in serially offending firms, or perhaps even learning how to use more sophisticated methods of collusion, as a result of the earlier cartel or even the investigation of that cartel.

4. The serial involvement of the same firms in cartels also raises the question of whether prosecution of cartels results in effective deterrence in these sectors. It could simply be that the incentives to collude are so high, given the sectoral characteristics, that they more than offset the deterrence effect of competition law.

5. The competition problems arising in some sectors might require a more targeted approach than that commonly used by competition agencies. For instance, this could involve monitoring some sectors or even some companies closely, to enable quicker detection of cartels. However, more targeted action could

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\* This paper was prepared by Federica Maiorano of the OECD Competition Division and Themis Eftychidou, competition lawyer.

also extend to guidelines and enforcement practice relating to fines and leniency programmes. Some jurisdictions incorporate recidivism as an aggravating factor in their cartel-fining guidelines, for example. However, leniency programmes generally do not exclude recidivists and this may provide an incentive for violators to engage repeatedly in competition law infringement. International co-operation between competition authorities can also help with the detection and prosecution of such cartels.

6. In this paper, we will focus on four sectors where a number of competition authorities have significant enforcement experience. These are chemicals; cement and concrete; food products; and construction services, including public tenders. Relying on the Private International Cartels (PIC) database,<sup>2</sup> we provide some indication of repeated collusion by the same firms in the four sectors to the extent possible given the data limitations, such as the many anonymous firms recorded among the cartelists and the differences in how cases are reported.

7. We outline the economic characteristics of the sectors drawing on relevant cases in the specific industries, subject to public availability of their assessment by competition authorities. Factors are not identical in the four sectors and this suggests that collusive behaviour is not the result of a standard list of factors. This is most evident in the construction sector, which exhibits very different characteristics compared to the three manufacturing sectors. There is also variation within a broader sector: for example the market of detergents and cleaning products shows different features compared to organic chemical products, however both product categories have been heavily investigated by competition authorities.

8. For the purpose of this background note, and given the different legal definitions of recidivism across jurisdictions, serial offenders will be companies that have been found to have colluded repeatedly, either in different jurisdictions or in the same jurisdiction, regardless of whether infringements are simultaneous or not, and regardless of the type of collusive agreement or practice. In this definition, however, we do not consider other types of antitrust violations (such as abuse of dominance).

9. The remainder of the paper is structured as follows: Section 2 provides an overview of empirical papers on the sectors where collusion and repeated collusion are concentrated. Section 3 recaps the main factors identified by the economic literature as conducive to collusion and briefly summarises the insights of the literature on firm-specific factors, such as corporate governance. Section 4 describes the economic characteristics of each of these sectors, based on case decisions. Section 5 discusses recidivism and deterrence, and makes some considerations on the implications for competition authorities. Section 6 concludes.

## **2. Evidence on cartels and repeated collusion**

10. In this section we review some evidence on the distribution of cartels by economic sector, noting the lack of empirical work on *repeated* collusion by sector. Next, we provide our analysis of cartel data in the four industries under consideration. In particular, the cases of repeated collusion in the same sector are identified.

### **2.1. Empirical studies on sectors where collusion takes place**

11. The empirical literature on cartels often provides an analysis of cases by sector, such as in Antonielli and Mariniello (2014) and Combe and Monnier (2012) that analyse European Commission

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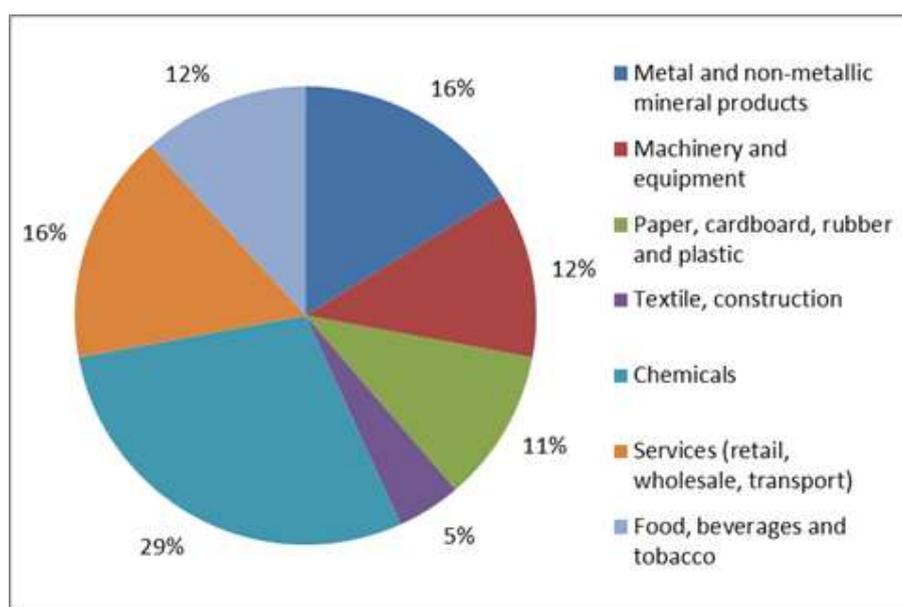
<sup>2</sup> The Private International Cartels (PIC) database is a detailed list of cartel cases around the world produced by Professor John Connor.

decisions, and in Levenstein and Suslow (2011) on cartels prosecuted by the European Commission or the US Department of Justice (DoJ).<sup>3</sup>

12. Antonielli and Mariniello (2014), in a study on manufacturing sectors that are more susceptible to antitrust enforcement, analyse European Commission decisions on mergers and cartels over the period 2000 – 2013. The authors classify products into 22 manufacturing sectors which follow the statistical classification of the European Union (NACE). They find that the Commission issued 65 cartel decisions and that 27 (i.e. 40 percent) concerned the chemical sector. Cartels were also uncovered in other sectors such as machinery and equipment,<sup>4</sup> other non-metallic mineral products (including cement and glass), and computer and electronics. In other manufacturing sectors, no cartels were detected: these were leather, wood, recorded media, other transport equipment, furniture and other manufacturing.

13. Combe and Monnier (2012), on a sample of decisions by the European Commission between 1969 and 2009, confirm the high share of cartels in chemicals where they find 30 percent of Commission decisions. While their classification of sectors is not directly comparable with the one followed by Antonielli and Mariniello (2014) and the reference period is also broader, they also find that machinery and equipment and metallic and non-metallic mineral products represent substantial proportions of total cases, 12 percent and 16 percent respectively.

**Figure 1. Breakdown of cartel decisions by sector, EC decisions between 1969 and 2009**



Source: Chart based on data from Combe and Monnier (2012)

14. Levenstein and Suslow (2011) study cartel duration in a sample of 81 international cartels prosecuted by the U.S. Department of Justice and / or the European Commission between 1990 and 2010. International cartels are defined as those whose members are from more than one country. Their scope may

<sup>3</sup> Veljanovski (2007) on 30 cartels sanctioned by the European Commission in 1999 – 2006 finds that 44 percent of cases in the chemical industry and 21 percent in industrial inputs.

<sup>4</sup> Machinery and equipment is a very composite category, including diverse products such as bearings, engines, ovens, furnaces and machinery for a variety of uses: agricultural, mining and quarrying, textile, apparel and leather production, etc.

be national or global. The authors find that most cartels in their sample are in intermediate manufactured goods, with 40 percent of cases in chemicals. Another 25 percent of cases are in a “variety of other manufacturing industries, with multiple convicted cartels in steel, carbon and graphite products, plastics, and paper industries” (Levenstein and Suslow, 2011).

15. A broader sample of cases, contained in the Private International Cartels (PIC) database<sup>5</sup> covering the period 1990 – 2014, shows a broadly similar picture (Table 1).

**Table 1. Distribution of non-global cartels by economic sector**

| Sector   | % of total cases |
|--|------------------|
| Construction   | 6%               |
| Finance, insurance, banking                                | 8%               |
| Food and beverages   | 9%               |
| Machinery, incl. electrical and parts                      | 6%               |
| Organic and inorganic chemicals                            | 7%               |
| Paper and printing, rubber and plastic                     | 6%               |
| Primary metals, minerals and metal ores, fabricated metals | 7%               |
| Stone, clay, graphite, glass products                      | 7%               |
| Transport services   | 4%               |
| Wholesale and retail                                       | 11%              |
| Other  | 29%              |

Source: PIC database, OECD calculations

16. As discussed later in this section, the studies that analyse cartels convicted by competition authorities are not based on random samples. These are cartels that broke down, for instance because of internal punishment or because one of the participants denounced the cartel, or were detected by competition authorities. Studying only cartels that were uncovered may distort the results and reveal only certain characteristics but not others. In order to examine the characteristics of collusion the sample should ideally include both undiscovered and discovered cartels.

17. Studies on registered cartels, including export cartels, are not affected by this sample selection issue. A study on Finnish registered cartels indicates that, among the market allocation of cartels in the sample, 77% are found in homogenous goods industries (Hyytinen, Steen and Toivanen, 2013). Symeonidis (2003) compares cartelised and non-cartelised manufacturing sectors in order to assess the most significant economic factors associated with collusion. He constructs a dataset of UK legal cartels, based on the agreements registered under the 1956 Restrictive Trade Practices Act.<sup>6</sup> His dataset contains about 150 four-digit industries, almost half of which were subject to collusive agreements in the mid- and late 1950s. Symeonidis (2003) defines a sector as having a high incidence of collusion based on the number of collusive sub-sectors in the total number of sub-sectors. According to this classification, high incidence of collusion is found in mining and quarrying, basic metals, other metal products, building materials, and electrical engineering.

<sup>5</sup> The database is a detailed list of cartel cases around the world produced by Professor John Connor. Section 2.3. below provides some information on the content and definitions in the database.

<sup>6</sup> As explained by Symeonidis (2003): “The 1956 Act required the registration of restrictive agreements between firms on goods, including both formal, written undertakings and informal, verbal or even implied arrangements.”

18. Studies of legal cartels should however be read with caution since they often use old data.<sup>7</sup> The economic structure of many countries has arguably changed compared to those days, and therefore the overall distribution of cartels may have been affected by this shift.

## 2.2. *Empirical studies on sectors where repeated collusion takes place*

19. Despite some consensus that “there are some industries that seem particularly prone to collusive activity, across space and time” (Levenstein and Suslow, 2015), there is little research on serial cartel offenders by economic sector.<sup>8</sup>

20. Levenstein and Suslow (2006) discuss some industries in which there are repeated episodes of collusion, such as aluminium, coffee and steel. In the example of a sugar cartel, they report that it formed in 1926 for the first time, and subsequently in 1931, 1937, 1959, 1968, 1974 and 1978 (Table 3 of the paper). This observation is made in the context of discussing the on-and-off nature of some cartels. As noted by the authors, “one of the most clearly established stylized facts is that cartels form, endure for a period, appear to break down, and then re-form again.”

21. Connor (2010) identifies 289 firms that have engaged in repeated collusion over the period 1990 – 2009.<sup>9</sup> He analyses “the number of times a company participated in unique, convicted hard-core cartels. If a company was sanctioned by multiple jurisdictions for the same crime, that counts as one cartel offense.” The author finds that serial offenders represent 18.4 percent of the total number of non-anonymous cartelists. The average number of cartels per offender is four, but most firms in the sample engaged in two cartels only.

22. The chart below shows the percentages of serial offenders, out of total cartelists, by sector.<sup>10</sup> The sectors where serial offenders are more frequent than other cartelists are organic chemicals, rubber and plastic, machinery, and wholesale and retail services. However, the paper does not explore the reasons for these differences.

23. In addition, the author analyses whether cartelists convicted before 2000 have offended again afterwards. He notes that these firms have participated in cartels again and, in many cases, the majority of cartels they have been involved in took place after 2000. However, there are also some exceptions. ADM is an example of a company that was heavily involved (and had a ring-leading role) in many cartels such as the lysine, the citric acid and the high fructose corn syrup cartel, but subsequently did not offend again.

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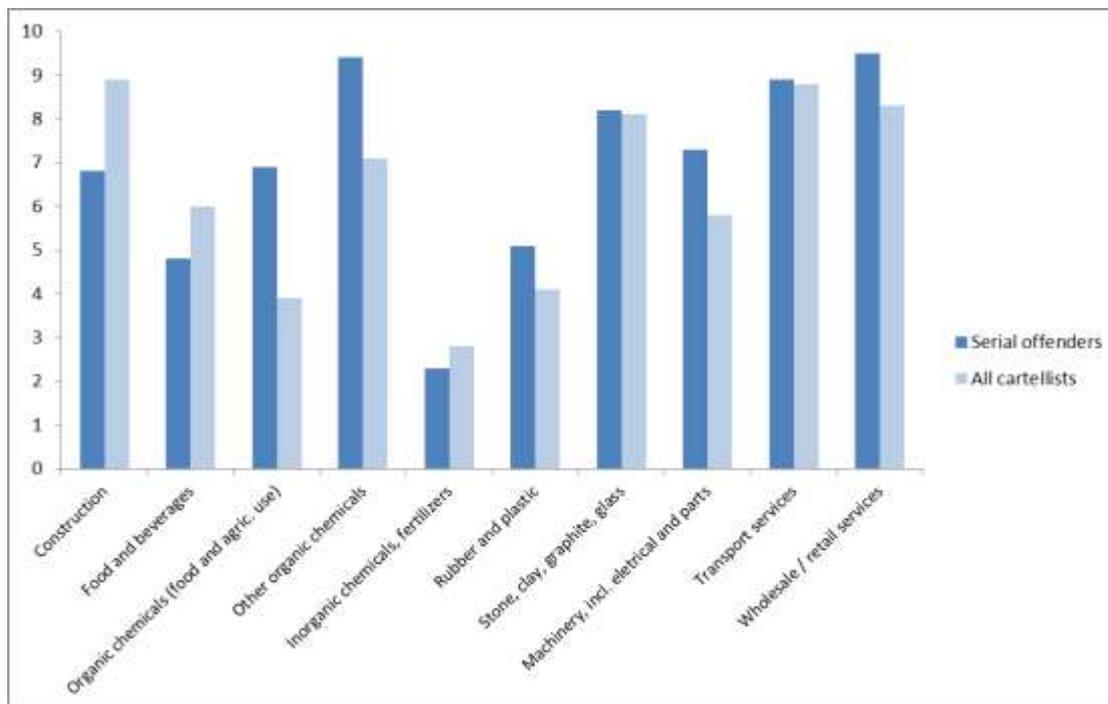
<sup>7</sup> For instance, the dataset used in Jacquemin et al. (1981) on Japanese export cartels covers the period 1967 to 1972. Dick (1996) analyses the period 1918 – 1965.

<sup>8</sup> There is, however, data on repeated cartel offenders. An earlier study on DoJ cases from 1962 to 1980 (Bosch and Eckard, 1991) finds that 14% of a sample of 127 indicted cartelists, across sectors, were serial offenders. Connor and Helmers (2007) find that in a sample of private international cartels sanctioned in 1990 – 1995 the proportion of serial offenders was 11.3%.

<sup>9</sup> Connor (2010) refers to these firms as recidivists. The term is used in a broad sense, to indicate “if it is convicted a second time for cartel conduct, no matter where or when the earlier violation took place.”

<sup>10</sup> Only the highest percentages shown in Connor (2010), Table 2, are reproduced here. Inorganic chemicals are also included, because other studies do not break down chemicals into sub-sectors.

**Figure 2. Percentage of serial offenders (%) out of total cartels, by sector**



Source: Reproduced from Connor (2010), Table 2

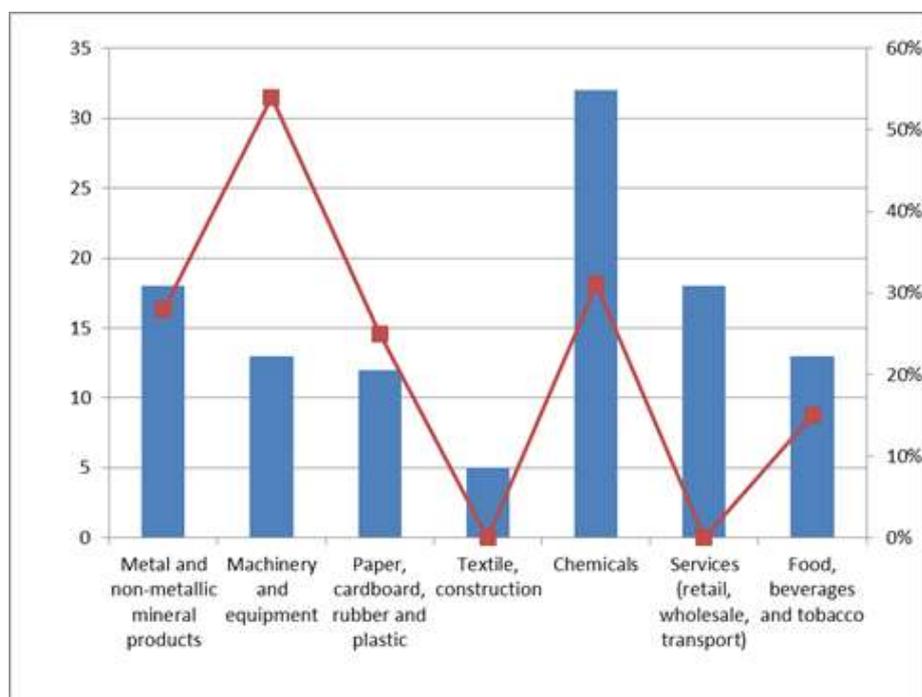
24. One of the claims in Connor (2010) is that “recidivism appears to be increasing rapidly, both in number and relative to all corporate cartellists.” Werden et al. (2011) have responded with an analysis of Department of Justice (DoJ) cases suggesting that “no company with multiple convictions after July 23, 1999 relapsed into cartel activity.”<sup>11</sup> This difference largely depends on the different definitions adopted in the two papers. On the one hand, Connor (2010) defines a recidivist as a company that has been involved in cartels more than once, including contemporaneous infringements, and attributes cartel offences by merging parties to the new entity; on the other, Werden et al. (2011) focus on companies that were previously convicted in the United States and subsequently joined a cartel prosecuted in the United States.

25. In their paper on the European Commission’s cartel decisions from 1969 to 2009, Combe and Monnier (2012) analyse the extent of repeated collusion and how it varies by sector. They define the rate of recidivism as the proportion of cartels including at least one firm sanctioned by the European Commission for cartel offences in the past. The authors find that 24 percent of cartels, out of a total of 111, involve at least one recidivist and that 35 firms are serial offenders. In addition, out of the cartels involving at least one recidivist, 66 percent include one serial offender, 18 percent two serial offenders and 14 percent three serial offenders.

<sup>11</sup> In more detail, the authors note that “Bayer affiliates were convicted three times in 2004 and 2005, but their participation in the three cartels had terminated by the end of 2002. Ajinomoto was convicted in 2000 and 2002 for its simultaneous participation in two separate international cartels, but its role in both had ended by the time it was charged in conjunction with either cartel. Degussa affiliates were convicted in 2002 and again in 2004, but their participation in both cartels had ended in 1998. Akzo Nobel is the only remaining company convicted of multiple cartel offenses in the United States since July 23, 1999. Akzo Nobel affiliates were convicted in 2001 and 2006, and the latter conviction was for cartel participation that ended after the prior conviction; however, Akzo Nobel joined the later cartel years before the earlier conviction. Thus, none of these companies relapsed into cartel activity after being convicted.”

26. The rate of recidivism is particularly high in the machinery and equipment sector and in the chemicals sector. In particular, Combe and Monnier (2012) report that all the cartels involving three recidivists were in the chemical sector.

**Figure 3. Number of cartels by sector (left-hand axis) and rate of recidivism in the sector (right-hand axis), EC decisions between 1969 and 2009**



Source: Chart based on data from Combe and Monnier (2012)

### 2.3. Evidence on serial offenders from the PIC database<sup>12</sup>

27. This section presents some data on the extent of repeated collusion in the chemicals, food, construction, and cement and concrete sectors. The purpose is to identify whether there are any serial offenders in these sectors and, if there are, to identify the relevant cartels. We use this information to analyse the circumstances of these cases and the economic factors characterising these industries (see Section 4, on the economic characteristics of the four sectors). The OECD Secretariat has conducted this analysis specifically for the Background Paper, relying on the Private International Cartel (PIC) database, in order to provide some facts to support the discussion in the Global Forum on Competition.

28. In this section, we provide summary statistics on the extent of serial collusion. However, we choose not to indicate the names of the companies that appear in the PIC database. Competition authorities sometimes do not name cartel members and therefore the available data is a subset of a broader sample. In addition, the identities of the companies that are involved more often in uncovered cartels, and that are recorded in the PIC database, may add little to the overall conclusions.

<sup>12</sup> The Private International Cartels (PIC) database is a detailed list of cartel cases around the world produced by Professor John Connor.

### 2.3.1. Data description and limitations

29. The information is drawn from the Private International Cartel (PIC) database, covering an extensive sample of cartels uncovered and investigated in the period 1990 – 2014. The database includes cartels that have “one or more corporate or individual participants with headquarters, residency, or nationality outside the jurisdiction of the investigating antitrust authority” (Connor and Helmers, 2007). In practice, the term “international” refers to the fact that the cartel members (or their parent companies) are registered in more than one country. The dataset distinguishes the following types of cartels: (i) national cartels, which operate within one jurisdiction only; (ii) EU-wide cartels, operating in at least two EU Member States; and (iii) global cartels, involving at least two continents.<sup>13</sup>

30. The data presented in this section is not meant to provide a comprehensive statistical description of the extent of repeated collusion in the four sectors. Some of the data limitations that make the task challenging are as follows: (i) competition authorities do not always name cartel participants or leniency applicants, and this limits the availability of information on cartel participants; (ii) the database includes both sanctioned and investigated cartels, when the investigation is still pending; (iii) the database records cartel offences of an acquired company as offences of the acquirer, as a result the number of firms that are found to be serial offenders may be overstated.<sup>14</sup> The coverage of the database limits the cases and the firms that we have been able to identify.

31. There are also differences in how cases are reported across jurisdictions and this affects how they are recorded in the database. For instance, one authority may sanction a cartel in its entirety, while another may bring cases against individual companies. In the latter cases, the number of cartels would be overestimated.

32. With these caveats in mind, our analysis of the PIC database points to some basic facts in the four sectors:

- The vast majority of (known) firms involved in cartels have been members of one cartel only. The percentage is above 80% in all four sectors;
- There is limited evidence of repeated collusion by the same company in the same jurisdiction, with the exception of the chemical industry, partly driven by the vitamins cartels;<sup>15</sup>
- The average number of cartels per firm<sup>16</sup> is higher in the chemical industry and in construction and lower in food.

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<sup>13</sup> Levenstein and Suslow (2011) note that “national cartels face many of the same challenges and make use of similar organizational devices [as international cartels]. There are differences, however, in the strategies employed. For example, rules for geographic market allocation are used more frequently by international cartels, rather than the simple production quotas favored by domestic cartels.”

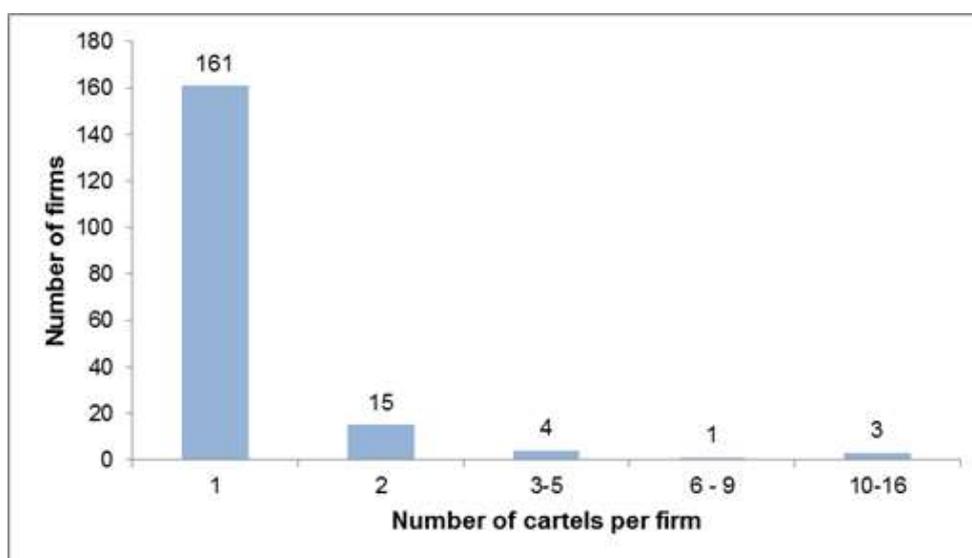
<sup>14</sup> As explained by Werden et al. (2011), “For companies that merged during that time period, he attributed to the successor the sum of the cartel offenses attributed to the predecessors. A company that was the product of several mergers could have ended up with a double-digit cartel count even if the merged company itself had never engaged in cartel activity and even if none of its predecessor companies ever relapsed into cartel activity. (*footnotes omitted*)”

<sup>15</sup> The vitamins cartel – which consisted of different firms colluding on various vitamins, approximately over the same period – is reported as separate cartels in the database.

### 2.3.2. Cement and concrete

33. All the cartels recorded in the PIC database have national scope, meaning that its activities concerned only one country even though participants were based in different countries, except for a cartel sanctioned by the European Commission in the 1990s.<sup>1718</sup> Out of the total 375 convicted or investigated cartelists, 64 percent are known while the others are anonymous. Most (known) firms in the sample have been involved in cartels only once (see chart below). However, we find that the three companies that have participated most often in cartels have been sanctioned or investigated at least ten times each. In some cartels, more than one subsidiary of a given group was a member of the cartel.<sup>19</sup>

**Figure 4. Number of cartels per firm (cement and concrete)**



Source: PIC database, OECD calculations

<sup>16</sup> The number of cartels per firm is calculated based on information in the PIC database. First, we count how many times a parent company has been sanctioned (or investigated); second, we create a variable such that, for each unique parent company, we assign the number of times it has been sanctioned.

<sup>17</sup> 94/815/EC: Commission Decision of 30 November 1994 relating to a proceeding under Article 85 of the EC Treaty (Cases IV/33.126 and 33.322 - Cement), OJ L 343, 30.12.1994, p. 1–158.

<sup>18</sup> The Connor database (2015 02 26 update) includes an investigation into cement companies launched by the European Commission in 2010, following inspections in 2008. This investigation has been recently closed, therefore we have removed the case from the count of cartel cases. See [http://ec.europa.eu/competition/elojade/isef/case\\_details.cfm?proc\\_code=1\\_39520](http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_39520).

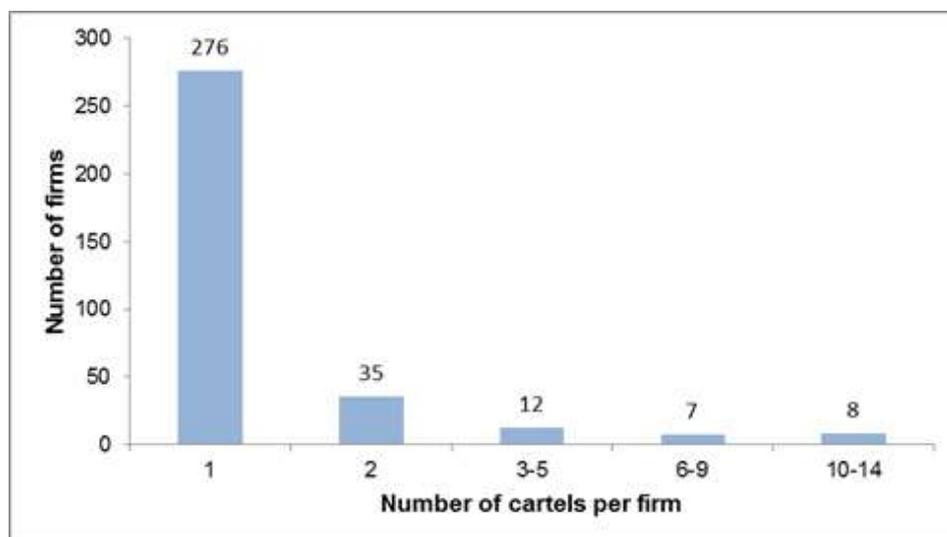
<sup>19</sup> For instance, according to the PIC database, three separate subsidiaries of a construction group and two subsidiaries of another group participated in the EU-wide cartel sanctioned in 1994 by the European Commission.

34. The three firms that have participated most frequently in cartels were involved in 16, 14 and 10 cases each.<sup>20</sup> These three producers are also among the top ten manufacturers globally. According to the PIC database, these companies have not committed repeated offences in the same jurisdiction.

### 2.3.3. Chemicals

35. The PIC database records a total of 97 cartels in the chemical sector, out of which 37 are global cartels, such as the lysine and the vitamins cartels.<sup>21</sup> More than 80 percent of (unique) firms in the database have been members of one cartel only, with some notable exceptions. According to the PIC database, a global health-care firm was involved in 14 cartels in the 1990s, a multinational firm producing paints, coatings and chemicals was involved in 13 cases, most of which global cartels, and a conglomerate active in chemicals, plastics and oil and gas was found to have participated in 16 cartels, almost all of them vitamins cartels.

**Figure 5. Number of cartels per firm (chemical sector)**



Source: PIC database, OECD calculations

36. Figure 6 below shows the breakdown of cartels per firm for non-global cartels. These concern to a large extent toiletries, cosmetics and detergents and tend to be mostly national, except for a case at EU-wide level.<sup>22</sup> We find that most known cartelists in the PIC database have participated in one cartel only (see chart below), but the three companies that have participated most often in non-global cartels have been sanctioned or investigated at least ten times each. These companies are global producers of consumer

<sup>20</sup> These figures are based on the PIC database, covering both closed and ongoing investigations. Very recent cases, such as an ongoing probe launched by the Spanish competition authority (see <http://globalcompetitionreview.com/news/article/38781/spain-launches-second-round-concrete-dawn-raids/>) are not included.

<sup>21</sup> Each global cartel is recorded once in the database and the lead jurisdiction investigating it is also indicated.

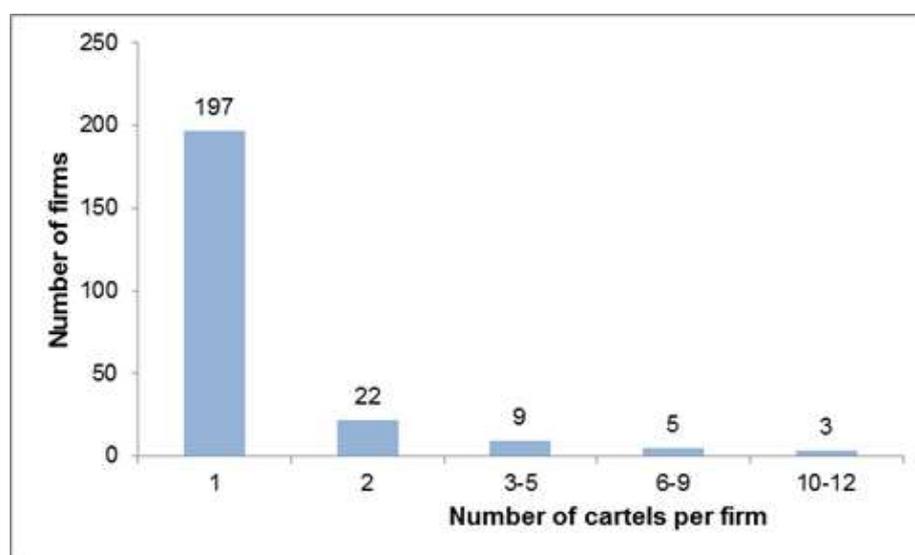
<sup>22</sup> Commission Decision of 13.4.2011 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (COMP/39579 – Consumer Detergents), C(2011) 2528 final.

goods: one is among the top 20 companies worldwide by market capitalisation and another is ranked between 41 and 60, according to PwC (2015). Repeated offences are largely across jurisdictions, but two of the companies were fined more than once in the same jurisdiction.

37. The database enables splitting the sample of cases in the chemical sector into inorganic chemicals and fertilizers, and organic chemicals. Repeated collusion is much less frequent in inorganic chemicals and fertilizers, where 96 percent of (known) cartel members have participated in one cartel only. For products belonging to the organic chemicals category, the corresponding percentage is 76 percent. We find that about 14 percent of cartelists have participated in two cartels, 5 percent in three to five and the remaining 5 percent in six to 14 cartels each.

38. In addition, we have identified the subset of cases concerning consumer products, such as toiletries and detergents. The PIC database indicates that 32 percent of cartel members have been involved in two or more cartels, which is higher than the average for the overall chemicals industry. 14 percent of firms have participated in two cartels, 8 percent in three to five cartels and 11 percent in six to 11 cartels.

**Figure 6. Number of cartels per firm (chemical sector, excluding global cartels)**



Source: PIC database, OECD calculations

#### 2.3.4. Food

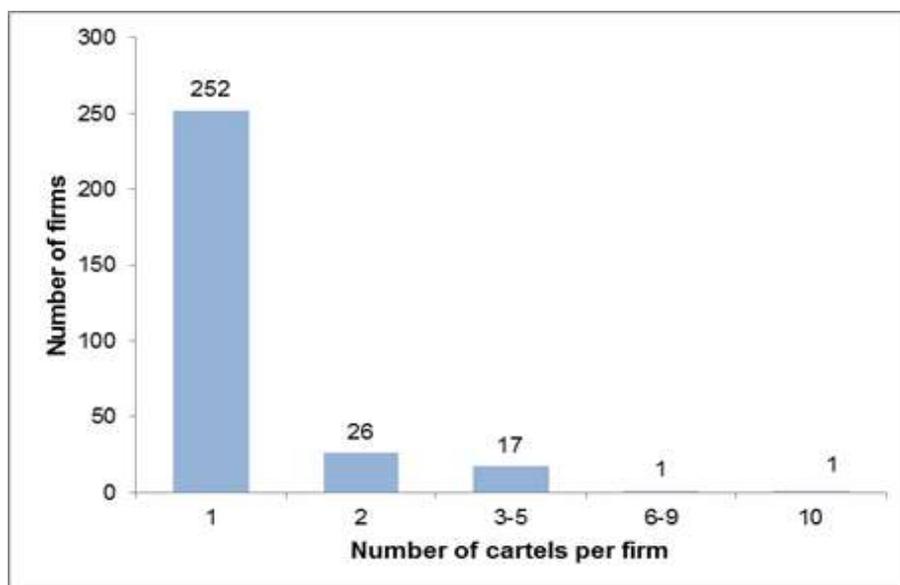
39. The majority of the 60 cases in the PIC database are national cases.<sup>23</sup> At EU level, the PIC database also includes a sugar cartel fined in 1998<sup>24</sup> and a 2014 Commission decision on a cartel of canned mushroom producers.<sup>25</sup>

<sup>23</sup> As explained in Section 2.3.1., national cartels in the PIC database operate in only one jurisdiction, but cartel members are registered in different countries. Two global cartels are recorded in the database, a chocolate bar cartel and a Korean instant noodles cartel which led to private damages claims in the US (In Re Korean Ramen Antitrust Litigation, case number 3:13-cv-04115).

<sup>24</sup> Commission Decision of 14 October 1998 relating to a proceeding pursuant to Article 85 of the EC Treaty Case IV/F- 3/33.708 - British Sugar plc, Case IV/F-3/33.709 - Tate & Lyle plc, Case IV/F-3/33.710 -

40. We find that about 85 percent of the known (unique) firms in the database were members of one cartel only, but there are also 44 firms that have been involved in at least two cartels. Compared with the other sectors covered in this paper, the number of cartels per firm is lower.

**Figure 7. Number of cartels per firm (food sector)**



Source: PIC database, OECD calculations

41. According to the PIC database, some serial offenders have been involved in more than one cartel in the same jurisdiction. One of the largest consumer goods company globally was involved in ten cases overall, including two cases on infant milk in Italy. Another serial offender participated in five cartels in flour milling, including two in Hungary. A few other companies, such as a large retailer and food and beverage companies, were members of four cartels each, across different jurisdictions. A large food and beverage company, involved in four cartels in food products, was sanctioned in two separate cases on infant milk in Italy.

42. In addition to repeated collusion in flour and infant milk, we find that there are repeat offenders in chocolate manufacturing and one serial offender in sugar and glucose products.

### 2.3.5. Construction

43. The PIC database records 54 cases which are mainly national cartels, except for two cases investigated by the US abroad (and classified as global in the database) and cartels prosecuted by the

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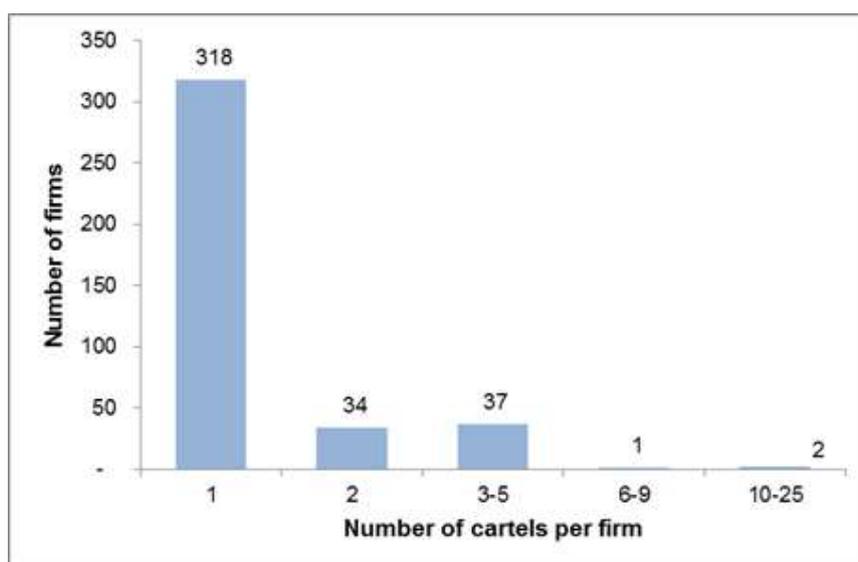
Napier Brown & Company Ltd, Case IV/F- 3/33.711 - James Budgett Sugars Ltd (notified under number C(1998) 3061) (Only the English text is authentic) (OJ L 076 22.03.1999 p. 1)

<sup>25</sup> Commission Decision of 25.6.2014 relating to proceedings under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (AT.39965 - Mushrooms), C(2014) 4227 final.

European Commission.<sup>26</sup> The database records cases where the number of firms participating in a cartel ranges from 2 (e.g. case on California bridges) to 656 in a Dutch cartel.

44. Our analysis indicates that, out of the four sectors, the construction industry has the largest number of cartels per firm, and there are also a few cases of repeated collusion in the same jurisdiction (e.g. Canada, France and Hungary). However, as in the other sectors, most (known) cartelists have participated in one cartel only. About 80 per cent of the 392 known firms included in the PIC database were sanctioned or investigated only once.

**Figure 8. Number of cartels per firm (construction sector)**



Source: PIC database, OECD calculations

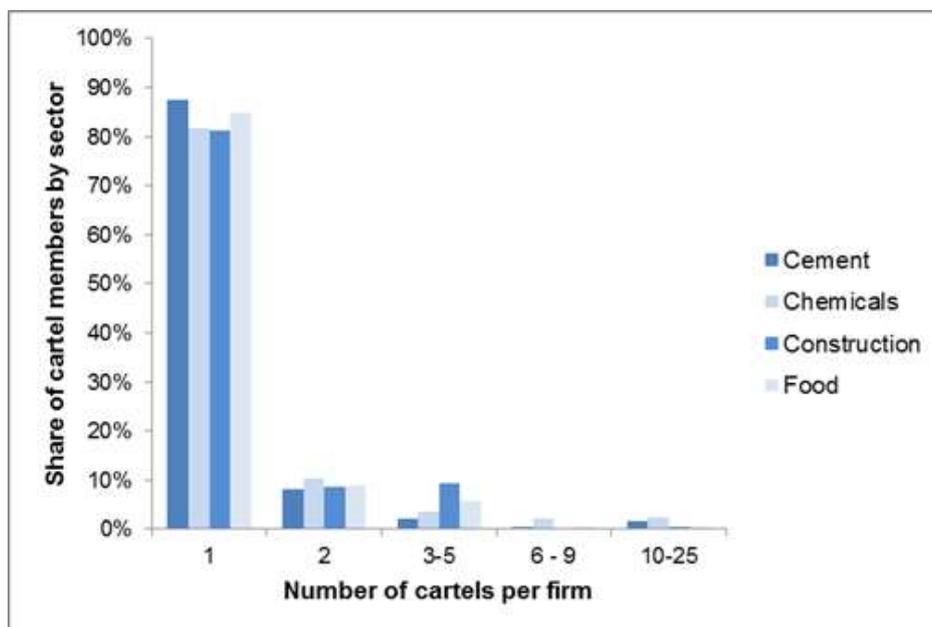
45. According to the PIC database, the serial offender involved in the highest number of cases (23), including repeated offences in Canada, Hungary and France, was a diversified conglomerate. A global construction group was a member of 19 cases in total and another international construction company was involved in seven cartels. In addition, there were cases in which a company was involved in a cartel through more than one subsidiary.

### 2.3.6. Comparison between sectors and discussion on findings

46. Available information on the extent of repeated collusion in the four sectors indicates that about 80 percent of cartel members were sanctioned only once for collusion. However, we also find examples of serial offenders, less so in food than in the other sectors. Serial offenders tend to be detected across jurisdictions, while repeated collusion by the same firms in the same jurisdiction is relatively rare according to the PIC database. Given that in many instances firms' names are not reported by authorities and are therefore not included in the PIC database, these are indicative conclusions based on the available sample.

<sup>26</sup> Decision against 28 construction associations in the Netherlands and their joint federation ([http://europa.eu/rapid/press-release\\_IP-92-84\\_en.htm?locale=en](http://europa.eu/rapid/press-release_IP-92-84_en.htm?locale=en)); a fine on a Dutch crane hire cartel ([http://europa.eu/rapid/press-release\\_IP-95-1306\\_en.htm](http://europa.eu/rapid/press-release_IP-95-1306_en.htm))

Figure 9. Number of cartels per firm in the four sectors



Source: PIC database, OECD calculations

47. The firms that are most often involved in repeated instances of collusion across countries are multinational companies or members of their group.<sup>27</sup> We have also found some examples of repeated offences by a multinational company in the same country (mostly in construction and some limited evidence in food and chemicals).

48. However, this may be driven by the scale of these companies and by the number of countries in which they operate. For instance, one of the companies involved in most cartels in the food sector is among the top 20 companies worldwide by market capitalisation and one of the companies that is most frequently a member of cartels in the chemical sector is ranked between 41 and 60 (PwC, 2015). The three cement producers that in the PIC database have the highest number of entries are also among the top ten manufacturers worldwide. Moreover, the PIC database includes cases that involve cartelists from different countries, so multinationals are over-represented by construction. For these reasons, the data do not seem to confirm the view in Connor (2010), who argues that economic logic supports the idea that diversified multinationals are more prone to recidivism. He advances the following potential explanations: (i) large and diversified companies operate in many product and geographic markets. Information on the consequences of an infringement does not flow very well across the entire business, therefore other divisions are not fully aware of the risks of collusion; (ii) if cartels are run by rogue managers, the probability of a rogue manager in a division is independent of the probability of a rogue manager in another division. As a result, “at a diversified parent group with ten divisions is ten times more likely to be caught than each of ten specialized firms.” (iii) if collusion is seen to deliver higher margins in a division, a diversified firm may choose to follow the same strategy in other units. However, in the same paper, Connor (2010) quotes an early study of corporate crime which concluded that “large corporations in general commit no more violations per unit size than do smaller corporations.”

<sup>27</sup> Available information often does not allow identifying serial offenders at the level of the subsidiary that was fined, but only at parent company level.

49. The cases of repeated collusion that are analysed in this section are only those that have been uncovered. This is a characteristic of most studies on cartels, unless they study legal cartels.<sup>28</sup> Connor (2010) notes that “cartel studies generally conclude that only about 10 percent to 30 percent of all such conspiracies are discovered and punished.” This leads to a sample selection bias and raises the question of whether the characteristics of the instances of repeated collusion we observe are shared also by those cartels we do not observe.

50. Grout and Sonderegger (2005) comment on a related question: whether the industries where they find most cartels are just the industries where most cartels are *detected*. They observe that in their dataset the correlation between industries in EU cartels and in and US cartels is high and they interpret this as follows:

“[...] if the authorities are acting relatively independently and only a small number of cartels are being plucked from those that exist, we should expect to find little overlap across industries. On the other hand, if the drivers of cartel formation are common between countries and if authorities are relatively successful in discovering cartels then one would expect to find a high correlation between the jurisdictions. Thus the high correlation may be an indication that authorities are being somewhat successful in their actions. Furthermore, the high correlation suggests that there are common factors at an industry level that leads to cartel formation. (Grout and Sonderegger, 2005; paragraph 4.11)”

51. However, they also note that authorities may not be acting totally independently and therefore the high correlation should be interpreted with caution. For instance, the discovery of one cartel in a jurisdiction may help uncover information about similar cartels in other countries. Alternatively, when a cartel is discovered in a product market, other authorities may target that market in search for collusive behaviour.

52. Leniency programmes may be one of the reasons cartels are uncovered in certain sectors. As noted in OECD (2013), “investigations initiated through amnesty/leniency seem to be concentrated in a relatively small number of industries. In the United States for example, in the late 1990s, investigations were concentrated in the food and feed industry, the vitamins industry, and the chemical industry. Today, the concentration appears to be even more focused than it was in the 1990s. The “big three” industries over the past five years are the electronics/computer parts industry, the air cargo/passenger industry, and the automotive parts industry. (*footnotes omitted*)”

53. It has been argued that the Leniency Plus Program explains the concentration of investigations in specific industries since the programme enables the authorities to fully investigate industries product-by-product (Klawiter, 2011).<sup>29</sup> In addition, the distribution of cartels across industries is affected by the strategic use of leniency applications by firms. Cartels detected through leniency applications may be those

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<sup>28</sup> For instance, Marvão (2014) observes: “Since cartels are prohibited by the EU Treaty, they are secret so the available data only include cartels that were prosecuted and convicted. Past cartels may have remained secret because their members did not have a strong enough incentive to report them. This problem of selection on the unobservables cannot be overcome, but its existence is acknowledged in the interpretation of the results.”

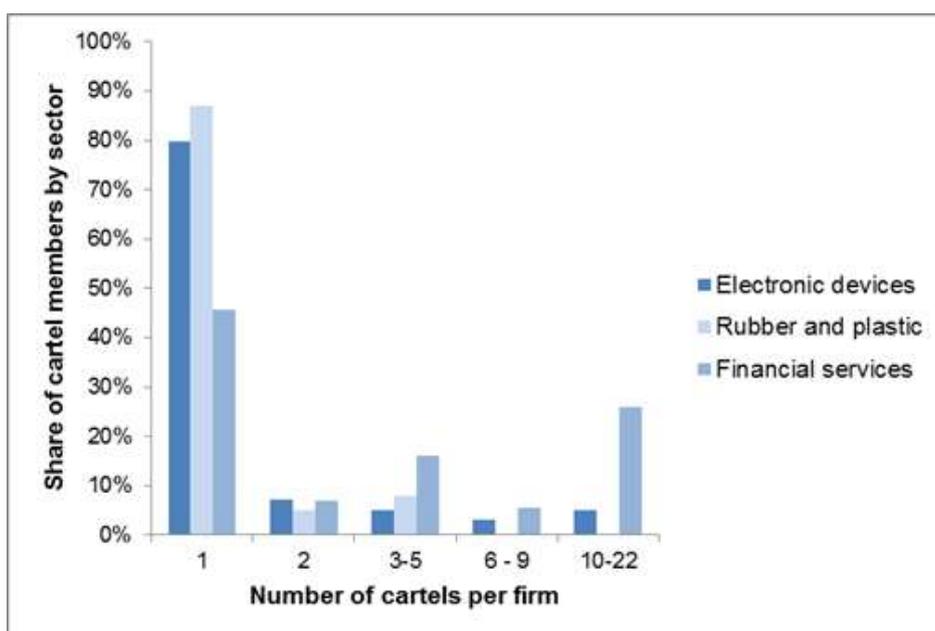
Davies and Ormosi (2014) propose a methodology to address sample selection bias in the context of estimating consumer harm from cartels.

<sup>29</sup> Leniency Plus arises where a company is the target of an antitrust investigation and discovers another cartel or several cartels in other product markets where the company does business. If the company is the first to report the other cartel or cartels, it will receive full leniency for that product or products and an additional discount on any fine it is negotiating on the first product.

that are less profitable and have become unstable (OECD, 2013).<sup>30</sup> These factors can also contribute to the observed pattern of repeated offences in the four sectors discussed in this paper.

54. Finally, while we have not conducted an exhaustive comparison of the extent of serial collusion in all the sectors covered by the PIC database, there are a few other sectors where there are frequently repeat offenders. The figure below shows that the number of cartels per firm is rather high in the manufacturing of electronic devices and in financial services. However, there are also other sectors, such as rubber and plastic, where serial collusion is less frequent.

**Figure 10. Number of cartels per firm in selected sectors**



Source: PIC database, OECD calculations

### 3. Economic factors identified in the literature

55. Economic theory has identified some characteristics of markets and of products that are considered as factors conducive to collusion. These factors have been extensively covered in the OECD (2013) on the “Ex officio cartels investigation and the use of screens to detect cartels”, which has further grouped the factors into “structural”, “supply-side” and “demand-side” factors.

56. Economic factors may have an impact on the incentives to collude, the ability to reach an agreement and the ability to sustain it. Before describing, in Section 4, the characteristics of the four

<sup>30</sup> Levenstein and Suslow (2011) report an example of the strategic use of leniency in the chemical sector. “Consider, for example, the contrast in Rhone-Poulenc’s behavior in the methionine and methylglucamine cartels. Under indictment for its participation in the vitamins cartel, it gave evidence in the methionine case in return for a reduced sentence in the vitamins case (and amnesty in the methionine case). Its confession did not mention the methylglucamine cartel, for which it was later fined. Why would Rhone-Poulenc turn in one cartel and not the other? One was profitable and the other was not. Monsanto was a large and growing producer of methionine that refused to participate in the cartel. As a result the cartel had ceased to have much effect on price. The methylglucamine cartel, in contrast, was much more successful, with the two cartel members controlling 100 percent of the global market.” (Levenstein and Suslow, 2011)

sectors we focus on in this paper, it is useful to briefly introduce these factors. Section 3 summarises the factors and provides an overview of the empirical evidence on their relevance. In addition, another strand of the literature looks at the characteristics of firms that are potentially related to collusive behaviour. This is briefly reviewed in the last part of the section.

### 3.1. *Overview of sector-specific factors identified in the economic literature*

57. When choosing whether to collude or to compete, a firm compares the immediate gain obtained deviating from the collusive agreement with the long-term loss of profits when the other firms retaliate (Tirole, 1988). A firm will collude when the gain is lower than the loss. Specifically, collusion is more likely the lower the profit from deviating, the lower the profit when the other firms punish the firm for deviating and the more patient a firm is (i.e. its discount factor is larger).

58. These factors are taken into account by competition authorities in their enforcement activities, for instance when addressing explicit collusion and in merger control, in order to assess if a specific market or industry is prone to collusion or not. In addition, these factors could help explain repeated cases of collusion in the same industry and of serial offenders. However, the factors facilitating tacit collusion are not necessarily those that one would expect to characterise sectors where explicit collusion takes place.<sup>31</sup> Arguably, interfirm communication will be needed mostly in situations that are not very conducive to collusion.<sup>32</sup>

59. This section provides a brief overview, mostly based on OECD (2013), Motta (2004), Bishop and Walker (2010) and Grout and Sonderegger (2005). For ease of exposition, the factors are grouped into structural, supply-side and demand-side factors, following OECD (2013).<sup>33</sup>

#### 3.1.1. *Structural factors*

60. The number of firms has an impact both on reaching an agreement and on enforcing it. Collusion is more likely when there are fewer competitors in a market.<sup>34</sup> When there are many firms colluding, each of them will obtain a relatively small share of the total profits. If one deviates, however, it may manage to serve all the market. The gains in the deviation period would be larger than the loss of potential profits in the punishment phase. This comparison indicates that collusion would be more unstable the higher the number of firms.

61. However, there are also cases of cartels involving many firms. For instance, the UK Office of Fair Trading uncovered bid rigging practices in the construction sector and fined 103 firms in 2009 for

<sup>31</sup> In line with previous Secretariat papers such as OECD (2015) and OECD (2012), we refer to “explicit collusion” to indicate situations where firms reach a common understanding to restrict competition through inter-firm communication. We use the term “tacit collusion” to refer to collusion that is not expressly negotiated.

<sup>32</sup> For this point and the implications of detecting collusion based on explicit communication, see the note by Louis Kaplow for the OECD Competition Committee session on oligopoly, in June 2015, [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DAF/COMP/WD\(2015\)13&docLanguage=En](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DAF/COMP/WD(2015)13&docLanguage=En)

<sup>33</sup> Note that these factors are divided into different categories by different authors. For instance, Motta (2004) refers to structural factors as opposed to price transparency and exchange of information, while Bishop and Walker (2010) identify factors that affect the ability to increase prices and factors that affect the ability to reach an agreement.

<sup>34</sup> However, there are also circumstances in which this is not the case. In a market with homogeneous goods and capacity constraints, Kühn (2012) shows that capacity fragmentation can facilitate collusion.

numerous local markets within the country. The Dutch construction cartel led to fines to about 1,400 firms (Bishop and Walker, 2010). Moreover, in a concentrated market the presence of “maverick” firms can undermine the ability to sustain high prices.<sup>35</sup> This is especially the case if these non-cartel firms can easily expand capacity and production to compete with the cartel.

62. Barriers to entry into a market make it easier to sustain collusive prices.<sup>36</sup> High prices and profits in a market attract new entry, which makes the cartel more difficult to sustain. New entrants may behave aggressively, steal market shares from incumbent firms and ultimately make the cartel unsustainable. Even an accommodating new entrant, who joins the collusive arrangement, might destabilise it. In fact, more firms would be encouraged to enter, if they observed that incumbents followed an accommodating strategy. However, it has also been noted that potential entry does not necessarily destabilise cartels. When incumbents are expected to fight entry and this threat is credible, entrants may be discouraged from entering at all (Harrington, 1989b).

63. The observability of firms’ actions makes collusion more likely. As pointed out in the OECD (2013), cartels can be sustained more easily if cartelists can monitor the implementation of the collusive arrangement and retaliate promptly when one cartelist secretly undercuts the other cartel participants. As shown by Green and Porter (1984), if market demand and the prices charged by other firms are not observable, a firm may think that low demand levels are due to price cuts by other firms. As a result, firms will punish competitors and trigger a price war. However, the punishment will not last indefinitely and firms will revert to a collusive equilibrium.

64. Regular and frequent orders also help collusion. For instance, an order which was larger than usual would provide strong incentives to deviate because it would offer large profits. The profits would be large enough to counterbalance the risk of a punishment, since expected future orders would be smaller. When transactions are frequent, firms can timely punish any deviation and this is another factor that helps sustain collusion.

### 3.1.2. *Supply-side factors*

65. Symmetry among competitors, along various dimensions such as market shares, costs, capacities, is commonly seen as facilitating collusion. Intuitively, firms find it easier to reach an agreement when there are few differences between their cost structures or operating efficiencies. In this case, the optimal price may be similar for all firms.<sup>37</sup>

66. The role of large inventories and excess capacity is not clear, both in theoretical models and in empirical papers (Motta, 2004). On the one hand, a firm with large excess capacity can punish deviations harshly. On the other hand, excess capacity also increases the incentive to deviate so as to fill capacity. These effects apply when all firms have excess capacity. An unequal distribution would make it more difficult to sustain collusion, in line with the argument about symmetry set out above.

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<sup>35</sup> A maverick firm is a company that pursues an aggressive strategy or that is very different from its competitors. For instance, the European Commission decision in Pilkington-Techint/SIV merger [1994] OJ L158/24 discusses how a maverick can disturb tacit co-ordination.

<sup>36</sup> A similar reasoning applies to barriers to expansion. For instance, as explained by Levenstein and Suslow (2003), the expansion of Chinese vitamin C manufacturing capacity was among the factors that led to the fall of the vitamin C cartel.

<sup>37</sup> Compte, Jenny and Rey (2002) consider the case in which firms have different capacities and show that a more equal distribution of capacities would help collusion. Harrington (1989a) finds that when firms have different discount factors they can still reach a collusive agreement by redistributing market shares.

67. Multi-market contacts have long been thought to facilitate collusion.<sup>38</sup> The intuitive explanation is that a deviation would be punished in all the markets and therefore firms would be discouraged from cheating.<sup>39</sup> However, the incentives for collusion do not necessarily change because of multi-market contacts, at least when firms and markets are perfectly symmetric (Bernheim and Whinston, 1990). There may be situations in which firms are asymmetric, for instance in terms of market shares, when each market is taken in isolation. If markets are considered together, meaning that the costs and benefits of colluding are viewed jointly across all markets, asymmetries may be smoothed and collusion may be helped through this channel.

68. Product homogeneity is also often thought to make collusion easier, since firms need to coordinate on fewer dimensions, such as price and capacity, compared with a situation where they compete on differentiated products. As noted by Bishop and Walker (2010), major cartel decisions by the European Commission have concerned products that are to a large extent homogeneous, such as cement, PVC, vitamins, zinc phosphate, and hydrogen peroxide and perborate. However, theory is ambiguous on this point (Motta, 2004). On the one hand, when products are differentiated a deviation is less profitable, compared with homogeneous products, because the firm cannot expect to steal a large market share from its competitors. This effect makes collusion more likely in differentiated products. On the other, when a firm deviates the punishment is not very strong, since the firm will still have positive demand because its product is differentiated. This effect makes collusion more difficult to sustain.

69. A market where innovation is frequent is less prone to collusion, as “the incentives of firms to sell their new products will outweigh the incentives to collude and to share the market with competitors” (OECD, 2013). If innovation is so fast-paced that incumbents anticipate that they may not be very competitive in the future, this makes them more impatient. As a result, they compete more aggressively.

70. Finally, as indicated in the OECD (2013), collusion can also be facilitated due to structural links (such as cross-shareholdings, even non-controlling, passive minority shareholdings) or the existence of co-operative agreements and contractual relationships between competitors. Such relationships can, for example, have a direct impact on the firms’ pricing strategies and on their overall incentives to compete. They can also enlarge the scope for retaliation, thereby enhancing the ability to punish deviating partners.

### 3.1.3. *Demand-side factors*

71. Predictability of demand may help sustain collusion, since it improves transparency. When demand is very uncertain or subject to frequent shocks, firms find it difficult to disentangle the effect of demand variability and of lower prices by rivals on low sales. Conversely, in a stable and mature market it is easier to identify deviations from the collusive agreement.

72. The ability to increase prices depends on the elasticity of demand. If demand is more inelastic, the cartel members can set higher prices and achieve greater profits from collusion (Bishop and Walker, 2010). Conversely, if demand is very elastic it will be more difficult to sustain higher prices. However, as indicated in the OECD (2013) “it is unclear in the literature if the elasticity of demand has an impact on the sustainability of collusive prices”. For instance, Motta (2004) explains that demand elasticity affects firms’ payoffs both when they cheat and when they face retaliation. Since both the costs and the benefits of deviation are affected, the net effect on the sustainability of collusion is not clear. Nevertheless, collusion

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<sup>38</sup> There is also empirical evidence of this effect in the airline market (Evans and Kessides, 1994) and in US mobile telephony (Parker and Röller, 1997).

<sup>39</sup> Another channel through which multi-market contact may facilitate collusion is because it increases the frequency of interaction among the same firms.

is more profitable when demand elasticity is low, which in turn can influence the firms' willingness to establish a cartel and facilitates its stability over time (OECD, 2013).

73. The concentration of buyers, and therefore buyer power, can also affect the ability to sustain collusive prices. For instance, a large buyer can create more competition among potential suppliers or can even threaten to produce the good itself. In addition, a large buyer can make large and less frequent orders and therefore reduce the risk of collusion (Snyder, 1996).

#### *3.1.4. Can these factors help predict collusion?*

74. The joint relevance of the factors summarised above in predicting the likelihood of collusion has been tested in studies such as Grout and Sonderegger (2005), Kudo and Odagiri (2014) and Antonielli and Mariniello (2014).

75. Before turning to the available empirical evidence, it is worth noting the value of these economic factors for competition authorities. While economic analysis can help establish if it is plausible for a sector to be prone to collusion, the factors are only suggestive of market conditions that facilitate collusion. Even if one or more factors are present in an industry, this does not necessarily mean that the industry is cartelised. Moreover, there may be industries in which some factors are present while others are not. There is no clear indication on how to weigh the different factors, when they point to different directions. As stated in OECD (2013), "the relationship between economic factors and the probability of collusion is often not linear, and various economic factors may have different effects on competition depending on the market features."

76. On the one hand, the presence of these factors is not a sufficient condition for concluding that the industry is cartelised; on the other hand, there is also a question of how to interpret their absence. Bishop and Walker (2010) have argued that "even absent competition laws preventing such behaviour, the characteristics of many industries imply that firms will not be able to engage in sustained explicit coordination."

77. Another comment about the relevance of the factors concerns the distinction between tacit and explicit collusion. If firms are able to tacitly collude, they will prefer this type of co-ordination to the risk of establishing a cartel and being detected by the authorities. Therefore, when conditions are very conducive to co-ordination in a sector, one would not expect to observe cartels because firms will not need to collude explicitly (Bishop and Walker, 2010).

78. In addition, cartel organisation issues are clearly important to understand cartel formation and stability, and can interact with sector-specific factors. Despite conditions that are not very conducive to collusion, cartel arrangements could be found to overcome them and make cartels more successful.

### **3.2 What is the empirical evidence?**

79. The empirical literature on the factors facilitating collusion does not always confirm the theoretical insights and there are also some inconsistencies in the results obtained by different authors.<sup>40</sup>

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<sup>40</sup> As reported by Symeonidis (2003) on earlier papers: "Hay and Kelley [1974] suggest that product differentiation hinders collusion, this is not confirmed by Dick [1996a]. Collusion is more likely in concentrated industries according to Hay and Kelley [1974] or Fraas and Greer [1977], but not according to Dick [1996a] or Asch and Seneca [1976]. And while Dick [1996a] finds a positive link between capital intensity and the incidence of collusion, Hay and Kelley [1974] find no link between the ratio of fixed to total costs and collusive conduct."

For instance, demand fluctuations are found to be negatively related with collusion while there are mixed results on barriers to entry, depending on how they are measured.

80. As a general comment on the challenges of empirical analysis, Grout and Sonderegger (2005) note that “the need for cartel members to communicate intensifies precisely when collusion is harder to sustain. This observation suggests that parties might be more likely to engage in overtly collusive practices specifically in those circumstances that are predicted by the theory as being adverse to collusion. This suggests that there is unlikely to be a straightforward relationship between the theory and the empirical studies.”

81. Kudo and Odagiri (2014) empirically investigate the characteristics of the sectors where cartels were formed (and detected) in Japan. They use data on cartel cases detected and prosecuted by the Japan Fair Trade Commission (JFTC) over the period 1990 – 2004, before a leniency programme reducing fines was introduced in Japan. The authors organise their dataset by industry and they include 131 manufacturing sectors.<sup>41</sup>

82. They find that demand growth and its fluctuations are negatively correlated with the probability of cartels. The negative sign of the coefficient on fluctuations is consistent with economic theory, while the result on demand growth is not in line with expectations. Kudo and Odagiri (2014) interpret this result by arguing that “in a state of declining demand, companies seek to secure a certain level of profits through, for example, the formation of cartels instead of competing for their survival.” Barriers to entry<sup>42</sup> are also significant and positively associated with the probability of cartels. Market concentration is not found to be significant. The authors’ explanation is two-fold. They argue that possibly firms may not need to form cartels if the industry is already concentrated or that cartels are formed but they are easier to sustain and more difficult for the JFTC to detect.

83. Kudo and Odagiri (2014) also explore the relationship between the same variables and the *number* of cartels uncovered by the JFTC in a given industry. The results broadly confirm the conclusions reached about the likelihood of cartels. However, the growth rate of demand is no longer significant. Market concentration, as measured by CR3, has a negative significant coefficient in this model, while it is not significant in the model on the likelihood of cartels.

84. Antonielli and Mariniello (2014) study European Commission decisions in cartel and merger cases during the period 2000 – 2013. They match the sectors in which these decisions were taken with data on industry characteristics in the main EU countries. They find that “by and large, both merger control and anticartel action have been focusing on sectors displaying a higher level of market concentrations and economic rents or economy of scale.”

85. Grout and Sonderegger (2005) conduct a wide-ranging analysis of cartel decisions in Europe and the US. Their dataset includes EC cases from 1990 and US DoJ cases of horizontal price fixing from 1994.<sup>43</sup> As is also the case for the other papers studying cartels, Grout and Sonderegger (2005) note that “implicit in the approach is the assumption that the location across industries of known cartels is informative about the whereabouts of other cartels, or more precisely, informative about the whereabouts

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<sup>41</sup> The industries follow the Japan Standard Industry Classification (JSIC)), at the 3-digit level. The highest number of cartels was found in the chemical industry and in the ceramics, stone and clay products industry, with eight cartels each. In some sectors, no cartels were detected over the relevant period.

<sup>42</sup> The proxies used are inventory per establishment and machinery/equipment acquisition value per establishment.

<sup>43</sup> There is some overlap of cases but it is limited: less than 20 per cent of the cases are common.

of cartels that can be discovered and prosecuted.” The data on cartels are matched to industries at a SIC three-digit classification.

86. The authors find that demand factors are very significant and in line with expectations: while growth in turnover is positively related with cartel formation, variability has a negative effect on cartels. Market concentration and industry turnover, an indication of scale, are also significant. However, entry barriers<sup>44</sup> are not significant except when measured by economies of scale. Grout and Sonderegger (2005) argue that the mixed evidence on entry barriers may be due to data issues. The sample consists only of cartels that have been discovered. If barriers to entry are not high, firms may have to find alternative ways to keep potential entrants out of the market and may therefore engage in riskier activities that lead to cartel detection. Industries that are characterised by high fixed costs relative to marginal costs will enjoy short-run benefits from cheating that are likely to be high. Grout and Sonderegger (2005) find that economies of scale are positively associated with cartels.<sup>45</sup> The study also finds evidence that employee costs, which are not among the factors analysed by the theoretical literature on sector-specific factors, have a significant impact.

#### **Box 1. Experimental evidence on factors conducive to collusion**

The relevance of the factors identified by the literature has also been investigated in a number of experiments. Engel (2015) summarises the results of 140 publications and working papers in a meta-study. The experiments test the impact of a variety of factors, some of which are usually included in the competition authorities’ merger guidelines such as product homogeneity and market concentration. The author standardises the results of the different experiments, so that they can all be expressed in terms of how close the outcome of the experiment (e.g. price, quantity) is to collusion or to a competitive equilibrium. Engel (2015) computes the relative weights of the factors included in the experiments. These are based on the marginal effects from regressions where the market outcome is the dependent variable and the different factors are the explanatory variables.

The factors that are associated with a higher risk of collusion include whether the firms sell complements, price matching guarantees and posted offers (implying that buyers either accept the offer or do not buy the product at all). The factors that are associated with a lower risk of collusion include whether a computer algorithm is one of the players, which is interpreted as a “maverick” following an optimal strategy regardless of the behaviour of the other players; if firms are represented by groups, instead of participating individually, and if firms are capacity constrained.

The number of firms has also been investigated. As summarised in Huck and Armstrong (2010), “[i]n experimental markets, it appears that the number of oligopolists is crucial in terms of the ability to collude tacitly, i.e., where firms cannot communicate directly with each other.” However, Fonseca and Normann (2014) in a recent paper compare industries with two and four firms. They find that duopolies form fewer cartels than oligopolies with four firms. After a cartel is disrupted, prices do not return to the level which prevailed before the cartel was formed for the first time. This hysteresis effect is more significant in the oligopoly case than in the duopoly. Experiments on the impact of product homogeneity on collusion show that prices above competitive levels are observed in Bertrand oligopolies, even when there are more than two competitors. When information is revealed to each participant about the others’ actions and payoffs, experiments find that this improves competition, contrary to the results of the theoretical literature.

### **3.3. Firm-specific factors**

87. The likelihood of collusion may also be affected by firm-specific characteristics such as corporate structure, governance and culture.

<sup>44</sup> Measured by measured in gross capital expenditure per firm, the level of stocks per firm and the level of R&D per firm.

<sup>45</sup> Other proxies of entry barriers, such as R&D expenditure, are not found to be significant.

88. González and Schmid (2012) investigated a sample of 182 U.S. cartel members<sup>46</sup> included in the Connor database (2010), to empirically analyse the relation between corporate governance and the probability of engaging in collusive conduct. The results show that larger and more mature firms are more likely to participate in a cartel. The authors find that this is consistent with the result in Connor (2010) that most of the cartel members are international conglomerates which have a division operating in industrial goods (e.g. chemical intermediates, non-metallic minerals).

89. The analysis also shows a significant relationship between price-fixing behaviour and corporate governance measures. The authors examine *inter alia* measures such as the E-Index (a measure for takeover protection<sup>47</sup>), the size of the board of directors, CEO tenure, pay-for performance schemes and R&D investment. The results reveal a negative relationship between the E-Index and the likelihood to participate in a cartel. According to the authors “[a] possible explanation for this finding may be that better protected firms worry less about profitability and therefore are less likely to participate in a cartel”. Moreover, board size and CEO tenure are found to be positively related to the likelihood of collusion. A possible explanation offered by the authors is that larger boards are less effective and also give more opportunities for connections with other firms. As for the tenure of the CEO, this measure is a proxy of the power of a CEO in a company and also of how well he/she is connected within the firm and the industry. The analysis shows a positive relationship between tenure and the likelihood of collusion. According to the authors “[t]here is some evidence that firms are more likely to participate in a cartel if their CEO is more powerful and the board is presumably less effective in monitoring the CEO’s problems.” The study also identifies a relationship between investment decisions and collusion. Cartel members invest in less risky R&D, while better growth opportunities and more competition are associated with higher investments.

90. The literature has also identified a strong relation between cartel formation and managerial incentives. Spagnolo (2005) observes that that the most common managerial compensation practices facilitate collusive behaviour in oligopolies. In particular, managers have a strong preference for a smooth time paths of profits. Firms that dislike profit’s variance are more prone to sustain collusion since any defection from the collusive agreement, followed by potential punishment, will increase the variance of profits. Spagnolo (2005) also finds that conglomerates, since they compete simultaneously in different markets, have an additional incentive to collude. Moreover, when managers have capped incentive provisions (e.g. capped bonus plans or termination contracts with incumbency rates), “manager-led firms can sustain collusive agreements much more easily than profit-maximising ones.”<sup>48</sup>

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<sup>46</sup> According to the authors, the starting point was a sample consisted of all 819 U.S. cartel members included in the Connor (2010) dataset, after excluding cartels which started before 1987 and all firms which are not covered by Compustat and CRSP which substantially reduced the sample size to 182 firms.

<sup>47</sup> The authors explain that “to account for the firms’ anti-takeover protection, we use the Entrenchment Index (E-Index) proposed by Bebchuk, Cohen, and Ferrell (2009) which concentrates on the six most important provisions included in the well-known G-Index (Gompers, Ishii, and Metrick, 2003). A high E-Index (or G-Index) implies more takeover defenses and therefore lower shareholder rights as the managers are better protected from the market for corporate control”.

<sup>48</sup> Buccirosi and Spagnolo (2008) confirm these findings and explain that “[t]he reason is that capped incentives make managers’ objective function strictly concave in each period profits, hence managers’ marginal utility from higher profits decreasing. This reduces managers’ evaluation of gains from unilaterally defecting from the collusively agreed strategies, and increases their evaluation of losses from a price war following a defection”.

91. Bertrand, Lumineau and Fedorova (2014) build on the rational choice theory in organisational misconduct.<sup>49</sup> This strand of the literature originates with the seminal work by Becker (1968) to develop a theory of deterrence, based on the key insight that an agent chooses rationally whether to infringe the law taking account of the expected penalty faced (in turn, this is affected by the probability of punishment and the disutility caused by punishment). The authors investigate the conditions supporting firms' collusive behaviour. Using a sample of firms involved in cartels in the European Union, the authors explore factors related to motivation and opportunity and the participation in collusive conduct. They find that "the lower the performance of the firm (as measured by its return on assets), the more likely it will be engaged in a cartel." Examining opportunity, the authors conclude that the size of the firm increases the likelihood of collusion, with this type of effect being negatively moderated by the level of concentration in the industry. They also note that internal (i.e. firm-level) and external (i.e. industry-level) factors interact.

92. Another important factor linked to collusive behaviour is business culture. Collusive culture cannot be easily defined and measured within the complex environment of an organisation. Collusion may be directly instigated from the top of the organisation or, indirectly, if managers are forced to gain profits quickly. Collusive culture may also result from the close and frequent interaction with trade associations or other industry bodies. Examining collusive culture, Harding and Joshua (2010) note that guilds and trade associations may facilitate the development of a co-operation instinct.<sup>50</sup> In addition, the authors report that larger and more complex firms are more likely to exhibit co-operative culture. However, the authors also note that even when an organisation has a business culture favourable to collusion, there may be significant differences between business units. For instance, sales managers may be willing to obtain quick results and profits (and hence have co-operative instincts) while other parts of the business may be in favour of effective compliance with competition and consumer regulations.

93. The importance of business culture of effective compliance is illustrated by the example of Aveng, a global infrastructure group involved in a construction cartel in South Africa. The (now former) CEO launched an internal investigation to identify suspicious behaviour and involvement in anti-competitive practices. Following this investigation, the CEO committed to change the culture of misconduct and transform the organisation, in particular by breaking those "circles of influence" which were among the factors that kept the cartel intact for a long time.<sup>51</sup>

94. In addition, some companies may not have fully explored compliance programmes and training which may reduce the risk of an antitrust violation.<sup>52</sup> Business culture built on compliance programmes is also increasingly recognised by competition agencies. A recent indication comes from US and Barclay's plea agreement for the Forex cartel where the company has received a reduced recommended sentence

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<sup>49</sup> The authors refer to Cornish and Clarke (1986) and Opp (1997) and explain that "[t]he rational choice approach of organizational wrongdoing assumes that actors calculate the costs and benefits of pursuing a wrongful course of action and only decide to pursue the action if they conclude that the likely benefits of the wrongdoing outweigh its potential costs".

<sup>50</sup> In the present paper for instance, collusive behavior through trade associations has been identified in cement cases (see below, as described in the Annex)

<sup>51</sup> The Institute of Internal Auditors, South Africa, "Collusion, Corruption and Corporate Culture". Available at [c.ymcdn.com/sites/www.iiasa.org.za/resource/collection/BA8203A5-101F-460C-A2EC-1DDEC9FED153/Collusion, Corruption and Corporate Culture.pdf](http://c.ymcdn.com/sites/www.iiasa.org.za/resource/collection/BA8203A5-101F-460C-A2EC-1DDEC9FED153/Collusion,_Corruption_and_Corporate_Culture.pdf)

<sup>52</sup> See for example, the International Chamber of Commerce Antitrust Compliance Toolkit available at <http://www.iccwbo.org/Advocacy-Codes-and-Rules/Document-centre/2013/ICC-Antitrust-Compliance-Toolkit/>.

because of its efforts towards compliance.<sup>53</sup> In a 2014 speech titled “Compliance is a Culture, Not Just a Policy,” the deputy assistant attorney general of the Antitrust Division and head of criminal enforcement, noted that “[e]ven though they are at the top, senior management must help lay the foundation upon which a company builds its culture of compliance. It does not matter how comprehensive a company’s compliance program is if the senior management does not make it a foundation of the company’s corporate culture.”<sup>54</sup>

#### 4. Economic characteristics of the four sectors

95. In this section, we sketch the main characteristics of the sectors under consideration, starting with the three manufacturing sectors (chemicals; cement and concrete; food), followed by construction services. The section presents a summarised description of the main characteristics of the sectors, as reported in various sources, such as – to the extent possible – competition authorities’ decisions and reports, complemented by other sources, such as papers and market reports. This section includes the main conclusions of the qualitative analysis, while the full information of characteristics with their corresponding sources is included in the Annex. Repeated offences are also mentioned in the Annex, when observed.

##### 4.1. Chemicals

96. The chemical industry produces a wide range of outputs and these are mostly used as inputs by other industrial sectors, as well as in diverse economic activities such as agriculture and construction. The products include petrochemicals, basic inorganics, such as fertilizers and industrial gases, and polymers, such as plastics and synthetic rubber. Specialty chemicals represent a smaller category of products and include, for instance, paints and inks, crop protection, dyes and pigments. In addition, the industry produces consumer chemicals, such as toiletries and detergents, and these account for a smaller share of the sector’s revenues.

97. Global industry turnover has been increasing at about 7% annually over the last decade, largely driven by growth in Asia (A.T. Kearney, 2012). Global sales slowed down in 2013 and the industry is expected to shift further away from production in Europe and the North American Free Trade Agreement (NAFTA) countries.<sup>55</sup> The largest markets worldwide by turnover are China, which accounts for about one-third of global sales, the NAFTA area and the European Union (European Chemical Industry Council, 2015).<sup>56</sup>

98. As mentioned in the previous section, the chemicals sector appears frequently in cartel cases, mostly at a global level. These cases typically concern industrial chemicals. With respect to national cases, these usually concern toiletries, cosmetics and detergents. Serial collusion is rather pronounced in the

<sup>53</sup> See United States District Court, District of Connecticut, Plea Agreement, United States of America vs Barclay’s PLC, at paragraph 13, available at [www.justice.gov/file/440481/download](http://www.justice.gov/file/440481/download)

<sup>54</sup> See Brent Snyder, Deputy Assistant Attorney General Antitrust Division U.S. Department of Justice, *Compliance is a Culture, Not Just a Policy*: Remarks as Prepared for the International Chamber of Commerce/ United States Council of International Business Joint Antitrust Compliance Workshop New York, NY September 9, 2014, available at [www.justice.gov/atr/speech/compliance-culture-not-just-policy](http://www.justice.gov/atr/speech/compliance-culture-not-just-policy)

<sup>55</sup> Global turnover in 2013 was EUR 3,156 billion (European Chemical Industry Council, 2015), compared with EUR 3,127 in 2012 (European Chemical Industry Council, 2014).

<sup>56</sup> Out of total sales of EUR 3,156 billion in 2013, China accounted for EUR 1,047 billion, the NAFTA zone for EUR 528 billion and the European Union for 527 billion (European Chemical Industry Council, 2015).

chemicals sector, at least in Europe. It has been noted that the cases “set a benchmark in the application of the recidivism uplift mechanism under the 2006 Fining Guidelines and give insight into the level of fine increase that multi-recidivist companies may expect to receive in future cases”.<sup>57</sup>

99. Based on market reports and the information available from competition cases, which are discussed in the Annex, the main economic characteristics of the industry are as follows:

- Concentration: high concentration has been reported by competition authorities in a number of products, ranging from consumer chemicals to commodity products used by the industry.<sup>58</sup>
- Barriers to entry: these arise because of investment in research and development (R&D),<sup>59</sup> economies of scale,<sup>60</sup> learning by doing effects and the cost of regulatory compliance on environmental matters. Brand is an additional source of barriers to entry in consumer chemicals as advertising expenditure for these products is significant.<sup>61</sup>
- Most products in the sector are homogenous (e.g. commodity chemicals) but there are also differentiated products (e.g. toiletries). For commodity chemicals, producers typically compete on price and “the production costs of the marginal producer are the principal drivers of market prices” (McKinsey and Company, 2015). In the latter products, there is intense effort by companies to achieve product differentiation.
- Demand fluctuations: the demand for most chemicals is derived demand from other sectors such as automotive, construction and clothing. Demand for basic chemicals is cyclical and driven by global economic growth.<sup>62</sup> Capital investment is driven by future expected demand, and therefore

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<sup>57</sup> Flavia Distefano, *Recent EU Chemicals Cartels and Risks Arising from REACH Implementation*, The European Antitrust Review 2015 by the Global Competition Review, available at [globalcompetitionreview.com/reviews/62/sections/209/chapters/2465/chemicals/](http://globalcompetitionreview.com/reviews/62/sections/209/chapters/2465/chemicals/). The review reports 22 cartel decisions with the highest fine record compared to any other sector.

<sup>58</sup> At global level, the ranking of the chemical companies with higher sales is topped by diversified producers of industrial chemicals. Among the top firms, there are oil companies that run integrated operations. The revenues of the top 100 companies account for about 9% of global 2014 revenues. See ICIS, Top 100 Chemical Companies, available at [www.icis.com/pages/icis-top-100-chemical-companies/](http://www.icis.com/pages/icis-top-100-chemical-companies/)

<sup>59</sup> Lieberman (1989) studies the impact of learning by doing and technology on new entry in the chemical industry. He finds limited impact of cumulated output (indicating experience in production) on new entry. He also finds evidence that “access to technology appears to have been more difficult in markets with few producers; this retarded entry but seldom reduced the entry rate to zero.”

<sup>60</sup> Lieberman (1987) finds that the average size of a production plant increase “more than five-fold over the period from the late 1950s through the early 1980s.”

<sup>61</sup> According to McKinsey and Company (2015), the advertising to sales ratio for discretionary consumer products is 25% (Exhibit 2, page 94 of the report). Among the products considered in the study, this belongs to the top quartile on the basis of this indicator.

<sup>62</sup> The Economist reports that in 2009 sales in some divisions of the largest chemical company worldwide fell by almost half, due to the economic crisis (The Economist, 23 June 2010, [www.economist.com/blogs/newsbook/2010/06/chemical\\_industry](http://www.economist.com/blogs/newsbook/2010/06/chemical_industry)). Market intelligence company IHS plots the profitability of the chemical industry over time, showing significant fluctuations (IHS Quarterly, 19 May 2014, [blog.ihs.com/q12-investment-risk-for-chemical-producers](http://blog.ihs.com/q12-investment-risk-for-chemical-producers)).

whether investment and capacity are in line affects the degree of capacity utilisation in the industry.

- Procurement: for those products that are for industrial use, it is common for purchasers to have structured procurement processes in place. These involve some screening of bidders, as they are designed to ensure that the suppliers can produce the quantities required and in accordance to the desired specifications (Marshall and Marx, 2012).
- Investment in research and development (R&D) is seen as necessary to compete in the long-run, for instance to keep up with innovation in the downstream sectors supplied by the chemical industry. Investment in innovation is more profitable in certain areas, such as materials, and less in commodities.<sup>63</sup> According to OECD data on industry R&D expenditure in a sample of 27 countries,<sup>64</sup> more than one-third of the countries invest the largest share of R&D expenditure in chemicals (and minerals). Data from the European Chemical Industry Council show significant variation across countries. In Japan the ratio of R&D expenditure over sales was 5.1% in 2013. This is significantly higher than in other economies, such as Switzerland (3.7%), the United States (2.1%) and the European Union (1.8%).

100. The vitamins cartel has also revealed a number of factors that facilitated collusion, as can be seen in the box below.

#### Box 2. Factors identified in the 16 vitamins cartels

The vitamins industry has been involved in a large number of cartel cases. Connor (2006) reports 16 vitamins cartels that “were probably the largest, most harmful, and harshest sanctioned international cartels of the late 20th century”.<sup>65</sup> Vitamins cartels have been investigated and sanctioned in a number of jurisdictions, including the US, Canada, Europe, Japan.

Connor (2006 and 2008<sup>66</sup>) investigated the structural features of the vitamins industry and concluded that certain structural and market conditions were favourable to the formation of cartels. These were:

- **High degree of concentration.** The market was highly concentrated with the mean four-firm concentration (CR4) in 1990 being extremely high at 97%<sup>67</sup>. In only three bulk vitamin markets the CR4 was below 90%, namely, biotin (88%), B6 (about 75%), and B4 (67%). The global markets for vitamins A, B2, B3, B9, B12,

<sup>63</sup> McKinsey (2013), “Chemical innovation: An investment for the ages”, McKinsey on Chemicals. As noted in A.T. Kearney (2012), “progress is expected in specialty chemicals and application niches with technological leaps in customer industries, such as biotech and fuel cells.”

<sup>64</sup> OECD Science, Technology and Industry Scoreboard 2013 - Figure 4.1.1 R&D specialisation, top three performing industries, 2011.

<sup>65</sup> Connor, John M., The Great Global Vitamins Conspiracy: Sanctions and Deterrence (February 22, 2006). American Antitrust Institute Working Paper No. 06-02. Available at SSRN: <http://ssrn.com/abstract=1103604> or <http://dx.doi.org/10.2139/ssrn.1103604>

<sup>66</sup> Connor, John M., The Great Global Vitamins Conspiracies, 1985-1999 (April 1, 2008). Available at SSRN: <http://ssrn.com/abstract=1120936> or <http://dx.doi.org/10.2139/ssrn.1120936>

<sup>67</sup> The calculations include also firms that were not involved in the cartel. However, Connor (2006) explains “Because the vitamins cartels contained all of the top three of or four producers, cartel control is almost the same as CR4 in most markets.”

D3, E, and carotinoids are especially highly concentrated;

- **High market control.** The mean degree of global market control by the members of the cartel was 93%, ranging from 70% for vitamin B6 to 100% for carotinoids;
- **Buyer concentration** in the bulk vitamin and vitamin premix markets is generally quite low;
- **Homogeneity.** Despite differences in terms of quality and strength, a vitamin has a unique molecular structure with unique biological properties. Thus, vitamins are widely viewed as “commodities,” and appear so homogeneous that price net of discounts is the only factor driving buyers’ decisions.
- **Entry costs.** The industry is capital intensive due to the large scale of manufacturing and requires high costs of production. Entry is slow and impeded by sunk costs and excess capacity.
- **Profit losses and price reductions before the cartel.** Nearly all of the cartels were formed immediately after a period of falling prices and profits.

Kovacic et al. (2007) also report most of the above-mentioned factors. According to the authors, “the industry is highly concentrated, and the large capital investments, and especially the production experience, required for the manufacture of vitamins are a barrier to entry. Although the major producers have similar production technologies, the chemical synthesis processes involve substantial learning by doing. Each producer becomes better, through time, at debottlenecking the chemical synthesis process at any given plant. A given vitamin product made by one firm is chemically identical to the same product made by another firm”.

#### 4.2. *Cement and concrete*

101. The cement and concrete industry has been frequently investigated for collusive behaviour. Harrington et al. (2014) report that the “frequency of cartelisation is explained by a number of factors that make collusion profitable and agreements stable”. These are as follows:

- Transportation costs and economies of scale typically make cement markets highly concentrated. As noted by Boyer and Ponsard (2013), “[t]he production of cement is carried on in large plants, the size of which is technologically determined”;
- Cement is a homogeneous product which makes competition especially intense (and collusion particularly attractive) and co-ordination on a common price fairly easy;
- While firm-level demand is highly elastic because of the lack of product differentiation, market demand is highly inelastic. This is because the demand for cement is derived from the demand for final products, for which cement makes up a small percentage of costs;
- Entry costs are high, which discourages new entry. However, the threat of imports from more distant cement manufacturers constrains maximum prices (Salvo, 2010).

102. Other economic characteristics of the industry include the following:

- Demand for cement and concrete is closely related to movements in the economy and is subject to cycles;
- Even though cement is a homogeneous product, due to high transportation costs the threat of competition from imports may be limited. Antonielli and Mariniello (2014) find that import

penetration in “cement, stone and ceramic products” is among the lowest among industrial sectors in large European countries,<sup>68</sup>

- In the case of ready-to-mix concrete, the product must be used “within 1 to 2 hours of being produced” and therefore the market is local.<sup>69</sup>
- The industry is capital intensive. As reported by Boyer and Ponsard (2013), “the ratio of investment cost to sales is of the order of 2 to 3 which is one of the highest in industry.”<sup>70</sup>
- Supply capacity is relatively fixed and increasing the capacity of a plant requires large investment.<sup>71</sup>

### 4.3. Food

103. The sector includes the processing of a wide range of food products, including final products ready for consumption as well as intermediate inputs used for the preparation of the end product. Food and beverages processing accounts for between 1 to 3 percent of GDP (Dobbs et al., 2015).<sup>72</sup> The sector is especially important given that it represents a large proportion of consumption in some countries: food accounts for more than 40 percent of consumer expenditure in some non-OECD countries, while it represents only about 6 percent of expenditure in the US and in Singapore.<sup>73</sup> For the same reason, and the potentially regressive effect on lower-income households (OECD, 2014),<sup>74</sup> the prices of food products are also a sensitive matter in the context of worldwide price increases.<sup>75</sup>

104. A distinguishing feature of food manufacturing, compared with the other sectors analysed in the paper, is the complexity of the vertical relationships between upstream suppliers and retailers. There are a number of cases where competition problems have resulted from the interaction (and pressure) between the food chain levels, rather than from the food processing level *per se*. Concerns have been raised about the functioning of the food value chain and competition issues such as market or buyer power, high concentration, transparency and vertical linkages among the levels of the food chain are likely to be part of

<sup>68</sup> The authors calculate the share of imports on sales in France, Germany, Italy, Spain and the UK. This figure is about 12% for cement, stone and ceramic products (Antonielli and Mariniello, 2014; page 14).

<sup>69</sup> Competition Commission (2012), Aggregates, cement and ready-mix concrete market investigation, Working paper on market definition for aggregates, cement and RMX, [https://assets.digital.cabinet-office.gov.uk/media/5329dfb440f0b60a730002cf/market\\_definition\\_housestyled.pdf](https://assets.digital.cabinet-office.gov.uk/media/5329dfb440f0b60a730002cf/market_definition_housestyled.pdf)

<sup>70</sup> Boyer and Ponsard (2013).

<sup>71</sup> As explained by Boyer and Ponsard (2013), “[a] cement plant requires a limestone quarry, which is a scarce resource subject to environmental regulations; on top of that, a cement plant ordinarily operates for more than 20 years.”

<sup>72</sup> Dobbs, R., Remes, J. and J. Woetzel, (2015), “Where to look for global growth”, McKinsey Quarterly, January 2015.

<sup>73</sup> Source: ERS, USDA calculations based on annual household expenditure data from Euromonitor International.

<sup>74</sup> High and volatile prices of raw materials also present significant challenges for competition authorities, especially when they concern food products. This was discussed in an earlier session of the Global Forum, see OECD (2012).

<sup>75</sup> Data from the Food and Agriculture Organization (FAO) of the United Nations indicate that the consumer price index rose by 81% from 2006 to 2014 at global level.

this impact (OECD, 2014).<sup>76 77</sup> The box below describes the product categories that are most frequently investigated by competition authorities.

105. Based on market reports and information available from competition cases, which are discussed in the Annex, the main economic characteristics of the industry are as follows:

- Concentration: high concentration has been reported by competition authorities in a number of cases, such as infant food, flour and liquid milk. However, the sector appears relatively less concentrated than others, such as tobacco or chemicals, at least in large European countries according to Antonielli and Mariniello (2014);
- Barriers to entry due to regulation, high fixed costs or strong brands: regulatory restrictions acting as a barrier to entry have been identified in a few sub-sectors of the food processing industry. Examples of such regulations are restrictions on the right to mill in France, advertisement restrictions for baby milk in Italy or the quota system in the sugar market at EU level. High fixed costs are a barrier to entry in the processing of certain food products, such as sugar beet processing, which requires large capital investments. Strong brands and consumer loyalty are also important for some products, but market research suggests that consumers are increasingly switching brands, also in favour of private labels. A study by Deloitte (2015) finds that in the US “three out of four packaged goods categories have seen a decline in “must have” brand loyalty since 2011”;<sup>78</sup>
- Buyer power: concentration at the retail level, mostly related to the development of large supermarket chains,<sup>79</sup> increases pressure on food manufacturers. In general, buyer power may create more competition among suppliers, however it can also complicate the vertical structure of the food sector;
- Low elasticity of demand: has also been observed, especially in products which belong to the essential purchases for households. This characteristic has been reported by competition authorities in cartels cases on the flour industry in France and Germany, the milk sector in UK and the baby milk industry in Italy;

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<sup>76</sup> For more details, see OECD (2014).

<sup>77</sup> European Competition Network, Report on competition law enforcement and market monitoring activities by European competition authorities in the food sector, (ECN Report), May 24, 2012, at paragraph 95: “The milk sector has recently suffered from the high volatility of prices on international markets. After prices had increased until they peaked in 2008, they fell even more, while input costs (in particular feed and energy) continued to increase. This so-called “milk crisis” triggered discussions at EU level and put the existing CAP milk regime back into focus. As a result, the Single CMO Regulation has recently been amended by Regulation (EU) No 261/2012 to allow farmers, subject to very specific conditions, to engage in collective bargaining negotiations and agree on common prices for the deliveries of raw milk.” (footnotes omitted)

<sup>78</sup> Deloitte (2015), “The American Pantry Study – The call to re-connect with consumers”, <http://www2.deloitte.com/content/dam/Deloitte/us/Documents/consumer-business/us-cb-2015-american-pantry-study.pdf>

<sup>79</sup> A study by EY France, Arcadia International and Cambridge Econometrics for the European Commission investigates the effect of modern retail in the food sector. It documents concentration trends, at the retail and the manufacturing level, and the evolution of choice. See [http://ec.europa.eu/competition/sectors/agriculture/overview\\_en.html](http://ec.europa.eu/competition/sectors/agriculture/overview_en.html)

- Homogenous and differentiated products: most products in the sector are homogenous (e.g. flour, sugar) but there are also products that manufacturers try to differentiate through advertising and marketing methods (e.g. baby milk).

### Box 3. Which products are investigated more frequently?

Food processing covers a wide range of products and sub-sectors, and some of them are more frequently affected by cartels. The majority of cases recorded in the Private International Cartels (PIC) database concerns flour and cereal products (including a number of grains and flour cartels in the Netherlands, Germany, Belgium, France, Portugal and South Africa), followed by dairy products (such as two infant formula cases in Italy and a dairy cartel in Spain), sugar and chocolate (including in Canada and Germany) and meat products (including poultry cartels in Mexico and South Africa, and sausages in Germany). Most competition authorities have dealt with these markets either through cartel detection and mergers or through studies and market inquiries.

**Cereals and cereal-based products:** Collusive practices in cereals and cereal-based products have been extensively investigated in Europe. According to a report by the European Competition Network (ECN, 2012), there have been 32 cases in 17 EU countries. Anticompetitive practices have been discovered in various products, such as flour, bread, bakery products, pastry, wheat, grain and pasta. Apart from Europe, flour cartels have been discovered in South Africa (three cases), the US and Brazil.

**Milk and dairy:** The ECN (2012) reports 21 antitrust investigations/cases on milk and dairy products, with food processing being the most investigated level in the vertical chain. Several investigations in the sector concerned buyer cartels for the purchase of raw milk. Further to antitrust actions, the ECN reports 16 monitoring actions carried out by NCAs, in relation to the milk sector in Bulgaria, Denmark (two), Estonia, France (two), Germany, Hungary, Latvia (three), Poland, Romania, Slovakia, and Spain (two). In the first half of 2015 the Italian competition authority has launched a study into the milk and dairy value chain. The frequency of cases could be explained from the specific features of the milk sector. According to the ECN, the milk sector presents many specific features, "such as the continuing daily production and high perishability of unprocessed milk, which require well-functioning transport logistics. Together with the relatively high weight of milk as a commodity, this limits economical transport distances and the possibilities for farmers to switch between buyers. Therefore, markets are often national or regional in scope and NCAs are often well placed to address potential anti-competitive practices."

**Sugar and confectionery.** The last majority of cases discovered in this sub-sector were found at the processing level and included mainly horizontal infringements. In the sub-sector of chocolate confectionery products, the most important anti-competitive practices were sanctioned in Germany and France, in Canada, while in the US a similar alleged practice was not proved.

#### 4.4. Construction

106. The sector includes the activities for the construction of a wide range of buildings and civil engineering works. The former include, among others, residential buildings, offices and schools. Civil engineering works are, for example, roads, railways, bridges, tunnels and utility projects, such as water and electricity works. The construction sector also involves specialised activities, such as the installations of electrical and plumbing systems, plastering, painting and roofing activities.

107. The construction sector is a significant component of the economy. In 2013, it employed 5.8 million people (5.15% of total non-governmental employment) in the US.<sup>80</sup> In the European Union, construction accounted for 5.7% of total gross value added in 2013.<sup>81</sup> The sector is especially important in

<sup>80</sup> U.S. Department of Labor, Bureau of Labor Statistics. In the UK, the corresponding figure was 2.1 million jobs in the third quarter of 2014, accounting for 6.3% of the UK total ([www.parliament.uk/briefing-papers/sn01432.pdf](http://www.parliament.uk/briefing-papers/sn01432.pdf)).

<sup>81</sup> [http://ec.europa.eu/eurostat/statistics-explained/index.php/National\\_accounts\\_and\\_GDP](http://ec.europa.eu/eurostat/statistics-explained/index.php/National_accounts_and_GDP)

countries where infrastructure requires substantial investments, because it is obsolete or because it is not pervasive enough.<sup>82</sup> For example, infrastructure investment has been an important source of economic growth in China over the last two decades.<sup>83</sup> As infrastructure investment is projected to double in the next 15 years, the economic importance of the construction industry is set to increase.<sup>84</sup>

108. Public sector orders are a substantial share of the total value of the construction industry. In the US, public construction accounts for about 27% - 29% of total construction put in place.<sup>85</sup> The corresponding figure in the UK was 26% in the first quarter of 2015.<sup>86</sup>

109. The construction sector has been repeatedly under antitrust scrutiny, to the extent that it has been argued that “[t]here seems to be a culture and an environment that induces and sustains economic offences and malpractices” (Dorée et al., 2003). The Competition Committee has previously debated whether the industry appears conducive to collusion or not. Some countries consider the industry as prone to collusion, holding also the view that when the relevant market is defined, competition becomes limited; other countries consider that cartels are not that attractive for construction companies.<sup>87</sup>

110. Following Weishaar (2013) and OECD (2008), we outline the key economic characteristics of the industry:

- Demand is very cyclical. Construction investment is subject to large fluctuations and its different components (e.g. infrastructure vs. housing) do not necessarily follow the same cycle.
- There are many small companies, often operating locally, but also a few large companies and global players.
- Tenders are a common way to select construction companies. This leads to a certain degree of information transparency, at least in public tenders, where the available budget may be known and the other bidders’ offers may be disclosed.
- In each given tender, the product that has to be delivered is relatively homogenous. On large infrastructure projects, there is a more limited degree of substitution on the supply side. For instance, a contractor that can build a local road may not be well-equipped to handle a large infrastructure project to build a bridge or an underwater tunnel.

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<sup>82</sup> The Economist, “Infrastructure in the rich world: building works”, 29 August 2015, <http://www.economist.com/news/finance-and-economics/21662593-historic-opportunity-improve-infrastructure-cheap-danger?zid=311&ah=308cac674cccf554ce65cf926868bbc2>

<sup>83</sup> Wilkins , K. and A. Zurawski (2015), “Infrastructure investment in China”, Reserve Bank of Australia Bulletin, June 2015, <http://www.rba.gov.au/publications/bulletin/2014/jun/pdf/bu-0614-4.pdf>

<sup>84</sup> McKinsey (2015), The construction productivity imperative, available at [http://www.mckinsey.com/insights/infrastructure/the\\_construction\\_productivity\\_imperative](http://www.mckinsey.com/insights/infrastructure/the_construction_productivity_imperative)

<sup>85</sup> Census Bureau, <https://www.census.gov/construction/c30/c30index.html>

<sup>86</sup> [www.parliament.uk/briefing-papers/sn01432.pdf](http://www.parliament.uk/briefing-papers/sn01432.pdf)

<sup>87</sup> OECD (2008), Competition in the Construction Industry (2008), DAF/COMP (2008) 36, Executive Summary, p. 10, available at [www.oecd.org/daf/competition/sectors/41765075.pdf](http://www.oecd.org/daf/competition/sectors/41765075.pdf)

- Sub-contracting is very common. This is related, for instance, to the complexity of projects requiring different specialisations, and to the need to complete large assignments in an efficient and timely manner. As a result, firms often co-operate on some projects but compete on others.
- There are a large number of buyers. Even public spending in construction works is fragmented, with local authorities playing an important role.

111. Additional factors, which are not directly related to the likelihood of collusion, are low productivity and efficiency levels which often lead to delays and cost overruns (McKinsey, 2015).

## 5. Enforcement tools to address endemic collusion

112. Competition authorities can have a significant effect on the firms' decisions to join cartels, to continue their involvement or to report cartel activity. This deterrence effect depends on the likelihood of detecting cartels and on the severity of sanctions against cartels. Competition authorities use a variety of instruments to promote compliance, such as fines, leniency programmes and criminalisation (OECD, 2011).<sup>88</sup> In certain cases, these instruments take account of repeat offences. These horizontal tools are sometimes complemented by proactive and more targeted instruments to monitor economic sectors seen as more prone to collusion. In this section, we outline the instruments that can support competition authorities' investigation activities in industries that are more prone to collusion or display a high level of repeat offences.

### 5.1. Definitions of serial offenders and recidivists

113. As explained in Section 2, there is little evidence on the level of recidivism across different economic sectors. In addition, the extent of recidivism in general is a contentious matter, as it depends on the definition under which it is examined. In particular, there is a dichotomy between a strict legal definition of recidivist and a broader definition of serial offender, such as that adopted in this paper. There are also differences between the legal definitions adopted across different jurisdictions.

The elements along which recidivism could be defined include the following:<sup>89</sup>

1. Contemporaneous or serial offence: a broad definition of serial offender, such as the one adopted in this paper and in the empirical literature (e.g. Marvão, 2015; Connor, 2010), would consider multiple offences. However, legal definitions typically refer to prior sanctions since presumably ongoing investigations cannot count as convictions. Wils (2012), using legal arguments, also claims that “[i]t appears that there is much less justification to increase fines in case of contemporaneous infringements than in case of recidivism”.<sup>90</sup>

<sup>88</sup> The Competition Committee has discussed various approaches to promoting compliance, with a focus on cartels, in June 2011. The tools covered by the discussion included also private actions, plea bargaining / settlements and corporate competition compliance programmes.

<sup>89</sup> Barennes and Wolf (2011) describe some of these elements on the basis of EU jurisprudence and EC decisions.

<sup>90</sup> Wils (2012) explains that “[i]f an undertaking is found to have committed two or more (separate) contemporaneous infringements, each of these infringements should, in principle, be punished with the same fine as if that infringement was the only infringement. However, where several fines are imposed simultaneously or around the same time, there is an increased risk of inability to pay, and inability to pay may justify a fine reduction”.

2. Same jurisdiction or across jurisdictions: prior offences could be those committed only in one jurisdiction or also in other countries, such as the EU Member States.
3. Time limitations: some jurisdictions may limit the maximum period for which a previous offence will be considered (e.g. the US, Germany and the UK).<sup>91</sup>
4. Subsidiary-level or group-level: the broad definition of serial offender may differ from a legal definition in that a serial offender may also be a group whose subsidiaries have been involved in cartels (Barenes and Wolf, 2011). A legal definition would be expected to focus more narrowly on a specific company, rather than a group. A related question is whether the offense is transferred as a result of mergers and acquisitions. This assumption underpins the construction of the PIC database, but is not a neutral one and may vary depending on the jurisdiction.
5. Type of antitrust violation: a cartel may be considered a recidivist if it has engaged in the past in similar conduct, but the interpretation of ‘similar’ may vary.<sup>92</sup> This could concern, for instance, any type of cartel conduct or could be theoretically extended to abuse of dominance.

114. As an example to illustrate how different definitions lead to contrasting views on recidivism, Connor (2010) observes that “recidivism appears to be increasing rapidly, both in number and relative to all corporate cartels”.<sup>93</sup> These findings are based on a wider notion of recidivism, where contemporaneous infringements are also taken into account and cartel offences of predecessors are attributed to merged companies. According to Connor, “[i]n the context of price-fixing, a company will be identified as a recidivist in the most general sense if it is convicted a second time for cartel conduct, no matter where or when the earlier violation took place.”

115. However, other studies such as Werden, Hammond and Barnett (2012), based on a narrower definition of recidivism, do not confirm these findings. Werden, Hammond and Barnett (2012) reviewed cartel records in the United States, without limiting their research to international cartels, and found no record of recidivists. Their definition of recidivism concerns companies that had been previously convicted in the United States and subsequently joined a cartel prosecuted in the United States. Wils (2012) also points out that the broad definition of recidivism adopted by Connor<sup>94</sup> is not consistent with the definition

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<sup>91</sup> Lianos et al. (2014).

<sup>92</sup> Lianos et al. (2014) report that in France “To be identical or similar, practices must have a same anticompetitive object or effect, as for instance foreclosure.” Wils (2012) refers to the EU Courts and the interpretation of the similar infringement: “The notion of ‘similar’ infringements, it appears from the case law that an infringement of Art. 101 TFEU and an infringement of Art. 102 TFEU cannot be considered as similar (Judgments of the General Court of 12 Dec. 2007 in Joined Cases T-101/05, BASF v. Commission [2007] ECR II-4949, para. 64 and of 25 Jun. 2010 in Case T-66/01, Imperial Chemical Industries v. Commission, not yet published in ECR, paras 378–381”.

<sup>93</sup> In line with this observation, Ginsburg and Wright (2010) while examining the deterrence of antitrust sanctions, also refer to the Connor and Helmers (2007) findings, and note that “there is a problem with recidivism”.

<sup>94</sup> According to Wils (2012) “It is, however, clearly erroneous to criticize the Commission for having under-applied its Guidelines in that it has not identified as recidivism situations that would only qualify as recidivism under a definition of recidivism different from that used in those Guidelines and in the case law of the EU Courts”.

provided in the guidelines of the European Commission. He also observes a decline of recidivism in the recent EC decisions adopted by the European Commission during the period 2006–2010.<sup>95</sup>

## 5.2. *Fines and leniency programmes*

### 5.2.1. *Do enforcement tools account for serial offenders?*

116. Many competition authorities have moved towards imposing higher fines on recidivists, by using recidivism as an aggravating factor. Lianos et al. (2014) provide an overview of the fining guidelines in selected major jurisdictions, and find that recidivism is among the aggravating factors in the guidelines. According to Wils (2012), treating recidivism as an aggravating factor can contribute to ensure compliance in three ways. First, the imposition of fines may have a deterrent effect. Second, in the case of collective violations such as cartels, the differentiation of penalties according to the role played by the different conspirators can have the effect of raising the cost of setting up and running cartels. Third, the public punishment of those who violate the antitrust prohibitions may also have a moral effect, by sending a message to the spontaneously law-abiding, reinforcing their moral commitment to the antitrust prohibitions.

117. By way of example, the relevant European and the US guidelines are reproduced below. There are notable differences in the time limitation of offences and in the fact that the EC guidelines take account of decisions taken by the competition authorities of EU Member States. The European Commission revised the guidelines of setting fines and significantly changed the rules for repeated offenders in 2006. According to the Commission<sup>96</sup> “[u]p to now, the Commission’s practice is to increase a fine by 50% where the undertaking has been found to have been previously involved in one or more similar infringements. The new Guidelines change this approach in 3 ways:

1. The Commission will take into account not only its own previous decisions, but also those of National Competition Authorities applying Articles 81 or 82 [current Art. 101 & 102 TFEU];
2. The increase may be up to 100%;
3. Each prior infringement will justify an increase of the fine.”

118. The corresponding rule in US legislation is provided by the Sentencing Guidelines Manual (§8C2.5) for which a prior history of infringement is considered as a factor increasing upwards the “culpability score”, as follows:

“If the organization (or separately managed line of business) committed any part of the instant offense less than 10 years after (A) a criminal adjudication based on similar misconduct; or (B) civil or administrative adjudication(s) based on two or more separate instances of similar misconduct, add 1 point;  
Or

<sup>95</sup> According to Wils (2012), “To the extent that there is a trend within this five-year period, it is a declining one: 24% in 2006 (eleven out of forty-five), 11% in 2007 (seven out of sixty-four), 13.5% in 2008 (five out of thirty-seven), 13% in 2009 (five out of thirty-eight), and 4% in 2010 (three out of seventy-one)”.

<sup>96</sup> European Commission Press Release IP/06/857 of 28 June 2006, available at [europa.eu/rapid/press-release\\_IP-06-857\\_en.htm?locale=en](http://europa.eu/rapid/press-release_IP-06-857_en.htm?locale=en) and full text of [Guidelines on the method for setting fines imposed pursuant to Art. 23\(2\)\(a\) of Regulation 1/2003, \[2006\] OJ C210, available at eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52006XC0901\(01\)&from=EN](http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52006XC0901(01)&from=EN)

(2) If the organization (or separately managed line of business) committed any part of the instant offense less than 5 years after (A) a criminal adjudication based on similar misconduct; or (B) civil or administrative adjudication(s) based on two or more separate instances of similar misconduct, add 2 points.”

119. Unlike fining guidelines, leniency programmes are usually not adjusted to address recidivism. For instance, the International Competition Network (ICN) Anti-cartel enforcement manual, recently published in 2014, does not distinguish between recidivists and other applicants<sup>97</sup> and the same holds for the leniency programmes in force in the EU and in the US.<sup>98</sup> The Hellenic Competition Authority (HCC) used to prevent repeat offenders from accessing the leniency programme,<sup>99</sup> but this was later modified.<sup>100</sup>

120. The rationale for allowing recidivists to benefit from leniency has been investigated by Chen and Rey (2012).<sup>101</sup> They find that “withdrawing leniency for repeated offenders generates a countervailing effect which can make the leniency policy completely ineffective.” The authors argue that denying access to leniency can, on the one hand, discourage firms from adopting repeated “collude and report” strategies but, on the other hand, “may also trigger other forms of collusion, such as reporting once and never after.” This is because, after reporting once, each cartel member knows that no member will report. As a result, collusion becomes more stable than if all firms could be granted leniency. This results hold as long as cartel members have an incentive to collude in the product market, i.e. the leniency programme is ineffective.<sup>102</sup>

121. The arguments for allowing recidivists to benefit from leniency have been summarised by Wils (2012) who notes that, given the leniency programmes’ benefits in terms of increasing detection and making cartels more unstable, excluding firms from these programmes will reduce these benefits. If fewer cartel members have the incentive to report, cartels will be easier to set up and operate.<sup>103</sup>

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<sup>97</sup> ICN, Anti-cartel enforcement manual, April 2014, <http://www.internationalcompetitionnetwork.org/uploads/library/doc1005.pdf>

<sup>98</sup> See also the 2009 European Competition Network (ECN) report providing an overview of key features of leniency programmes in the European Union: [http://ec.europa.eu/competition/ecn/model\\_leniency\\_programme.pdf](http://ec.europa.eu/competition/ecn/model_leniency_programme.pdf) and [http://europa.eu/rapid/press-release\\_MEMO-09-456\\_en.htm](http://europa.eu/rapid/press-release_MEMO-09-456_en.htm)

<sup>99</sup> See paragraph 4e of Decision No 299/V/2006 of the plenary of the Hellenic Competition Commission on leniency, stating that in order to qualify for immunity from a fine, the following condition has to be satisfied among others: “the undertaking must not have participated in the past in a prohibited collusive practice for which a decision by a National Competition Authority or the European Commission has been issued.” See <http://www.epant.gr/img/File/Hellas-Leniency%20Programme%20en.pdf>

<sup>100</sup> Hellenic Competition Commission, Decision 526/VI/2011, [http://www.epant.gr/img/x2/apofaseis/apofaseis661\\_1\\_1351256055.pdf](http://www.epant.gr/img/x2/apofaseis/apofaseis661_1_1351256055.pdf)

<sup>101</sup> In their model, two firms play an infinitely repeated game, choosing whether to collude or to compete à la Bertrand. They introduce heterogeneity across industries by letting the payoff from collusion vary. They assume that the competition authority detects a cartel either by investigating the industry (with a certain probability) or because a cartel member reports it.

<sup>102</sup> Some experiments on leniency programmes address also questions on recidivisms, with mixed results: Bigoni et al. (2012) find that leniency programmes eliminate recidivism, while Hinloopen and Soetevent (2008) conclude that leniency does not reduce recidivism compared with standard cartel laws.

<sup>103</sup> Wils (2012) also examines the perceived unfairness in granting recidivists leniency, in particular related to (i) an offender escaping punishment; and (ii) the unequal treatment of cartel members. He argues that these concerns are certainly exacerbated in the case of recidivists, but they can be alleviated through the design of leniency programmes. For instance, he argues that it is important to ensure “leniency is only granted to

### 5.2.2. Do these tools work?

122. The deterrence effect of cartel investigations has been widely studied. A report by London Economics (2011), based on a survey of UK businesses, finds that the most important deterrent is reputational damage from competition enforcement, followed by criminal penalties on individuals and by financial penalties on firms.

123. In particular, “[f]ines on firms and individuals are generally found to reduce the incentive to engage in anti-competitive behaviour” (London Economics, 2011).<sup>104</sup> Against the backdrop of increasing fine levels over time, an active debate continues on optimal fines (Allain et al., 2013; Katsoulacos and Ulph, 2013).<sup>105</sup>

124. OECD (2013) describes the uptake of amnesty / leniency programmes and their success in increasing the number of cartels detected in many jurisdictions.<sup>106</sup> However, questions remain on whether these programmes mostly uncover cartels that are no longer successful or stable and are about to collapse. In addition, cartels may sometimes become more stable and easier to set up in the presence of leniency programmes (Motta and Polo, 2003; Chen and Harrington, 2007; Harrington, 2008).

125. A review of the empirical evidence by Marvão and Spagnolo (2014) finds that “it is unclear whether they [leniency programmes] are actually increasing welfare by generating a strong deterrence effect, or whether they are actually reducing welfare through the larger administration and prosecution costs they generate, without any compensating increase in deterrence. The most favourable evidence available is for the US, where sanctions are much tougher, and this is consistent with what theory would predict.” The same study summarises also the available *experimental* evidence, and concludes that leniency programmes have a deterrence effect, provided that they are well-designed. In line with the empirical evidence, experiments show that the deterrence effect is limited, unless sanctions are severe.

126. While there is a large body of literature on deterrence in general, empirical evidence on deterrence and repeated collusion is scant. This is partly because information on the identities of cartelists is sometimes not available, at least in some jurisdictions. This section provides an overview of studies on empirical and experimental evidence concerning the deterrence effect of leniency programmes with some references on repeated offenders.

127. Marvão (2015) studies the European Commission’s cartel cases over the period 1996 – 2013 to investigate the factors related to a higher probability of self-reporting by cartel members. The author assembles a dataset of 93 cartels in which there was at least successful leniency applicant. These cases involve a few instances in which cartel members were repeat offenders or multiple offenders. Repeat offenders, consistently with the definition in the 2006 Leniency Notice of the European Commission, are those firms that have been *previously* found to infringe competition law (i.e. seven out of the 441 firms in

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the extent that the company or individual has genuinely and effectively cooperated with the competition authority, thus objectively distinguishing its situation from the other cartel participants that have not done so, or not to the same extent, or at the same early point in time” (Wils, 2012).

<sup>104</sup> The study was performed for the UK Office of Fair Trading (OFT) and investigated the drivers of compliance and the deterrence effect of the authority’s competition enforcement work. The OFT merged with the Competition Commission to form the Consumer and Markets Authority.

<sup>105</sup> Lianos et al. (2014) provide an extensive review of the economic literature on fines and discuss how they interact with other enforcement tools.

<sup>106</sup> Buccrossi, Marvão and Spagnolo (2014) study how private enforcement affects the incentives offered by leniency programmes.

the database). The author defines as multiple offenders any firms that have been sanctioned for collusion more than once. Following this broader definition, which is consistent with the definition adopted in this paper, Marvão (2015) finds that about 84 percent of firms in the sample have participated in one cartel only.

128. One of the main contributions of the paper is the finding that that leniency reductions granted to multiple offenders are higher than average. In particular, Marvão (2015) reports that “the predicted leniency reduction is 19 to 26 percentage points higher for multiple offenders (RO) than for single offending firms, at the mean values of the remaining explanatory variables. In addition, the number of multiple offenders per cartel (NRO) also has a positive and significant impact on the firm’s predicted leniency reduction.” Sequential offenders also benefit from reductions but, unlike multiple offenders, these are lower than for other firms (by about 35 percent on average, see Table 7 in the paper). However, the author also finds that for each repeat offender in a cartel, the leniency reduction for the cartel is about 50 percent higher than average.

129. Marvão (2015) comments on the results by noting that “there is some evidence that firms can “learn how to play the leniency game”, either learning how to cheat or how to report, as the reductions given to multiple offenders (and their cartel partners) are substantially higher.” She finds that repeat and multiple offenders are rarely the first to report (32% and 20%, respectively), but they often receive a leniency reduction (59% and 68%, respectively).

130. In a paper covering both US and EU cases,<sup>107</sup> Marvão (2014) finds that in the US “repeat offenders are more likely to receive immunity from fines (6 to 8 percentage points)” and that “this likelihood is larger with each additional repeat offender in the cartel.”

### 5.3. *Proactive tools*

131. Pro-active detection occurs when competition agencies engage in cartel detection on their own initiative, i.e. pro-active methods of cartel detection are initiated from within the agency and do not rely on an external triggering event (OECD, 2013). The OECD Competition Committee has previously debated *ex officio* investigations and the use of screening methods.

132. Proactive tools include a variety of instruments which can be complementary to each other, as well as to reactive tools (e.g. leniency, complaints). For instance, if a competition authority is aware that certain industries are prone to collusion or has indication of serial offenders in these industries, the information can be used to prioritise these sectors for enforcement activity or to conduct research into specific markets. While the day to day investigation activities may remain the same, this additional tool might increase the potential to detect cartels (considering also that if industries or companies have been convicted in the past, they might be more sophisticated in their reactions to investigations), as well as it may increase the deterrence effect for the same industries and offenders.

133. A variety of methods has been presented by the ICN (2010). The most important tools that can apply to specific industries which seem to be prone to collusion are described below.<sup>108</sup>

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<sup>107</sup> The data for European cases are collected by the author, while the information on US cases is drawn from the Private International Cartels (PIC) database of Professor Connor.

<sup>108</sup> Some agencies conduct a systematic monitoring of the behaviour in a specific industry. Behavioural screening methods can also be useful to monitor an industry and flag suspicious patterns of cartel behaviour. For example, some agencies have used screening methods to analyse the potential of bid

134. *The use of the economic analysis.* The proactive approach through the use of the economic analysis includes the use of economic studies to identify factors that could be indicative of collusion or markets that are prone to collusion, which would have to be followed up with further investigation. It also includes empirical approaches which often use economic evidence from previous cases to predict the industries in which future cartels may be detected. Industry or market studies may also be used for particular industries where cartels are historically most frequent and previous studies have identified common features.

135. *Liaison with other agencies.* Competition agencies may also co-operate with other competition authorities or other agencies engaged in a particular industry (e.g. regulators). Especially for industries with prior collusive behaviour, the interaction between authorities may prove very useful, as the exchange of information and experience from other cases may provide indications of cartel behaviour.

136. *Analysis of previous cases.* This can help the competition agency to focus on cartel behaviour in specific industries. The agency may also use the analysis of cases conducted by other competition agencies internationally. In the event of repeated collusion in an industry or repeated offenders across countries, the experience from previous cases by other agencies might be very useful to detect cartels in the same domestic industry or even the same offenders.

137. *Analysis of other competition work.* Other competition work conducted within the competition agency, such as mergers or abuse of dominance, may indicate important factors of a specific sector, indicate cartel behaviour and even repeated collusive practices. This information can be used as input for investigations into a sector or a market.

138. *Other tools.* Agencies might also focus on an industry which seems prone to collusion and monitor the media, the trade press and the internet. Through these tools, the competition agency may retrieve important information for the specific sector. In addition, the agency may monitor the participation in trade associations, especially if there were previous cases that have linked the activity of the trade association with anti-competitive practices.

139. As extensively discussed in a 2013 session of the OECD Competition Committee, proactive tools have some drawbacks. They may need substantial resources which competition agencies prefer to allocate differently.<sup>109</sup> In addition, proactive tools provide useful indications but these are usually not intended to serve as proof of illegal behaviour. Proactive methods can be used to reinforce other instruments, such as leniency programmes,<sup>110</sup> and consequently result in an overall positive effect of deterrence. Therefore, a combination of tools that could include both proactive and reactive detection measures is viewed to be most effective (OECD, 2013). Hüschelrath (2010) also highlights that “[t]here are signs that a collection of

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rigging. In 2006, Korea introduced a programme for bid rigging detection through the use of screens. The Bid Rigging Indicator Analysis System (BRIAS) automatically and statistically analyses bid rigging indicators based on the data on public tenders provided to the Korean Fair Trade Commission (KFTC) by public institutions. In detail, see Annex 2 of OECD DAF/COMP (2013) 27 “Ex officio cartel investigations and the use of screens to detect cartels”, where it is reported that “On average, BRIAS flags more than 80 cases per month for further analysis by the KFTC staff”.

<sup>109</sup> As Hüschelrath (2010) points out “[a]lthough detailed statistics are unavailable, proactive methods generally seem to play a relatively small role compared to the reactive methods.”

<sup>110</sup> If firms engaged in an undetected cartel are aware that the competition agency runs studies or monitors the specific market, they may have incentives to apply for leniency. See also OECD (2013) for the deterrent effect of screens.

complementary proactive methods is increasingly being applied to further increase the probability of cartel detection”.

140. Proactive tools aimed at monitoring factors, previous cases or industry activities are particularly well suited to the monitoring of industries that are prone to collusion. These tools could support the prioritisation of sectors within the work plan of competition authorities. In addition, they could help deter or uncover repeated offences. For instance, if certain industries are prioritised by competition authorities and firms are aware that these industries are being monitored, this may increase the probability of detection and / or discourage further cartel formation.

141. For those authorities that implement some form of proactive tool, those could be extended to incorporate information on the number of cartels previously detected in the sector, either in the same jurisdiction or more broadly. As an additional step, competition authorities may record previous cartels involving the same firms.

## **6. Concluding remarks**

142. This paper has examined four sectors where some degree of repeated collusion has been observed, both by different firms and by the same firms across different jurisdiction. These sectors are chemicals; cement and concrete; food products; and construction services, including public tenders.

143. The analysis faces some challenges (see Section 2), partly due to data unavailability (e.g. competition authorities do not always name cartel participants, information on the specific group subsidiary that was sanctioned is sometimes not available) and also to the fact that it is based only to discovered cartels. As Connor (2010) notes, “cartel studies generally conclude that only about 10 percent to 30 percent of all conspiracies are discovered and punished.”

144. In order to gain an initial understanding of the degree of repeated collusion, we have examined data from the Private International Cartels (PIC) database to compare the situation across these sectors. The vast majority of (known) firms involved in cartels have participated in one cartel only. Serial offenders tend to be detected across jurisdictions, while repeated collusion by the same firm in the same jurisdiction tends to be less frequent, with the exception of the chemical industry, partly driven by the vitamins cartels. Based on the PIC database, repeat offenders are involved in more cartels in the chemical industry and in construction, and in fewer cartels in the food sector.

145. Based on competition cases and other sources, we have also performed a qualitative analysis on the economic characteristics of the sectors. The sectors exhibit some of the characteristics that are considered in the literature as factors facilitating collusion, as follows:

- *Concentration*: in most of the cases examined in the paper, competition authorities found a high level of concentration in the four sectors. While the construction sector could appear fragmented, some countries note that this coexists with a small number of large firms. In addition, in each tender, the number of participants is typically small.
- *Barriers to entry*: almost all sectors had at least some barriers to entry, even though of different nature. In the sector of cement and concrete for instance, barriers to entry seem to be due to the capital intensive nature of the market and vertical integration between the two products. Food processing and chemicals sectors face, among others, barriers to entry arising from strict regulatory requirements (e.g. safety and environmental protection) which require financial efforts from companies to comply with.

- *Homogeneity of products*: this characteristic has also been observed in all sectors, such as food processing and cement and concrete. However, in the sub-market of detergents, in the chemicals sector, the product is not perfectly homogeneous and companies insist a lot on diversification through marketing and advertising. In the construction sector the homogeneity of the product derives from the nature of the public tendering itself, since a tender specifies in detail the required product and companies often compete only on price.
- *Other factors* not common to all sectors, have also been observed. For instance the involvement trade associations in cement and concrete, transparency on prices in some sub-markets of the food processing (such as milk), strong branding in sub-sectors of the food processing (i.e. chocolate confectionery) and of chemicals (i.e. detergents).

146. The qualitative analysis does not deliver clear-cut results on factors that are more often associated with repeated collusion. This is also the case in many of the decisions included in our survey, which tend not to link directly the economic characteristics of a market with a collusive outcome. In addition, in order to explain repeated collusion by the same firms, it would be necessary to take account also of the deterrence effect of competition policy. The characteristics of firms are likely to be relevant from this point of view and empirical work on firm-level characteristics of serial offenders could help to shed light on the factors competition authorities may monitor.

147. Data on previous cartel investigations and convictions can provide useful information for competition authorities. Sectors that appear repeatedly in cartel cases, and where serial offenders have been previously identified, can be subject to regular monitoring by the authorities and to *ad hoc* research activities, such as market studies. While taking account of serial collusion has its merits, authorities are also aware that enforcement itself may lead to a concentration of *uncovered* cartels in certain sectors (OECD, 2013; Klawiter, 2011).<sup>111</sup> For instance, this may result from the opportunity granted to firms involved in cartel investigations in one product to report cartels in other products and benefit from additional leniency on the initial product.

148. Enforcement tools that apply horizontally to all sectors, such as fines and leniency programmes, can be re-considered to address serial offenders. Fining guidelines typically take account of recidivism as an aggravating factor. There are differences in how recidivism is defined across jurisdictions, such as time limitations and the type of prior violations. Leniency policies do not seem to exclude recidivism and there is some economic literature confirming why this may be a reasonable approach.

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<sup>111</sup> See Section 2.3.6. of the present paper and OECD (2013) for more details.

## ANNEX

### Characteristics identified in the four sectors

#### 1. Chemicals

##### 1.1. Concentration

149. The chemicals industry includes a wide range of products, and some of them involve highly specialised production concentrated in few firms.

150. In the example of toiletries and detergents, the German Bundeskartellamt concluded that, in a cartel of manufacturers of branded cleaning products, the vast majority of the market segments affected were highly concentrated markets, in which the three leading companies enjoyed combined market shares of more than 50%.<sup>112</sup> In 2006, the Korean competition authority (KFTC) fined the three leading producers of laundry and dishwasher detergents for price-fixing and agreements on trade terms. The three leading firms accounted for more than 82% of the local market share.<sup>113</sup>

151. Similar considerations have also been made by competition authorities in a variety of cases involving chemicals for commercial and industrial uses. For instance, in a case brought by the KFTC in 2007, ten large petrochemical companies agreed on a benchmark price. According to the Commission, the parties accounted for more than 85% of the country's synthetic resins market.<sup>114</sup>

152. In the wood preservatives chemicals cartel case in Australia, the Federal court concluded that the two major suppliers in the copper chromium arsenic market, with market shares of 40% and 60%, engaged in price fixing.<sup>115</sup> The imposed sanctions by the Federal Court also took into account the fact that all parties had similar previous conduct.<sup>116</sup>

153. In 2010 in US, a class action filed by two businesses on behalf of all persons and entities who purchased titanium dioxide against an alleged price-fixing cartel by five sellers. The US District Court for

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<sup>112</sup> Bundeskartellamt, Case summary, Fine proceedings against manufacturers of drugstore products, reference number B11 - 17/06, available at [www.bundeskartellamt.de/SharedDocs/Entscheidung/EN/Fallberichte/Kartellverbot/2013/B11-17-06.pdf?\\_\\_blob=publicationFile&v=4](http://www.bundeskartellamt.de/SharedDocs/Entscheidung/EN/Fallberichte/Kartellverbot/2013/B11-17-06.pdf?__blob=publicationFile&v=4)

<sup>113</sup> Korea Fair Trade Commission, 2008 Annual report, available at [eng.ftc.go.kr/utility/quicksearch.jsp?pageId=0601df](http://eng.ftc.go.kr/utility/quicksearch.jsp?pageId=0601df)

<sup>114</sup> The cartel concerned the market of petrochemicals and specifically polypropylene and high density polyethylene, and lasted from 1994 to 2005 See Wall Street Journal “Korea Fines 9 Petrochemical Firms for Price Fixing”, published at [www.wsj.com/articles/SB117199941125913878](http://www.wsj.com/articles/SB117199941125913878)

<sup>115</sup> Federal Court of Australia, Australian Competition and Consumer Commission vs FChem (Aust) Limited [2008] FCA 344, NSD 1461 OF 2006, available at [www.judgments.fedcourt.gov.au/judgments/Judgments/fca/single/2008/2008fca0344](http://www.judgments.fedcourt.gov.au/judgments/Judgments/fca/single/2008/2008fca0344)

<sup>116</sup> Federal Court of Australia, Australian Competition and Consumer Commission vs FChem (Aust) Limited [2008] FCA 344, NSD 1461 OF 2006, at paragraph 48

the District of Maryland issued a memorandum opinion and referred to the market structure in order to conclude on whether there was evidence that the defendants had a motive to enter into a price fixing conspiracy. According to the memorandum,<sup>117</sup> “The structure of the United States titanium dioxide market is conducive to price-fixing, based on multiple factors. [...] The titanium dioxide market is highly concentrated, meaning that the “market is controlled by a limited number of sellers”. The five sellers involved in the cartel have admitted that they dominated the market in the specific period.

154. In the 2009 decision on the calcium carbide and magnesium based reagents cartel,<sup>118</sup> the European Commission noted the limited number of suppliers in the EEA territory<sup>119</sup>. This case is also of great importance as the Commission increased the fines for two participating firms that were addressees of previous decisions concerning similar infringements.<sup>120</sup>

## 1.2. Barriers to entry

155. The chemicals sector is characterised by significant barriers to entry. The type of barriers depends on the specific product market, including barriers to entry related to: a) substantial capital investments to achieve economies of scale; b) low substitution; or c) the learning or experience curve.<sup>121</sup> For detergents, where marketing and advertising are needed to build a strong identity, barriers to entry may arise from brand and product differentiation. Environmental regulations may also impose barriers to entry since firms need to invest in facilities and equipment that comply with the regulatory requirements.

156. The role of investment, both in research and development and in branding, was highlighted in a 2014 decision about cleaning and hygiene products by the French Competition Authority. In The authority

<sup>117</sup> United States District Court for the District of Maryland, case: *In re Titanium Dioxide Antitrust Litigation*, 10-cv-00318-RDB, filed 08/14/13, p. 47, available at: [www.mdd.uscourts.gov/Opinions/Opinions/In%20re%20Titanium%20Dioxide%20Antitrust%20Litig.10-318%20Mem.%20Op.%20&%20Order%20COMBINED.pdf](http://www.mdd.uscourts.gov/Opinions/Opinions/In%20re%20Titanium%20Dioxide%20Antitrust%20Litig.10-318%20Mem.%20Op.%20&%20Order%20COMBINED.pdf)

<sup>118</sup> The Commission imposed fines on nine companies for their participation, from April 2004 until January 2007, in a cartel involving market sharing, quota fixing, customer allocation, price fixing and the exchange of commercially sensitive information in the EEA, with the exception of Spain, Ireland, Portugal and the United Kingdom.

<sup>119</sup> Commission Decision, COMP/39.396—Calcium carbide and magnesium based reagents for the steel and gas industries, 2009 (C 2009) 5791 final, Recital 37 (July 22, 2009), available at [http://ec.europa.eu/competition/antitrust/cases/dec\\_docs/39396/39396\\_2009\\_5.pdf](http://ec.europa.eu/competition/antitrust/cases/dec_docs/39396/39396_2009_5.pdf). The Commission notes “There are a limited number of producers and suppliers of calcium carbide in the EEA. In addition to the seven producers/suppliers mentioned in recitals (9) to (33), there were seven other producers/suppliers with an estimated combined joint market share in the EEA of around 15% for calcium carbide powder and 31% for calcium carbide granulates.”

<sup>120</sup> At paragraphs 309-312 where the decision reports “The fact that they repeated cartel behaviour, albeit in a different sector from those in which they had previously incurred penalties, shows that the first penalties did not sufficiently prompt them to change their conduct. This constitutes an aggravating circumstance”. The previous decisions the Commission took into account were for Akzo Nobel: Commission decisions of 19 March 2002 in case COMP/36/756 (Sodium Gluconate), 10 December 2003 in case COMP/37.857 (Organic Peroxide), 9 December 2004 in case COMP/37.533 (Choline Chloride), and 19 January 2005 in case COMP/37.773 (Monochloroacetic acid). For Degussa, the Commission took into account the Commission decision of 2 July 2002 in case COMP/37.519 (Methionine).

<sup>121</sup> For the learning curve, see Lieberman (1989).

reported that the market presented barriers to entry due to the need for continuous innovation and investments on research and development, and that branding and advertising were also crucial. According to the decision, all these constraints led to high fixed costs, more easily absorbed by larger companies already in the market, which benefit from substantial economies of scale.<sup>122</sup>

157. Regulatory requirements were identified as the source of significant barriers to entry in a similar previous case in 2011 on detergents. The French authority noted that regulatory requirements, particularly in terms of environmental protection, involve significant financial efforts for companies, as they have to heavily invest in the manufacturing of the product to comply with environmental protection rules.<sup>123</sup> It should be noted that there are repeated offenders observed in the two cases (2014 and 2011).

158. In the titanium dioxide cartel in US, the Memorandum Opinion also reported barriers to entry due to the large investment needed to enter the market: “[...] Third, the large capital investment necessary to open a titanium dioxide plant created a high barrier to entry by new sellers. High barriers to entry make a market more susceptible to collusion. [...]”<sup>124</sup>

### 1.3. Demand factors

159. Demand factors that may facilitate collusion are also present in the chemicals sector. Global competition pressure and switching of purchases to other substitutes has caused a severe drop in demand during the last decades.<sup>125</sup>

160. The Memorandum Opinion of the US District Court for titanium dioxide cartel observed the following market conditions favouring price-fixing: “the Plaintiffs offer adequate evidence to suggest that in the decade before the Class Period and especially in 2001, the Defendants suffered substantial declines in consumption and price of titanium dioxide. Reduced demand is a market condition “that favor[s] price cuts, rather than price increases”<sup>126</sup>

161. In the calcium carbide and magnesium reagents cartel, the Commission notes that demand has been decreasing during the last years due to economic and technical developments.<sup>127</sup> The cost of cokes

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<sup>122</sup> Autorité de la concurrence, décision n° 14-D-19 du 18 décembre 2014 relative à des pratiques mises en œuvre dans le secteur des produits d’entretien et des insecticides et dans le secteur des produits d’hygiène et de soins pour le corps, at paragraphs 106, 114 and 1324, available at [www.autoritedelaconcurrence.fr/pdf/avis/14d19.pdf](http://www.autoritedelaconcurrence.fr/pdf/avis/14d19.pdf)

<sup>123</sup> Autorité de la concurrence, décision n° 11-D-17 du 8 décembre 2011 relative à des pratiques mises en œuvre dans le secteur des lessives, at paragraph 618, available at [www.autoritedelaconcurrence.fr/pdf/avis/11d17.pdf](http://www.autoritedelaconcurrence.fr/pdf/avis/11d17.pdf)

<sup>124</sup> United States District Court for the District of Maryland, case: *In re Titanium Dioxide Antitrust Litigation*, 10- cv-00318-RDB, filed 08/14/13, p. 48

<sup>125</sup> See for example, Oxford Economics, a report for Cecif, October 2014, *Evolution of competitiveness in the European chemical industry: historical trends and future prospects*, available at [www.cefic.org/Documents/PolicyCentre/Competitiveness/Oxford-Study-2014.pdf](http://www.cefic.org/Documents/PolicyCentre/Competitiveness/Oxford-Study-2014.pdf)

<sup>126</sup> United States District Court for the District of Maryland, case: *In re Titanium Dioxide Antitrust Litigation*, 10- cv-00318-RDB, filed 08/14/13, p. 49

<sup>127</sup> Commission Decision, COMP/39.396—Calcium carbide and magnesium based reagents for the steel and gas industries, 2009 (C 2009) 5791 final, Recital 37 (July 22, 2009), at paragraph 43. As technical

and energy had also made magnesium more attractive and purchasers could easily switch between the two products.<sup>128</sup>

162. In the marine paints cartel in Italy, the Italian Competition Authority has fined five companies.<sup>129</sup> Apart from the oligopolistic structure and the profile of the market players,<sup>130</sup> the decision reported that demand was concentrated, with 84% deriving from maintenance activities.

163. The above conditions are more relevant for chemicals for industrial use and more homogeneous products. However, in the case of detergents and toiletries, firms attempt to differentiate products and reduce the elasticity of demand for their product. On detergents for example, which are commonly purchased and fast moving products, in close relation to the daily needs of households, price elasticity may be relatively low. In the 2014 decision on the French cartel on cleaning and hygiene products, the authority reports that price elasticity of demand was relatively low. This is mainly explained by the fact that cleaning and hygiene products are essential for households. In addition, product differentiation through branding, innovation and advertising play a central role in consumer choice.<sup>131</sup>

#### 1.4. *Other factors*

##### 1.4.1. *Homogeneous product*

164. As discussed in Section 3, cartels are more likely if the product is fairly homogeneous. Chemical producers usually deal with relatively homogenous products. According to the Memorandum Opinion by the US District Court for the titanium dioxide cartel, the product was characterised as commodity-like product with no differences among the five sellers: “[...] titanium dioxide is a standardized, commodity-

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developments, the Decision notes “The creation of more efficient steel plants and the increasing replacement of welding and cutting with acetylene by more efficient technologies”.

<sup>128</sup> According to the Decision and the parties (paragraph 175), calcium carbide and magnesium granulates were to some degree substitutable products.

<sup>129</sup> The companies had agreed to share their clientele in order to maintain their traditional customers without facing pressure from competitors also involved in the agreement. See press release from the Italian Competition Authority <http://www.agcm.it/en/newsroom/press-releases/1612-marine-paint-manufacturers.html>

<sup>130</sup> Italian Competition Authority, decision of the 25<sup>th</sup> January 2007, I646 – Produttori vernici marine, Provvedimento n. 16404, available at [www.agcm.it/concorrenza/intese-e-abusi/download/41256297003874BD/3DF3B800930B1730C125727D004C4232.html?a=p16404.pdf](http://www.agcm.it/concorrenza/intese-e-abusi/download/41256297003874BD/3DF3B800930B1730C125727D004C4232.html?a=p16404.pdf). The Italian Competition Authority mentions that the five companies represented practically the sum total of suppliers in Italy. In addition, the involved companies were members of international groups. As such they were able to provide the guarantee of the availability and supply of the products already used in the construction phase. Their relation with international groups or networks was also acting as a barrier to entry since it was difficult for a new supplier to compete on the international profile of the existing companies. One of them was a member of Akzo Nobel group.

<http://www.agcm.it/concorrenza/intese-e-abusi/download/41256297003874BD/3DF3B800930B1730C125727D004C4232.html?a=p16404.pdf>

<sup>131</sup> Autorité de la concurrence, décision n° 14-D-19 du 18 décembre 2014 relative à des pratiques mises en œuvre dans le secteur des produits d’entretien et des insecticides et dans le secteur des produits d’hygiène et de soins pour le corps, at paragraphs 1341-1349

*like product. Ultimately, price was the most important factor for titanium dioxide customers, since there are few qualitative differences in the products sold by the Defendants*<sup>132</sup>.

#### *1.4.2 Excess capacity*

165. In the titanium dioxide cartel in US, the Memorandum Opinion also reported that excess capacity was among the structural factors that make the market conducive to collusion: “[...] the Plaintiffs allege facts showing that Defendants maintained excess capacity. Excess capacity “makes price competition more than usually risky and collusion more than usually attractive.”<sup>133</sup>

166. In the (global) vitamins cartel for instance, as explained by Levenstein and Suslow (2011), the expansion of Chinese exports of vitamin C was among the factors that led to the fall of the vitamin C cartel.

#### *1.4.3 Asymmetry*

167. Asymmetries in market shares and in costs between the parties are frequently seen as making cartels less stable and difficult to form. Therefore, one may have expected to find a low correlation between industries with cartels and heterogeneous market shares of the leading firms.<sup>134</sup> In the Methionine case,<sup>135</sup> Degussa (Germany), Nippon Soda (Japan), and Aventis (former Rhone-Poulenc, France) were convicted for participating, between 1986 and 1999, in a worldwide cartel in the market for methionine, one of the world's most important amino acids, used mainly in animal feed for poultry and pigs. As Grout and Sonderegger (2005) point out, in the methionine cartel “there was considerable heterogeneity in the market shares held by the cartel members, with Degussa, the world's biggest producer, and Nippon Soda, a company five times smaller than Degussa”.

## **2. Cement and concrete**

### ***2.1. Concentration***

168. Competition authorities have commented on high concentration levels in a number of cases and have indicated that concentration results from the significant investment costs to enter the market and achieve economies of scale. In addition, concentration levels have been challenged not only in terms of market shares but also in terms of capacity (e.g. India and Poland). In a number of cases, the firms involved were often the same multinational companies operating through their subsidiaries in different national markets.

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<sup>132</sup> United States District Court for the District of Maryland, case: *In re Titanium Dioxide Antitrust Litigation*, 10- cv-00318-RDB, filed 08/14/13, p. 48

<sup>133</sup> United States District Court for the District of Maryland, case: *In re Titanium Dioxide Antitrust Litigation*, 10- cv-00318-RDB, filed 08/14/13, p. 49

<sup>134</sup> Grout and Sonderegger (2005).

<sup>135</sup> For the Methionine case, see Case C.37.519 – Methionine, OJ [2003] L 255/1, adopted on 2 July 2002 relating to proceedings under Article 81 of the Treaty establishing the European Community (“the EC Treaty”)1 and Article 53 of the Agreement on the European Economic Area, available at [eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32003D0674&from=EN](http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32003D0674&from=EN)

169. In a recent case, in Belgium, the decision of the Conseil de la Concurrence pointed to the high and stable market shares of the participating firms. According to the decision,<sup>136</sup> “the market shares of the grey cement market were relatively stable and dominated by CBR and Holcim which respectively possessed a market share of [30 à 40 %] for the first and of [20 à 30 %] for the second. With CCB, all three Belgian cement industries possessed over 70 % of the market of grey cement.”

170. High concentration levels were also reported in the South African cement cartel. Concentration facilitated the monitoring of the agreement, relying on the aggregate data shared by the industry association with its members (see Box).

#### **Box 4. Collusion and concentration trends in the cement industry in South Africa**

The South African Competition Commission initiated an investigation into the cement industry in June 2008 and in 2009 and shortly after, the largest cement supplier applied for leniency. The cartel involved price fixing and market allocation through the allocation of market shares and territories by the main cement producers Pretoria Portland Cement Company Limited (PPC), Lafarge, AfriSam (South Africa) (Pty) Ltd (AfriSam) and Natal Portland Cement Cimpor (Pty) Ltd (NPC-Cimpor). PPC was granted immunity, Afrisam and Lafarge reached a settlement and Natal Portland Cement Cimpor refused to settle and referred to the tribunal for penalties.

The cartel members tried to maintain the market shares they enjoyed before 1996, when the cartel was exempt from competition legislation. In anticipation of the disbandment of the legal cartel, the cement producers agreed that they would keep the market shares they enjoyed when the cartel was “legal”.

Concentration facilitated the monitoring of the agreement, as explained by Govinda, Khumalo and Mkhwanazi (2014). According to the authors, “[g]iven 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.”

In 2014, South Africa’s Competition Commission approved the proposed acquisition of Lafarge by Holcim on condition that Holcim divests of the shareholding in Afrisam within a period of three years after approval of the merger. According to the authority, “Holcim’s shareholding interest in Afrisam, a cement producer in South Africa, would present anti-competitive effects post-merger. This is due to the fact that the shareholding creates an undesirable structural link between Holcim and Afrisam in that it provides Holcim with access to Afrisam’s commercially sensitive information.”

Zengeni and Mondliwa (2015) also refer on the consolidation process in the sector. The authors point out that the cement industry in South Africa is “largely run by major multinational companies, namely, Lafarge, Heidelberg and Holcim” and that the Holcim-Lafarge merger and a further merger between Afrisam and PPC will introduce a number of consolidated players with potential anti-competitive effects in the sector

171. The industry association was also involved in a case in India, where the competition authority found that cement companies co-ordinated on price, dispatch and supplies in the market. In 2002, the Competition Commission of India (CCI) fined eleven cement companies and the cement association for anti-competitive agreements. According to the decision, the Commission found that a few firms had a wide presence in India with plants located all over the country and that “given that a few large players controlled

<sup>136</sup> Conseil de la Concurrence, Décision n° 2013-I/O-34 du 30 août 2013 Affaire CONC-I/O-05/0075 : Cimenteries CBR S.A., Holcim (Belgique) S.A., Compagnie des ciments belges S.A., FEBELCEM A.S.B.L. et CRIC, at paragraph 43, available at [economie.fgov.be/fr/binaries/34\\_2013IO34\\_Pub\\_tcm326-231421.pdf](http://economie.fgov.be/fr/binaries/34_2013IO34_Pub_tcm326-231421.pdf)

majority of the market for cement in India made the market oligopolistic in nature. In an oligopoly since there are not many firms, interdependence is inevitable.”<sup>137</sup>

172. In 2009 the Polish Office of Competition and Consumer Protection (UOKiK) issued a decision against the largest cement producers in the country, concluding that from 1998 to 2009 the companies had been sharing the national market for grey cement. The seven companies “owned nearly 100 % of shares in production and sales market of grey cement in Poland”.<sup>138</sup>

173. Bejger (2011) examined a number of indicators in the Polish cement cartel, including patterns in market shares and prices. He concluded that “both market shares of players and price/supply processes exhibits theoretically motivated, distinctive for collusion patterns such as: stability, low volatility and independence of market size of market shares’ system, seasonality smoothing of prices and weak correlation with market supply (demand).”

174. The cement cartel in Romania also confirmed the oligopolistic structure of the industry. According to the decision, the Romanian market represented an oligopoly with the three members of the cartel controlling a combined market share of 98% of the domestic market in 2003.<sup>139</sup>

## 2.2. *Barriers to entry*

### 2.2.1. *Vertical integration*

175. Cement manufacturing is characterised by significant entry barriers mostly linked to the industry requirement for high capital investment and substantial costs to operate. An additional structural pattern

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<sup>137</sup> Competition Commission of India Case No. 29/2010 Builders Association of India against Cement Manufacturers' Association and others, at paragraphs 6.5.45-6.5.47 where it is also reported “As regards available capacity the data of CMA for the year 2010 reveals that there were 47 cement companies having 142 plants and installed capacity of 97% of total capacity. As has been discussed in the preceding paras, 12 cement companies are having about 75% of total production capacity in India. Further, DG has reported that 21 companies control about 90% of the market share in terms of capacity.” Full decision available at [cci.gov.in/May2011/OrderOfCommission/292011.pdf](http://cci.gov.in/May2011/OrderOfCommission/292011.pdf)

<sup>138</sup> Press release by the Polish Office of Competition and Consumer Protection (UOKiK) of the 13.12.2013, UOKiK breaks cement cartel: Decision of UOKiK, available at [uokik.gov.pl/news.php?news\\_id=10754](http://uokik.gov.pl/news.php?news_id=10754) and press release of the 10.12.2009, Cement cartel smashed available at [uokik.gov.pl/news.php?news\\_id=1768](http://uokik.gov.pl/news.php?news_id=1768). According to the authority, the cartel consisted of an agreement among the producers of grey cement: Lafarge Cement, Górażdże Cement, Grupa Ożarów, Cemex, Dyckerhoff, Cementownia Warta and Cementownia Odra. The companies had shared the Polish market by agreeing to freeze market shares and by fixing minimum cement prices, the timetables, the amounts and the order of applying the price increases. In addition, it was established that through various meetings the participants shared sensitive information, especially on sales volumes. The cartel was detected after a leniency application.

<sup>139</sup> Romanian Competition Council, Decision no 94/26.05.2005 relating to the sanctioning of LAFARGE ROMCIM S.A., HOLCIM (Romania) S.A. and CARPATCEMENT HOLDING S.A. for the infringement of Article 5(1)(a) of the Competition Law no 21/1996, at paragraph 18, available at [www.consiliulconcurentei.ro/uploads/docs/items/id6156/decizii\\_2005\\_94.pdf](http://www.consiliulconcurentei.ro/uploads/docs/items/id6156/decizii_2005_94.pdf). In 2005, the Romanian competition authority concluded that SC Lafarge Romcim SA (belonging to Lafarge Group), SC Holcim Romania SA (member of Holcim Group) and SC Carpatcement Holding SA (belonging to Heidelbergcement Group) participated in a price-fixing cartel.

which acts as a barrier to entry is the vertical integration of cement and concrete producers. Due to the close relation of the two products, companies improve efficiency by vertical integration. This characteristic, if also considered in conjunction with the high requirements of capital, usually leads to substantial entry barriers for new operators. This structural factor has been identified in cases in Brazil, Belgium and Turkey.

176. In a 2013 decision on a cement cartel in Belgium, the Conseil de la Concurrence reported structural issues in the cement industry. The decision stated that the major cement producers in Belgium and Europe were vertically integrated and linked with the production of concrete. Therefore grey cement was vertically linked to the production of ready-to-mix concrete.<sup>140</sup>

177. The Turkish Competition Authority (TCA) also reports that the vertical integration of the cement industry acts as a barrier to entry. As cement is the main component of concrete and clinker, firms vertically integrated to produce all products discourage the entry of new producers. New producers would not be able to compete with the economies of scale already achieved by the integrated firms. In addition, the vertically integrated firms may impose difficulties to already independent producers that need supplies of their raw materials (e.g. cement) in order to use them for the production of their final product (e.g. concrete).<sup>141</sup> The interrelation of all products has encouraged the vertical integration of firms but this structural feature imposed barriers to entry and thus, may hinder competition. A strong distribution network is also a factor considered by the Turkish Competition Authority as a barrier to entry. Since distributors purchase from a single producer who meets their requirements, a new entrant has to establish a new distribution system to compete equally with the existing firms.<sup>142</sup>

178. In a 2014 decision, Brazil's Administrative Council for Economic Defence (CADE) imposed structural remedies and record fines of EUR 1 billion in the cement and concrete industry.<sup>143</sup> The cartel started in the concrete market as companies traded assets among themselves to maintain their previously

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<sup>140</sup> Conseil de la Concurrence, Décision n° 2013-I/O-34 du 30 août 2013 Affaire CONC-I/O-05/0075 : Cimenteries CBR S.A., Holcim (Belgique) S.A., Compagnie des ciments belges S.A., FEBELCEM A.S.B.L. et CRIC, at paragraph 41

<sup>141</sup> OECD (2008), Competition in the Construction Industry (2008), DAF/COMP (2008) 36, Executive Summary, p. 99, available at [www.oecd.org/daf/competition/sectors/41765075.pdf](http://www.oecd.org/daf/competition/sectors/41765075.pdf)

<sup>142</sup> The Turkish competition authority has dealt for many years with the cement market, together with ready mixed concrete and aerated concrete markets. According to the authority, these markets have been investigated more than ten times and also led to the adoption of proactive measures. In 2006, during one of the investigations, the Competition Board decided that cement and ready-mix concrete producers should provide information on their monthly capacity and their production and sales figures. According to the authority, this is a type of measure with a further "intention to screen the cement market" OECD (2013), Ex officio cartel investigations and the use of screens to detect cartels, DAF/COMP (2013) 27, p. 197, available at <http://www.oecd.org/daf/competition/exofficio-cartel-investigation-2013.pdf>

<sup>143</sup> CADE fined six companies, six individuals and three industry organisations in the cement and concrete industry. According to the authority, the parties conspired to fix prices, divide the market and create barriers to entry between 1986 and 2007. Notice of the 29<sup>th</sup> of May 2014 by the Administrative Council for Economic Defense – CADE, available at [www.cade.gov.br/Default.aspx?71c455a47c9166ad78c596a1b69f](http://www.cade.gov.br/Default.aspx?71c455a47c9166ad78c596a1b69f)

agreed participation in the market. The Reporting Commissioner justified<sup>144</sup> the forced asset sales as “a way of increasing competition in the market. Brazil’s cement industry is highly consolidated; very few producers control the market and those that do own assets right down the supply chain, making it ripe for collusion. Forcing the companies to sell off plants, cement kilns and minority shareholdings will, the commissioner hopes, bring in new players and free up the vertical structure of the industry”. CADE also imposed the divestment of 20% of the concrete production capacity in the regions in which the condemned companies owned more than one concrete plant. Finally, CADE prevented the condemned companies from carrying operations between themselves in projects in the cement sectors and to acquire any asset in the concrete market for five years.

### 2.2.2. *Technical standards*

179. Technical standards can be used anti-competitively to prevent entry or to favour incumbents, as shown in cartel cases in Brazil and in Belgium.

180. In the 2014 case in Brazil, the participating firms imposed barriers to entry through the change of rules established by the Brazilian Association of Norms Techniques (ABNT). By the new rules, among other requirements, the use of additives for the preparation of concrete was prohibited. As a result, the possibility of turning a concrete plant into a milling plant by using additives was eliminated. In this way, the companies involved in the cartel maintained their ability to use their concrete plants (integrated with their cement plants) unlike their independent competitors. As a consequence the number of competitors in the market was reduced in favour of integrated producers.

181. In its 2013 decision on the cement cartel in Belgium, the Conseil de la Concurrence also investigated the anti-competitive use of standards. In 1999, ORCEM (Netherlands) decided to enter the Belgian market. To gain access, the product should have been certified and normalised (i.e. granted with national norms). Cement producers CBR, CCB and Holcim, as well as trade association Febelcem and the National Centre for Technical and Scientific Research for the Cement Industry delayed the adoption of licensing and standards for the use of ground granulated blast furnace slag as an ingredient in ready-mix concrete. As a consequence ORCEM faced a delay to gain access to the market. According to the decision,<sup>145</sup> the agreements and concerted practices had an anti-competitive objective and also resulted in at least the potential delay to the standardisation and certification of ORCEM’s product and thus the delay of ORCEM’s entry in the market.

### 2.2.3. *Cost of transportation*

182. Another important feature of the cement and concrete industry is the high cost of transportation. The lack of infrastructure and the high cost of transportation may limit purchasing and selling options in specific geographic areas. Harrington et al. (2014) point out that “[t]ransportation by trucks is the most frequent mode though, when available, transportation by rail or sea is cheaper. In the absence of the latter options, this might suggest that the relevant geographical markets are rather local”. Whether it is a matter of high costs or the options of selling are relatively local, the operation becomes less attractive for new entrants.

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<sup>144</sup> According to Harry Philips, *Alleged cement cartel facing unprecedented CADE fines and asset sales* (30 January 2014), available at [globalcompetitionreview.com/news/article/35122/alleged-cement-cartel-facing-unprecedented-cade-fines-asset-sales/](http://globalcompetitionreview.com/news/article/35122/alleged-cement-cartel-facing-unprecedented-cade-fines-asset-sales/)

<sup>145</sup> Conseil de la Concurrence, Décision n° 2013-I/O-34 du 30 août 2013 Affaire CONC-I/O-05/0075 : Cimenteries CBR S.A., Holcim (Belgique) S.A., Compagnie des ciments belges S.A., FEBELCEM A.S.B.L. et CRIC, at paragraph 309

183. Transportation costs have been reported by Turkey which considered cement “as a product which can be sold within a specific geographic area because of high transport costs”.<sup>146</sup> Switzerland also pointed out that foreign cement companies could not participate in construction projects since specific environment regulations required the transportation of cement by railway and only a limited Swiss suppliers had a direct (and less costly) access to railways.<sup>147</sup>

184. The Romanian cement cartel also confirmed the existence of barriers to entry in the cement industry. According to the 2005 decision, a new undertaking in Romania would need a significant investment of over EUR 200 million in order to be established while the actual levels of demand would require only a fraction of the installed production capacity. Finally, due to the country’s size, the poor infrastructure and the distance from the alternative cement sources, cement imports are relatively expensive.<sup>148</sup>

### 2.3. *Other factors*

#### 2.3.1. *Homogeneous product*

185. The cement industry is characterised by a homogeneous product which makes collusion particularly attractive and co-ordination on a common price relatively easy (Harrington et al., 2014).

186. For instance in Europe, despite the large number of different cement types (there are 27 different types) under European standard EN 197-1, the product is considered homogeneous (Harrington et al, 2014, and Hüscherlath and Veith, 2014).<sup>149</sup> The homogeneity of the product is also confirmed by Boyer and Ponsard (2013) for the European cement industry. However, the authors also note that “high transportation cost relative to the ex-work cost creates a strong spatial differentiation”.

187. The Turkish competition authority also reported that the product in the cement industry appears homogeneous. According to the authority “cement cannot be differentiated in colour, smell, like or packing unlike soaps. That’s the reason why price is the only tool to increase competition within the market”.<sup>150</sup>

#### 2.3.2. *Spare capacity*

188. As mentioned in Section 3, the effect of capacity utilisation on collusion is not entirely clear. As explained by the UK competition authority in the investigation on cement, aggregates and ready-to-mix concrete, “we would expect that producers will need some spare capacity to punish deviators in order for coordination to occur but that very large excess capacity will make coordination harder to sustain if it causes producers to produce below minimum efficient capacity utilization as the incentives to increase

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<sup>146</sup> OECD DAF/COMP (2008) 36, p. 99

<sup>147</sup> OECD DAF/COMP (2008) 36, p. 95

<sup>148</sup> Romanian Competition Council, Decision no 94/26.05.2005 relating to the sanctioning of LAFARGE ROMCIM S.A., HOLCIM (Romania) S.A. and CARPATCEMENT HOLDING S.A. for the infringement of Article 5(1)(a) of the Competition Law no 21/1996, at paragraph 19, available at [www.consiliulconcurentei.ro/uploads/docs/items/id6156/decizii\\_2005\\_94.pdf](http://www.consiliulconcurentei.ro/uploads/docs/items/id6156/decizii_2005_94.pdf)

<sup>149</sup> Most of cement sales in European countries refer to the so-called CEM I cement which contains only Portland cement clinker and no other possible constituents

<sup>150</sup> OECD DAF/COMP (2008) 36, p. 99

production would then be very strong.”<sup>151</sup> The investigation showed that, in 2008 to 2010, the industry had faced large spare capacity and that this had led to closures and mothballing of plants.

189. In 2003, the Bundeskartellamt imposed a record fine against the six largest German cement producers including Holcim, Heidelberg Cement, Lafarge Zement and Schwenk Zement. According to the authority, during the 1990s, leading producers of cement had carved up the German cement markets among themselves.<sup>152</sup> The cartel concerned the four regional cement markets of Westphalia and eastern, northern and southern Germany.

190. Harrington et al. (2014) report the volumes of production, consumption and capacity in the German cement industry. The authors explain that domestic cement consumption increased in the early 1990s and decreased substantially starting in the late 1990s. At the same time, overall domestic production stayed rather constant. There was also a reduction in overall oven capacity due to the reduction of plants, however the substantial reduction in capacity alongside the relatively constant production volumes suggest that overall capacity utilisation rose. According to the authors, for 2005, these six cement producers involved in the cartel, controlled 86.1% of capacity in Germany.

191. In the cement cartel in India, the decision reported that the overall capacity utilisation of the cement companies fell to 73% during 2010 from 83% in 2009 - 10. The Commission found that the cement companies have not utilised the available capacity so as to reduce supplies and raise prices in times of higher demand. According to the decision “while the capacity utilisation has been increased continuously during the last 4 years, the production has not been increased commensurately during this period, which seems to suggest that there is an understanding among the cement companies to keep the production lower the demand in order to create artificial scarcity for the purpose of charging higher profit.”<sup>153</sup>

### 2.3.3. *Transparency through trade associations*

192. As mentioned above, high levels of transparency and information sharing have been identified in the cement industry. This has often resulted from the involvement of trade associations.

193. In the cement cartel in India, the decision reported that there was a system of information exchange through the cement companies association (CMA). The information concerned weekly information on retail and wholesale prices and there were also exchanged information of actual production and available capacities.<sup>154</sup> In addition, the CMA formed a High Power Committee of Cement Management Association where various meeting took place where there was room for common understandings and information sharing among the participating companies.

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<sup>151</sup> UK Competition Commission (2013), Aggregates, cement and ready-mix concrete market investigation, Coordinated effects in Great Britain cement, Appendix 1, <https://assets.digital.cabinet-office.gov.uk/media/5329dfb2e5274a226b0002b1/coordinated-effects-in-great-britain-cement-excised.pdf>

<sup>152</sup> See Bundeskartellamt, press release of the 10th of April 2013, Highest fine in Bundeskartellamt history is final - Federal Court of Justice confirms compliance of fine provision with the constitution, available at [www.bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2013/10\\_04\\_2013\\_BGH-Zement.html](http://www.bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2013/10_04_2013_BGH-Zement.html)

<sup>153</sup> Competition Commission of India Case No. 29/2010 Builders Association of India against Cement Manufacturers' Association and others, at paragraph 6.7.2

<sup>154</sup> Competition Commission of India Case No. 29/2010 Builders Association of India against Cement Manufacturers' Association and others, at paragraph 4.2.44

194. The Turkish competition authority also pointed out that the cement market is characterised by a high level of transparency. First, due to existence of common distributors and the small number of producers, it is possible for cement industries to obtain information of the actual prices charged by competitors. In addition, the activities of the Turkish Cement Manufacturer’s Association, which include information on regional demand, may enable information sharing as well as facilitate the tracking of potential anti-competitive agreements.<sup>155</sup>

### **3. Food processing**

#### **3.1. Concentration**

195. Competition concerns often arise in relation to the degree of concentration in the food industry, whether at the manufacturing level or along the supply chain. As noted in OECD (2014), “with the food supply chain being characterised as a series of vertically-related markets, competition issues can arise within any stage of the food chain or with respect to the vertical linkages between any of the stages.”

196. High concentration at the manufacturing level has been observed in Europe and the United States.<sup>156 157</sup> The degree of concentration varies by product category, as shown in the chart below.

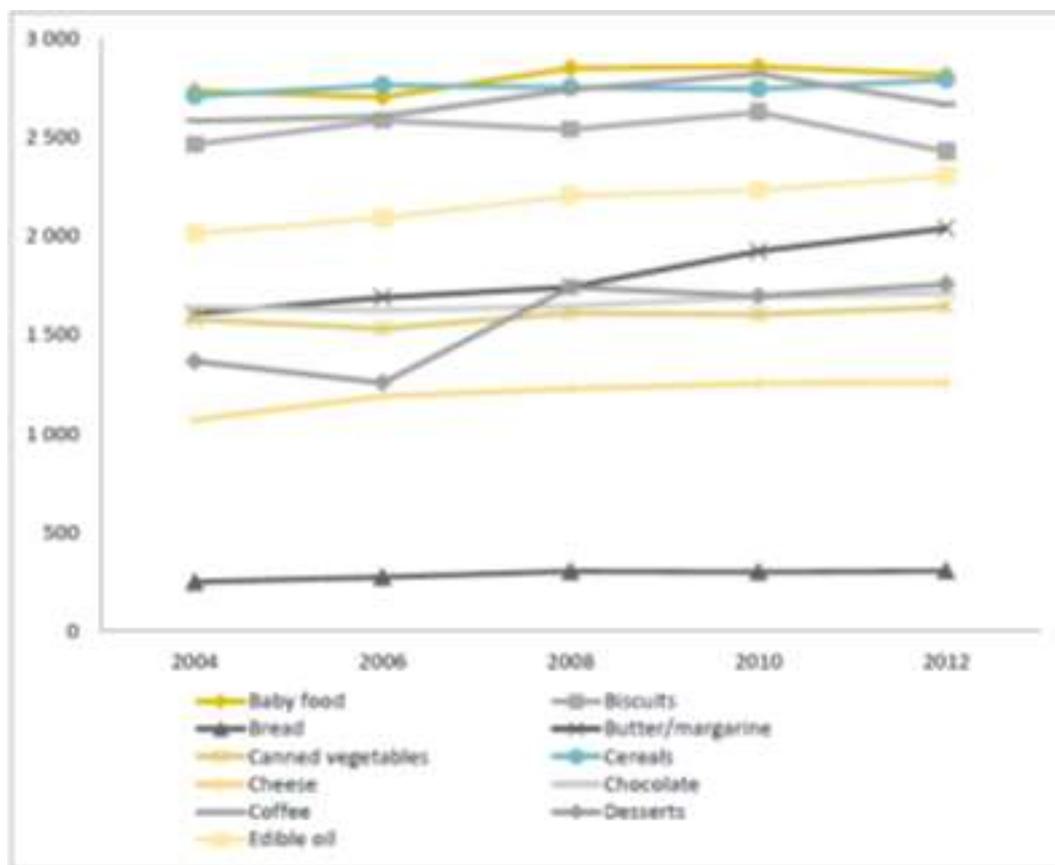
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<sup>155</sup> OECD DAF/COMP (2008) 36, p. 100

<sup>156</sup> See tables 2 and 3, pp. 15-16, at OECD (2014), Competition issues in the food chain industry, DAF/COMP (2014) 16.

<sup>157</sup> Both the ECN and the European Commission report that “[f]ood processors are quite concentrated in certain sectors and areas: “the largest dairy processor represents more than 50% of domestic production in Denmark, Sweden, and The Netherlands. Food manufacturers are also concentrated. For instance, in many Member States more than 70% of baby food products are supplied by two manufacturers. The situation may nevertheless vary depending on the Member State concerned: for instance for chocolate products (tablets, confectionary) the UK, Irish and Polish markets are supplied essentially by two manufacturers whereas the French market is supplied by more than five manufacturers”. See OECD (2014), Competition issues in the food chain industry, DAF/COMP (2014) 16, p. 110 with references to Case COMP/M.4842 – Danone/Numico; Case COMP/M.5644 – Kraft Foods/Cadbury

**Figure 11. Supplier concentration HHI by market share per production category (national level), selected products, average across 14 Member States<sup>158</sup>**



Source: EY analysis on © Euromonitor International

197. Baby food and cereals are among the products with the highest Hirschmann-Herfindal index (HHI) examined in the study (see Chart A1).<sup>159</sup> Other product categories often investigated for cartels, such as chocolate and milk, exhibited lower concentration: supplier concentration for chocolate is around 1,500 and the HHI for milk is between 2,000 and 2,500 on average in the EU Member States covered.<sup>160161</sup>

<sup>158</sup> The chart is reproduced from a study by EY France, Arcadia International and Cambridge Econometrics for the European Commission (Figure 76), available at [http://ec.europa.eu/competition/sectors/agriculture/overview\\_en.html](http://ec.europa.eu/competition/sectors/agriculture/overview_en.html)

<sup>159</sup> According to the study, frozen ready cooked meals have higher HHIs, between 3,000 and 3,500. Frozen pizzas and starters have approached 3,000 in 2010 and 2012.

<sup>160</sup> The Member States are Belgium, Czech Republic, Denmark, Finland, France, Germany, Hungary, Italy, the Netherlands, Poland, Portugal, Romania, Spain and the UK (page 64 of the report).

<sup>161</sup> The study by EY, Arcadia International and Cambridge Econometrics explains that “at national level, supplier concentration increased for 20 of the 23 product categories and 13 of the 14 sampled Member States. Concentration increased more on average during the pre-crisis period (when 22 of 23 product categories became more concentrated) than after 2008 (when 17 of 23 product categories became more concentrated). The product categories with the highest average concentration levels between 2004 and

198. This variation across product categories was also confirmed by a study on the Norwegian market<sup>162</sup> in 2011. The study reported that the supply level presented a high level of concentration, even more than the retail level. The combined market share for the three largest suppliers in different product groups varied from 61% to 99%. However, not all market segments presented the same high level of concentration. The Norwegian inquiry also reported that suppliers might find it challenging to enter small Norwegian markets.

199. Suppliers' concentration is a key characteristic of the markets for baby milk and baby food, according to the competition authorities that have examined cases in these product markets. The Italian competition authority has repeatedly dealt with collusive practices in the baby milk market, in 2000<sup>163</sup> and in 2005.<sup>164</sup> According to the authority, the baby milk sector is characterised in Italy by the presence of a few big operators and a competitive fringe, with the eight largest firms in the market, holding together more than 90% in the three investigated markets (the new-born infant formula market, the follow-on milk market and the special baby milks market). In addition, the authority reported that the degree of competition in the market was weakened by a number of features (see below, section 3.3.1.).<sup>165</sup>

200. The US baby food market also exhibits high levels of concentration. In 2001 in US, the FTC challenged a merger involving two of the three leading U.S. makers of baby food, a market with annual sales of nearly \$1 billion. At the time, the market had a clear leader, Gerber, which controlled approximately 65 percent of the market, with products sold in over 90 percent of US supermarkets. The second- and third-largest manufacturers, Heinz and Beech-Nut, proposed to merge. Both firms, the FTC alleged, competed aggressively at the wholesale level to gain and maintain position as the second brand (after Gerber) on retailers' shelves.<sup>166</sup>

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2012 were frozen ready cooked meals, baby food, cereals and coffee. The categories with the lowest average concentration levels were ham/delicatessen, cheese and fresh prepacked bread." (page 30)

<sup>162</sup> OECD, DAF/COMP (2014) 16, Competition issues in the food chain industry 2014, p. 294 with references to the report NOU 2013:6 "Mat, makt og avmakt, om styrkeforholdene i verdikjeden for mat", English summary available at [www.regjeringen.no/globalassets/upload/lmd/vedlegg/brosjyrer\\_veiledere\\_rapporter/mat\\_makt\\_og\\_avmakt\\_summary\\_engelsk.pdf](http://www.regjeringen.no/globalassets/upload/lmd/vedlegg/brosjyrer_veiledere_rapporter/mat_makt_og_avmakt_summary_engelsk.pdf)

<sup>163</sup> See case I328 at <http://www.agcm.it/concorrenza--delibere/concorrenza-provvedimenti/open/41256297003874BD/D9B1D3B7CE26E470C12568A9003A8089.html>

<sup>164</sup> In 2005, the Italian Competition Authority closed proceedings against seven suppliers of baby milk in Italy (Heinz Italy, Plada, Nestle Italy, Nutricia, Milupa, Humana Italy and Milte Italy) concluding that they had put in place a price agreement.

<sup>165</sup> See case I623 at <http://www.agcm.it/concorrenza--delibere/concorrenza-provvedimenti/open/41256297003874BD/0403E49529CE6846C12570A00050A409.html> ; OECD, DAF/COMP/GF/WD (2006) 5, Cartel case studies, case submitted by Italy, available at [www.oecd.org/daf/competition/prosecutionandlawenforcement/35994584.pdf](http://www.oecd.org/daf/competition/prosecutionandlawenforcement/35994584.pdf)

<sup>166</sup> OECD, DAF/COMP (2014) 16, Competition issues in the food chain industry 2014, p. 383 with references to the Brief for Plaintiff in Support of Motion for Preliminary Injunction, FTC v. H.J. Heinz Co., No. 1:00CV01688 (D.D.C. July 14, 2000).

201. In Australia, two mergers<sup>167</sup> in the infant food sector revealed a high level of concentration in the market. In the first case in 2012, the ACCC announced its decision not to oppose the proposed acquisition by Nestlé of Pfizer Nutrition, a global infant nutrition business, from Pfizer, subject to undertakings. The ACCC considered that the proposed acquisition would lead to the consolidation of two of the three major suppliers in an already concentrated industry with high barriers to entry. This is because Nestlé's and Pfizer's infant formula brands are "must have" brands for the major supermarket chains given strong customer loyalty and their role in attracting high-value retail customers. In the second case, on 6 June 2013, the ACCC announced its decision to oppose the proposed acquisition by H J Heinz of Rafferty's Garden. The ACCC concluded that the proposed acquisition would have or be likely to have the effect of substantially lessening competition in the national markets for the wholesale supply of wet infant food, infant cereals and infant snacks.

202. High concentration is also a factor highlighted in flour cartels in France and Germany, involving companies from both countries with manufacturer VK Mühlen appearing in both cartels. The 2012 decision of the French competition authority on the flour Franco-German cartel<sup>168</sup> reported that milling production in France appeared concentrated, following a consolidation process that took place over the previous twenty years and led to the concentration of planting and packaging utilities in a small number of large players. The milling industry in Germany appeared also concentrated in two main groups with a third player just having entered the market.<sup>169</sup>

203. In the UK, the "dairy retail price initiatives" decision pointed to a high level of concentration at the manufacturing level of liquid milk. It confirmed, *inter alia*, that smaller processors had limited opportunities to supply the retail level.<sup>170</sup>

### 3.2. Concentration at the retail level and buyer power

204. High concentration levels at the retail stage may also play a crucial role in the functioning of the food chain. Growth in concentration among retailers has given rise to concerns about market power which can affect competition at the processing level.

205. In Germany, a sector inquiry into the food retail sector<sup>171</sup> published in 2014 raised concerns because of the increasing buyer power of large retailers. The inquiry reported the small number of active

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<sup>167</sup> For details, see Australia's description at OECD, DAF/COMP (2014) 16, Competition issues in the food chain industry 2014, pp. 56-57.

<sup>168</sup> Autorité de la concurrence, décision n° 12-D-09 du 13 mars 2012 relative à des pratiques mises en œuvre dans le secteur des farines alimentaires, available at <http://www.autoritedelaconcurrence.fr/pdf/avis/12d09.pdf>, at paragraph 45.

<sup>169</sup> Autorité de la concurrence, décision n° 12-D-09 du 13 mars 2012, at paragraph 100.

<sup>170</sup> Decision of the Office of Fair Trading, CA98/03/2011, Dairy retail price initiatives, 26 July 2011 (Case CE/3094-03), at paragraphs 4.19 to 4.26, available at [http://webarchive.nationalarchives.gov.uk/20140402142426/http://www.offt.gov.uk/shared\\_offt/ca-and-cartels/dairy-decision.pdf](http://webarchive.nationalarchives.gov.uk/20140402142426/http://www.offt.gov.uk/shared_offt/ca-and-cartels/dairy-decision.pdf) with references to Arla Foods amba and Express Dairies plc: A report on the proposed merger' Competition Commission, October 2003, general information available at <https://www.gov.uk/cma-cases/arla-foods-uk-plc-midlands-co-operative-society-ltd#product-market>

<sup>171</sup> Bundeskartellamt, summary of the Final Report of the Sector Inquiry into the food retail sector, 2014, available at [www.bundeskartellamt.de/SharedDocs/Publikation/EN/Sector%20Inquiries/Summary\\_Sector\\_Inquiry\\_food\\_retail\\_sector.pdf?\\_\\_blob=publicationFile&v=3](http://www.bundeskartellamt.de/SharedDocs/Publikation/EN/Sector%20Inquiries/Summary_Sector_Inquiry_food_retail_sector.pdf?__blob=publicationFile&v=3)

food retailers in the market, which is dominated by four national retailers. According to the competition authority, the four leading retailers were by far the biggest buyers and together accounted for the largest share of the purchasing volumes. In negotiations with the food industry the leading retailers were largely able to use their strong market positions to their advantage.<sup>172</sup> However, the authority also noted that, in markets where supply structures are concentrated, there may be little or no scope for retailers who want to maintain a multi-brand strategy to switch supplier. This claim was based on an econometric assessment of the results of negotiations between manufacturers and retailers in order to determine the most relevant factors determining their (relative) bargaining power.<sup>173</sup>

206. In a merger in the baby foods market, the ACCC considered that, in the specific instance, grocery retailers did not have sufficient countervailing power to constrain a merged Heinz/Rafferty's Garden. Instead, countervailing power is limited by Heinz and Rafferty's Garden's superior brand strength and strong consumer trust and support. As purchases of infant foods are typically high value grocery customers, retailers have a strong incentive to stock the infant food brands preferred by those customers.<sup>174</sup>

207. In 2007, the Hungarian Competition Authority (GVH) commissioned a study on the relationship between large retail chains and their suppliers. The study concluded that the larger (in size) a retail chain was, the more its conduct tended to become abusive towards suppliers. The study also indicated that bigger suppliers were more likely to suffer from these practices than smaller competitors, resulting from the fact that they needed access to the market in order to grow.<sup>175</sup>

208. In the UK, the "dairy retail price initiatives" decision also reported a high level of buyer power in relation to the supply of milk from processors. The importance of private labels in the UK milk market was an important consideration in the analysis of the case. The decision pointed out that buyer power was based on a number of other factors<sup>176</sup> such as: a) the transparency of the farm gate price, which enables retail chains to identify decreases in the costs of processing and therefore seek that any such decreases are passed on through reduced wholesale prices; b) over-capacity in the processing industry, which enables retail chains to switch large volumes of milk purchases between processors. This ability to switch suppliers is greatly facilitated by the fact liquid milk is sold under the retailer's own brand because consumers would be unaware of the change of supplier; and c) the increased significance of retail chains as the source of household milk sales provides them with additional strength in the supply chain, because the share of each producer's sales to retail chain as a proportion of its overall sales has increased.

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<sup>172</sup> As a consequence, they were in a stronger bargaining position than the manufacturers and had a significant structural advantage over their smaller competitors in the food retail trade.

<sup>173</sup> In Italy, a 2013 survey on the retail sector also highlighted significant asymmetries and conflicting relationships between producers and large retailers. According to the authority, this "might suggest the existence of a certain degree of buyer power that might affect competition in the market". See Italian Competition Authority (Autorità Garante della Concorrenza e del Mercato), IC43 Settore della Grande Distribuzione Organizzata, 24 July 2013, available at [www.agcm.it/stampa/comunicati/6548-ic43-agroalimentare-antitrust-piu-forte-il-potere-di-mercato-della-gdo-rapporti-conflittuali-con-i-fornitori-oeffetti-incerti-sui-consumatori.html](http://www.agcm.it/stampa/comunicati/6548-ic43-agroalimentare-antitrust-piu-forte-il-potere-di-mercato-della-gdo-rapporti-conflittuali-con-i-fornitori-oeffetti-incerti-sui-consumatori.html)

<sup>174</sup> According to Australia's contribution at OECD, DAF/COMP (2014) 16, Competition issues in the food chain industry 2014, p. 57

<sup>175</sup> OECD, DAF/COMP (2014) 16, Competition issues in the food chain industry 2014, p. 197 with references to the 2007 Hungarian study on the relationship between large retail chains and their suppliers.

<sup>176</sup> Decision of the Office of Fair Trading, CA98/03/2011, Dairy retail price initiatives, 26 July 2011 (Case CE/3094-03), at paragraph 4.28.

### 3.3. *Barriers to entry*

209. Barriers to entry in the food processing industry are also of great importance and have been reported in several decisions on anti-competitive practices. The more difficult it is for a new player to enter the market, the more this market exhibits the potentials for collusive behaviour. In the food processing industry, barriers to entry may arise for different reasons and due to several features of each market segment. They may be identified in the nature of the product (e.g. strong brands are market leaders and consumers do not switch to substitutes), the capital intensive nature of the market (e.g. requirements for investment in facilities, distribution networks, vertical integration) or the regulatory requirements to operate (e.g. the food processor has to obtain specific facilities in order to produce).

#### 3.3.1. *Regulatory barriers*

210. Regulatory barriers were a facilitating factor in the 2015 French flour cartel between flour producers and bakeries. Barriers to entry were observed due to specific regulations on granting the right to mill<sup>177</sup> according to which there were specific limits on the amount of wheat which could be milled and transformed into flour for human consumption. In addition, in order for new mill producers to enter the market, they had first to own production facilities and acquire the rights to mill from an existing producer, which according to the decision was difficult to obtain. The same observations were pointed out in the Franco-German flour cartel in 2012<sup>178</sup>. In addition, the 2015 decision revealed the participation of certain repeated offenders also involved in the 2012 Franco-German cartel on packaged flour<sup>179</sup>.

211. Regulatory barriers have also been among the facilitating factors in a collusive agreement on baby milk in Italy. As reported by the competition authority, according to Italian law advertising of baby milk is prohibited, even though only for new born formula milk. Producers have autonomously extended this prohibition on all baby milks. Furthermore, a 1994 law allows hospitals to ask baby milk producers to supply them for free. Hospitals have to a large extent benefited from this opportunity and have usually organised a system of shifts where each (major) producer had a two-week exclusivity.

212. In the sugar market, ECN (2012) highlights the regulatory requirements imposed at EU level:<sup>180</sup> “The sugar market has various unique features linked to the regulatory framework set by the CMO [Common Organisation of Agricultural Markets] in agricultural products. This framework includes a quota system for beet sugar production allocated to Member States, which in turn allocate the quota to sugar beet processors. In addition, the framework sets a minimum beet sales price and a reference price for the sale of standard quality white sugar.”

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<sup>177</sup> A French regulation imposes specific plafonds on the amount of wheat which can be milled and transformed into flour for human consumption.

<sup>178</sup> Autorité de la concurrence, décision n° 12-D-09 du 13 mars 2012 relative à des pratiques mises en œuvre dans le secteur des farines alimentaires, available at <http://www.autoritedelaconcurrence.fr/pdf/avis/12d09.pdf>, at paragraphs 810-811

<sup>179</sup> The two cases investigated different types of cartel and at different levels. The 2012 cartel concerned anticompetitive practices among German and French flour producers while the 2015 cartel concerned the price-fixing between French flour producers and bakeries.

<sup>180</sup> European Competition Network, Report on competition law enforcement and market monitoring activities by European competition authorities in the food sector, (ECN Report), May 24, 2012, at paragraphs 142-143.

213. In a similar way as current regulatory barriers, prior regulation can also facilitate collusion. First, suppliers that were previously protected try to collude in order to maintain the existing advantages. Second, companies can informally continue to follow the regulations, even after they have been removed. An example of a prior protective regulation arises in the flour cartel in South Africa. MnCube (2014) notes that the wheat value chain was extensively regulated by the state from 1937 to 1996, including a marketing channel called Wheat Board which controlled imports, exports and was acting as the sole buyer and seller of wheat at predetermined prices. MnCube (2014) concludes that “[...] it appears that the cartel started subsequent to the de-regulation of the industry. Instead of competing, the flour millers replaced the regulated cartel with private agreements”. According to the author, other factors contributed to this cartel as well, such as high concentration, homogeneity of the product and firms’ interaction in more than one market at the same time.<sup>181</sup>

214. The cartel started in 1999 that is three years after the government abolished the protective regulations. Complaints from bread distributors in the Western Cape in December 2006 led to an investigation into allegations that the major bread manufacturers, all of whom were vertically integrated up to the wheat flour milling level of the value chain, were fixing bread prices.<sup>182</sup>

### 3.3.2. *Fixed costs*

215. In industries producing homogenous food products, such as flour, sugar and milk, companies need to invest in large plants in order to be efficient. According to ECN (2012), “processing sugar beet requires large capital investments which has led to a strong consolidation process over the last years and thus, led to a high concentration with only a few players in most Member States”.

216. Grimbeek and Lekezwa (2013)<sup>183</sup> studied the South African flour cartel and found that the industry was characterised by high barriers to entry mainly associated with economies of scale and the requirement for a well-established distribution network. To this end, firms needed significant capital investment in order to reach the required capacity to produce efficiently. New entrants were therefore not motivated to enter the market if they did not have sufficient customers to finance their expansion. In addition, the four largest firms in the flour industry were vertically integrated, which imposed an additional barrier to entry to new players as they had to operate at more than one level to obtain economies of scale and become competitive.

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<sup>181</sup> Mncube L, 2014, The South African Wheat Flour Cartel: Overcharges at the Mill, Journal of Industry, Competition and Trade, 2014 (14) 4: 487-509

<sup>182</sup> The four vertically integrated firms account for a combined 95% of the wheat flour market whilst also collectively dominating the downstream bread market. The Commission’s investigations found that these firms had been part of a hard core price fixing cartel from at least 1994 up to early 2007. In addition, the investigation found that the bakeries were engaged in market allocation conduct by agreeing to close down certain bakeries in specific areas in favour of competitors. One of the firms was granted leniency for its involvement in the bread cartel, whilst the other three respondents paid fines for their involvement.

<sup>183</sup> Grimbeek, S. & Lekezwa, B. (2012). “The emergence of more vigorous competition and the importance of entry – comparative insights from flour and poultry”. Paper presented at the Sixth Annual Conference on Competition Law, Economics and Policy in South Africa, University of the Witwatersrand, 6-7 September 2012, available at [www.uj.ac.za/EN/Faculties/ecofin/economics/research/cce/Documents/CCE%20Working%20Paper%2001-2013%20PoultryandMilling.pdf](http://www.uj.ac.za/EN/Faculties/ecofin/economics/research/cce/Documents/CCE%20Working%20Paper%2001-2013%20PoultryandMilling.pdf)

### 3.3.3. Brand

217. Some market segments in the food industry are characterised by products with top brand names, often supplied by multinational companies. Such producers tend to invest heavily in marketing, advertising and the promotion of their produce by creating and developing internationally recognised brand names. In such cases, new entry is difficult to occur due to significant investment to build a competitive brand.

218. A 2014 report by EY, Arcadia International and Cambridge Econometrics, notes an increase in choice, at least in Europe. “Choice in brand suppliers available in modern retailers’ shops increased over time in all Member States, ranging from 1.7% annual growth in Italy to 6.4% in Spain over the 2004-2012 period.” While choice increased overall, there was variation across different products: “Choice in brand suppliers increased the most from 2004 to 2012 in cereals, ham/delicatessen, chocolate and soft drinks. The product categories experiencing the lowest growth over the same period were butter/margarine, coffee and frozen vegetables. The total number of suppliers declined for two product categories (frozen vegetables, and baby food) over the crisis period.”

219. Baby food and infant milk and the chocolate confectionary market are examples of products where brands are important. For instance, in the proposed merger in the baby food market between Heinz and Rafferty’s Garden, the ACCC considered<sup>184</sup> that barriers to entry and expansion were high. The authority argued that barriers were due primarily to the challenge of overcoming brand loyalty to incumbent suppliers’ products, and limitations on access to retail shelf space. Brand loyalty and reputation are particularly significant in the infant food category due to consumers’ heightened desire to trust that products will be safe and healthy to feed their children.

220. In an alleged conspiracy in the chocolate confectionary market in the US (which eventually was not proven), barriers to entry deriving from brand was a recognised factor facilitating collusion. The court decision noted that “in concluding that the market was ripe for conspiracy, both experts make the following pertinent observations: first, the chocolate market was characterized by a few dominant sellers and high market concentration; second, new firm entry was largely precluded by substantial barriers to entry, including high cost and time investment and difficult brand introduction; third, defendants each faced similar input cost structures; and fourth, demand throughout the conspiracy period was relatively inelastic”.<sup>185</sup>

221. Two important cartels in the chocolate confectionery sector were uncovered in Canada and Germany<sup>186</sup>. Interestingly, both cases involved some of the top multinational firms in the industry. In 2013 in Canada, the Competition Bureau found a price-fixing conspiracy on chocolate products by three companies, Nestlé Canada Inc., Mars Canada Inc., and ITWAL Limited, a national network of independent wholesale distributors. During the same year in Germany, the Bundeskartellamt concluded its fine

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<sup>184</sup> OECD, DAF/COMP (2014) 16, Competition issues in the food chain industry 2014, p. 57.

<sup>185</sup> Full text of the decision available at [www.mcguirewoods.com/news-resources/publications/antitrust/In-re-Chocolate-Confectionary-dismissal.pdf](http://www.mcguirewoods.com/news-resources/publications/antitrust/In-re-Chocolate-Confectionary-dismissal.pdf)

<sup>186</sup> For Canada, see Competition Bureau, announcement of the 6<sup>th</sup> of June 2013, Charges Laid in a Price-fixing Cartel in the Chocolate Industry, available at [www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/03569.html](http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/03569.html) ; for Germany, see Bundeskartellamt, Case summary of the 27<sup>th</sup> of May 2013, Fine proceedings against confectionery manufacturers, available at [www.bundeskartellamt.de/SharedDocs/Entscheidung/EN/Fallberichte/Kartellverbot/2013/B11-11-08.pdf?\\_\\_blob=publicationFile&v=2](http://www.bundeskartellamt.de/SharedDocs/Entscheidung/EN/Fallberichte/Kartellverbot/2013/B11-11-08.pdf?__blob=publicationFile&v=2)

proceedings against several manufacturers of branded confectionery products and imposed fines totalling approximately EUR 63 million on 12 companies and several sales executives.<sup>187</sup> It should be noted that in both cartels discovered and sanctioned in Canada and Germany, the participating firms had similar profile with some repeated offences in both cases.<sup>188</sup>

### 3.4. *Low price elasticity of demand*

222. Some products in the food processing industry exhibit a low price elasticity of demand. This is mainly linked to the nature of some food products such as milk, bread or flour which are essential purchases for households.

223. For instance, in the 2015 decision on the French cartel between flour producers and bakeries, it is reported that the price elasticity of the product was so low that facilitated the increase on prices without anticipating any significant loss on demand<sup>189</sup>. The same observation is made in the 2012 decision on the Franco-German cartel. In the milk sector, the UK reports in the “dairy retail price initiatives” decision that milk is an inelastic product.<sup>190</sup>

224. Similar considerations about low demand elasticity were made by the Italian competition authority in the baby milk case. The authority noted that the demand of consumers is mainly driven by their paediatricians and it is quite insensible to price savings considerations. As a consequence, producers do not have many incentives to compete aggressively.

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<sup>187</sup> The proceedings had been initiated after a leniency application was filed by the company Mars GmbH. The investigations focused on co-ordinated price increases for chocolate products, which had occurred at the beginning of 2008. In 2007, prices for the commodities milk and cocoa had increased significantly. The manufacturers of chocolate products had to decide whether and to what extent they could pass on this cost increase to the retail trade (and ultimately the end consumer) by raising the prices of their products. Some of them coordinated the timing and scope of the price increases with their competitors in a direct and confidential exchange. Furthermore, in various discussion groups several confectionery manufacturers exchanged competitively sensitive information, in particular on the state of their annual negotiations with retailers.

<sup>188</sup> Despite the different legal entities (different entities at national levels), companies belong to the same company names. In addition, in the German cartel, we consider the leniency applicant as a participating firm.

<sup>189</sup> Autorité de la concurrence, décision n° 15-D-04 du 26 mars 2015 relative à des pratiques mises en œuvre dans le secteur de la boulangerie artisanale, available at <http://www.autoritedelaconcurrence.fr/pdf/avis/15d04.pdf>, at paragraph 388. It is noted that the decision is currently under appeal before the Paris Court of Appeal.

<sup>190</sup> Ibid, at paragraphs 4.55 to 4.60 (footnote 170).

### 3.5. *Transparency*

225. In 2012, the sector inquiry on the milk sector in Germany<sup>191</sup> revealed how high price transparency in the market can influence price formation of milk and dairy products and lead to potential distortive effects. In particular, the inquiry found the existence of market information systems which provided up-to-date data on the prices of raw milk paid by each dairy company to producers. These systems allowed private dairies to know the prices paid by neighbouring dairy cooperatives, which were then used as benchmark for the prices paid to their own suppliers. It was found that these mechanisms facilitated the standardisation of prices and led to a reduction of competition among dairy companies with regard to the acquisition of raw milk. The same inquiry also observed that price movements along the milk supply chain seemed to be margin-neutral for retailers.

## 4. **Construction**

### 4.1 *Concentration and fragmentation*

226. There is a widely expressed view that construction markets exhibit a high level of fragmentation. Many competition authorities have made this observation. However, despite the first impression, competition usually appears limited when it is examined in a specific relevant market with a small number of players.

227. A review conducted for the UK Office of Fair Trading (OFT) by Europe Economics in 2009 surveyed six OFT decisions involving price-fixing or other cartel activity in the construction sector between 2004 and 2006.<sup>192</sup> According to the findings of the survey, the combined market share of participants in the relevant product and geographic markets presented a great variation across cases. In one example, the combined market share was 60 percent, in another the market was so fragmented that none of the participants had large market shares. The OFT suggested that fragmentation is not a good indicator for cartel activities.<sup>193</sup>

228. The OFT report,<sup>194</sup> after highlighting the circumstances that facilitate the sustainability of cartels, including bid rigging, considered that the construction industry did not exhibit the features of a cartel prone

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<sup>191</sup> European Competition Network, Report on competition law enforcement and market monitoring activities by European competition authorities in the food sector, (ECN Report), May 24, 2012, p. 103, with reference to Bundeskartellamt, Milk Sector Inquiry. Final Report January 2012, (B2-19/08), available at [www.bundeskartellamt.de/SharedDocs/Publikation/EN/Sector%20Inquiries/Milk%20Sector%20Inquiry%20-%20Final%20Report.pdf?\\_\\_blob=publicationFile&v=7](http://www.bundeskartellamt.de/SharedDocs/Publikation/EN/Sector%20Inquiries/Milk%20Sector%20Inquiry%20-%20Final%20Report.pdf?__blob=publicationFile&v=7)

<sup>192</sup> Aluminium spacer bars (June 06); Flat roof and car park surfacing contracts in England and Scotland (Feb 06); Felt and single ply roofing contracts in Western-Central Scotland (Jul 05); Mastic asphalt flat-roofing contracts in Scotland (Apr 05); Felt and single ply flat-roofing contracts in the North East of England (Apr 05); and Flat-roofing contracts in the West Midlands (Apr 04).

<sup>193</sup> Office of Fair Trading, *Evaluation of the impact of the OFT's investigation into bid rigging in the construction industry: A report by Europe Economics*, (OFT 1240 June 2010), available at [www.europe-economics.com/publications/bidrig.pdf](http://www.europe-economics.com/publications/bidrig.pdf) with references to Office of Fair Trading (2006) "Agreement to fix prices and share the market for aluminium double glazing spacer bars" No. CA98/04/2006 and Office of Fair Trading (2006) "Collusive tendering for flat roof and car park surfacing contracts in England and Scotland" No. CA98/01/2006

<sup>194</sup> Office of Fair Trading, *Evaluation of the impact of the OFT's investigation into bid rigging in the construction industry: A report by Europe Economics*, (OFT 1240 June 2010), at paragraphs 5.6-5.9. According to the OFT, the circumstances in which collusive activity is likely to be sustainable are a small

industry: “The construction sector as a whole is not a highly concentrated market with only a small number of large firms. Nor is it a sector producing standard products offered at list prices. Projects are often complex and custom built with neither the customer nor the contractor having certainty about what is being delivered until completion of the work.”<sup>195</sup>

229. After an initial observation that the overall construction market is not concentrated, the OFT commented that supply may be concentrated in a small number of firms. This could be either because of the need of a specialist product or service, or due to geographical limitations which result in local markets, for instance because of high transport costs for some building materials. In these terms, the construction sector appears “as a collection of inter-related markets rather than as a single homogeneous industry”. Taking account these and other conditions<sup>196</sup>, the OFT reported that under these general conditions, sustainable cartel activity may well occur.<sup>197</sup>

230. In one of the largest collusion cases in the construction industry, the Netherlands Competition Authority (NMa<sup>198</sup>) was faced with 481 leniency applicants and about 650 companies implicated in the case. The authority launched an in-depth investigation into a number of segments of the construction market, such as building and housing, road works and civil engineering and the installation sector. According to the Dutch authority, there were many firms active in most of the submarkets and a large number of SMEs. However, despite the first observation of a highly competitive market, several factors led to a limited number of players per relevant market. First, tenders were run for projects with narrow content and specific standards. As such, the relevant market on a case-by-case basis consisted of a limited number of players. The authority also indicated that in the case of more complicated construction standards derived from environmental, safety or quality requirements, the supply side becomes even more oligopolistic. This might also act as a barrier to entry both for small-sized firms and foreign companies.<sup>199</sup>

231. The highly fragmented nature of the market has also been identified by the French competition authority. However, the authority has noted that this coexists with a small number of very large construction companies.<sup>200</sup> The French Competition Authority has revealed a number of cartels<sup>201</sup> in the

number of sellers, a high level of fixed costs, the cost of tendering for work relative to the expectation of success and the extent to which information relevant to any tender is available to all participants.

<sup>195</sup> Office of Fair Trading, *Evaluation of the impact of the OFT's investigation into bid rigging in the construction industry: A report by Europe Economics*, (OFT 1240 June 2010), at paragraph 5.10

<sup>196</sup> The report also notes that firms bidding for specialist work offer very similar products under very similar bids with a high level of information regarding the competing bidders (also due to the high level of sub-contracting).

<sup>197</sup> Office of Fair Trading, *Evaluation of the impact of the OFT's investigation into bid rigging in the construction industry: A report by Europe Economics*, (OFT 1240 June 2010), at paragraphs 5.11 to 5.13.

<sup>198</sup> At the time of the investigation, the Dutch Competition Authority was “The Netherlands Competition Authority (NMa)”. In April 2013, The Netherlands Consumer Authority, the Netherlands Competition Authority (NMa) and the Netherlands Independent Post and Telecommunications Authority (OPTA) merged, creating a new regulator: the Netherlands Authority for Consumers and Markets (ACM).

<sup>199</sup> OECD, DAF/COMP (2008) 36, *Competition in the Construction Industry* (2008), p. 78. It is also noted that “high transport costs and limited time-to-use for certain building materials (such as ready-mix concrete) decrease the geographical size of a market and therefore the number of competitors that can supply to this market.”

<sup>200</sup> OECD, DAF/COMP (2008) 36, *Competition in the Construction Industry* (2008), p. 52. It is noted that “La construction est un secteur très atomisé : les très petites entreprises (TPE : moins de 10 salariés) sont

sector with some cases involving repeated offences by the same company. For instance, in a 2013 decision, the French Competition Authority fined construction companies involved in anti-competitive behaviour regarding the rebuilding of watchtowers at Perpignan prison. The authority increased the fine by 30 per cent for one company, since it was involved in similar anti-competitive practices in public construction projects in France in 2005 and 2007.<sup>202</sup>

232. Some explanation on the level of fragmentation in the industry has been offered by the UK Department for Business, Innovation and Skills. In a 2013 publication on the UK construction industry<sup>203</sup>, it is pointed out that “[...] the industry has a large number of privately owned companies and is thought to be more fragmented than its major competitors such as Germany or France. High fragmentation is likely to be driven by a relatively high proportion of self-employment in the UK construction industry and a relatively high number of small and micro businesses”. As was the case in the Netherlands, the UK competition authority uncovered in the early 2000s a cartel involving numerous firms over an extended period of time.<sup>204</sup> The OFT imposed fines totalling £129.2 million on 103 construction firms in England.<sup>205</sup> According to the decision, the construction market was characterised by a high level of fragmentation.<sup>206</sup>

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*majoritaires dans le secteur du BTP, elles représentaient 91,7% de la structure totale du secteur en 2005, pour seulement 34,3% du chiffre d'affaires des travaux de construction. A l'inverse, les 289 entreprises de plus de 200 salariés (soit 0,1% du total) ont assuré 18,6% du chiffre d'affaires global en 2005. La concentration se révèle plus importante si on analyse l'actionnariat de ces grandes sociétés. Celles-ci sont en général contrôlées par des majors du BTP : Vinci, Bouygues et Eiffage. Elles peuvent aussi appartenir à d'autres opérateurs moins spécialisés : Cegelec, Spie, Sade”.*

<sup>201</sup> See among others, Décision n° 07-D-15 du 09 mai 2007 relative à des pratiques mises en œuvre dans les marchés publics relatifs aux lycées d'Ile-de-France, Décision n° 06-D-07 du 21 mars 2006 relative à des pratiques mises en œuvre dans le secteur des travaux publics dans la région Ile-de-France, Décision n° 05-D-19 du 12 mai 2005 relative à des pratiques mises en œuvre dans le cadre des marchés de construction des ouvrages d'art pour la réalisation de l'autoroute A84, dite "Route des Estuaires", dans le département de la Manche.

<sup>202</sup> Autorité de la concurrence, Décision n° 13-D-09 du 17 avril 2013 relative à des pratiques mises en œuvre sur le marché de la reconstruction des miradors du centre pénitentiaire de Perpignan, at paragraphs 183 to 196, available at <http://www.autoritedelaconcurrence.fr/pdf/avis/13d09.pdf>

<sup>203</sup> Department of Business, Innovation and Skills, UK CONSTRUCTION, *An economic analysis of the sector, July 2013*, with references to CIB Publication No. 293: *The Construction Sector System Approach: An International Framework* and HM Treasury (December 2010) *Infrastructure Cost Review: Technical Report* available at [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/210060/bis-13-958-uk-construction-an-economic-analysis-of-sector.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/210060/bis-13-958-uk-construction-an-economic-analysis-of-sector.pdf)

<sup>204</sup> The OFT concluded that the firms engaged in illegal anti-competitive bid-rigging activities on 199 tenders from 2000 to 2006, mostly in the form of 'cover pricing'. According to the OFT, "Cover pricing is where one or more bidders in a tender process obtains an artificially high price from a competitor. Such cover bids are priced so as not to win the contract but are submitted as genuine bids, which gives a misleading impression to clients as to the real extent of competition. This distorts the tender process and makes it less likely that other potentially cheaper firms are invited to tender".

<sup>205</sup> Decision of the Office of Fair Trading No. CA98/02/2009, Bid rigging in the construction industry in England 21 September 2009 (Case CE/4327-04).

<sup>206</sup> Decision of the Office of Fair Trading No. CA98/02/2009, at paragraphs II.1599 and VI. 122.

### **Box 5. Collusion in the Dutch construction industry**

In 2002, after a whistle-blower revealed that a major construction company was keeping secret financial accounts, the Dutch government began investigations that exposed rampant collusion throughout the Netherlands' construction industry. 481 leniency applicants came forward and overall approximately 650 companies were implicated. A parliamentary enquiry committee concluded that government agencies were defrauded by an average of 8.8 percent in public construction projects as a result of the collusion. The government imposed a total of 239 million euro in fines.

Based on an extensive investigation in the Dutch construction industry, Dorée (2004) analysed the factors and economic characteristics of the market. He compared the factors acknowledged in the literature with the factors appeared in the Dutch construction market. According to his research, he concluded that both sets of factors seemed mutually consistent.

He identified the following market characteristics: a) the Dutch construction industry is not a small number market but on the basis of limited tendering procedures, local small number markets are created; b) conspiracy effectively coped with the problem of new entrants by collective action; c) auction systems such as tendering and lowest cost selection create a risk for the bidders and cost estimates are imprecise and uncertain; d) system of checks and remunerations had been going on for such a time that the contractors felt it to be accepted common practice; e) contractors argued that the collusion system helped to stabilise the workload and reduce their uncertainty about future workload fluctuations; f) there is an obligatory and transparent selection procedure that has to be followed by public sector clients.

Consequently, the contractors could straightforwardly predict and manipulate the outcome of the selection procedure. Interestingly, Dorée notes the cultural perspective of the market "The Dutch construction industry is seen as a highly developed collective sector, with a high level of cooperation between common interest groups". There is a tendency for firms to cooperate, compromise and adopt a consensus, which smoothes the sharper edges of struggle and rivalry".

#### **4.2. *Tenders reduce the number of competitors***

233. Construction contracts are usually awarded through tenders organised by private or public entities. In addition, the local nature of projects often attracts (or favours) local suppliers due to the specific requirements as well as the high cost of transportation of building materials. A few competition authorities have commented on how tenders affect the nature of competition for construction contracts.

234. The South African Competition Authority has pointed out that the regulatory environment of public procurement procedures imposes barriers to entry.<sup>207</sup> The regulatory framework for tenders imposes specific requirements for companies in order to become eligible for bidding. First, companies should meet certain financial capacity criteria in order to bid for tenders of a specific value and second, they need to demonstrate their capacity to handle projects with regard to the number of qualified employees for projects above specific values.

235. In Switzerland, the competition authority (Comco) has dealt with a number of collusion cases. The majority involved bid-rigging on road construction and civil engineering projects in different cantons of Switzerland. There are also a number of cases under investigation. The authority has commented that the local dimensions of projects as well as the lack of mandatory open tenders are factors that facilitate collusion, since they both lead to a small number of bidders in a given tender.<sup>208</sup>

<sup>207</sup> OECD, DAF/COMP (2008) 36 Competition in the Construction Industry (2008), p. 145-146.

<sup>208</sup> OECD, DAF/COMP (2008) 36, Competition in the Construction Industry (2008), p. 95.

236. Similar concerns have been raised by the Hungarian competition authority (GVH), which has dealt with a number of infringements in the construction industry, including a 2009 decision involving three recidivists.<sup>209</sup> In an earlier submission to an OECD roundtable, the authority noted that “it cannot be said that the market is prone to collusion due to the low number of competitors.” However, it also noted some other characteristics that facilitated collusion, including public procurement procedures which led to an oligopolistic market structure.<sup>210</sup> Based on the enforcement experience in Hungary, GVH has also noted that a number of different projects were tendered out at the same time. This provided a natural environment for market sharing.

#### **4.3. Risk, complexity and sub-contracting**

237. The industry is characterised by a high risk of operation. Complex and specialised projects span over long periods of time and expose construction industries to delays and cancellations. As the OFT notes: “Nor is it a sector producing standard products offered at list prices. Projects are often complex and custom built with neither the customer nor the contractor having certainty about what is being delivered until completion of the work”.<sup>211</sup>

238. These market features lead to frequent sub-contracting and, in some cases, to vertical integration. These relationships increase multi-market contacts among competitors and improve information flows among competitors. More importantly, they lead to complex situations where competitors in some tenders may also found themselves co-operating on other projects.

239. According to the OFT report, sub-contracting is one of the main features of the industry:<sup>212</sup> “Sub-contracting is also common as most construction projects could not be efficiently completed without some degree of sub-contracting. However, the evidence suggests higher levels of sub-contracting and greater competition at all levels are a particular feature of the UK construction market”.

240. The South African authority also comments on the frequency of joint ventures, in order to reduce risk in large-scale and complicated projects. In addition, according to the authority new players face

<sup>209</sup> Hungarian Competition Authority (GVH) website, summary available at [www.gvh.hu/en/press\\_room/press\\_releases/press\\_releases\\_2009/5658\\_en\\_another\\_road\\_construction\\_cartel\\_wound\\_up\\_by\\_the\\_gvh.html?query=construction](http://www.gvh.hu/en/press_room/press_releases/press_releases_2009/5658_en_another_road_construction_cartel_wound_up_by_the_gvh.html?query=construction) In this case, the GVH noted that habitual and repeated recidivism is to be considered as a significant aggravating factor when determining fines.

<sup>210</sup> OECD, DAF/COMP (2008) 36, Competition in the Construction Industry (2008), p. 62, where it is reported “Simply because of its structure, the construction sector should not be considered as an unavoidable playing field of anticompetitive practices. In none of the segments has the GVH identified dominant or even an eminently strong position providing for the possibility of abusive practices. The number of small size construction firms is rather high, according to a 1999 decision close to 70 thousand. The number of firms of more than 50 employees in structural construction was 122 while in the segment of civil engineering 140. Though geographical distances reduce the availability or at least the competitiveness of distant firms, still it cannot be said that the market is prone to collusion due to the low number of competitors. Nevertheless a lot of cartel cases were investigated by the GVH in this sector including the most significant infringements ever discovered in Hungary. Cartels in the construction industry related to market sharing and price fixing”.

<sup>211</sup> Office of Fair Trading, *Evaluation of the impact of the OFT's investigation into bid rigging in the construction industry: A report by Europe Economics*, (OFT 1240 June 2010), at paragraph 1.9.

<sup>212</sup> Office of Fair Trading, *Evaluation of the impact of the OFT's investigation into bid rigging in the construction industry: A report by Europe Economics*, (OFT 1240 June 2010), at paragraph 5.10.

barriers to entry as a result of the vertical integration of the larger firms.<sup>213</sup> Larger South African contractors are vertically integrated into infrastructure and construction materials. This discourages the involvement of foreign companies, as they need to procure their materials locally due to the high transportation costs associated with these products. This structural feature not only discourages new players and foreign companies, but also encourages information sharing since firms are not competitors at all levels.

241. In 2008, the entire value chain of the construction industry became a priority of the South African Competition Authority.<sup>214</sup> In 2009, the authority launched a huge investigation in the sector to identify collusive conduct and, as a result of the prioritisation, a number of firms applied for leniency. In 2011, the authority invited all firms involved in bid rigging and collusive practices to settle, after uncovering crucial information of their conduct and paying –at some cases- certain administrative penalties. At the conclusion of the investigation, 57 settlements have been reached with the major ones being the FIFA World Cup stadia construction and the Gauteng Freeway Improvement Plan (GFIP). In the first one, the authority reached a settlement with 15 construction companies after imposing the highest ever fine of 1.46 billion rand (\$140 million), for colluding to rig bids for construction projects related to the 2010 World Cup.<sup>215</sup> In the second case, construction firms agreed to allocate tenders and to submit cover bids. Interestingly, some of the involved firms appeared in both cartels.

242. The Korean competition authority (KFTC – Korea Fair Trade Commission) has repeatedly dealt with collusion cases in the construction industry. In 2014, the KFTC has sanctioned a number of bid rigging cases imposing both high fines and criminal prosecutions.<sup>216</sup> In 2015, KFTC has fined more than 20 construction companies a total of 182.6 billion won (€150 million) for rigging bids in multiple large-scale government projects.<sup>217</sup>

243. In an earlier submission to an OECD roundtable, the KFTC has commented on the distinguishing features of the construction industry. Construction companies are exposed to substantial risk, for instance arising from design changes and unpredicted additional work. In order to better manage this risk and to improve efficiency in all the different components of a project, large players engage sub-contractors to spread risk and ensure delivery. These factors have contributed to a multi-layer subcontracting structure in the construction industry.

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<sup>213</sup> OECD (2008), pp. 145 – 146.

<sup>214</sup> Hekima Advisory. (2014). *The Role of CIDB in Limiting Construction Industry Cartels*. Regulatory Entities Capacities Building Project, undertaken by The Centre for Competition, Regulation and Economic Development, at pp. 14-16, available at [static1.squarespace.com/static/52246331e4b0a46e5f1b8ce5/t/534f8d5fe4b053dc26f7a611/1397722463112/1400407\\_EDD-UJ\\_RECBP\\_Project+Report\\_App12\\_Case+Study+-+Construction+and+Cartels\\_Final.pdf](http://static1.squarespace.com/static/52246331e4b0a46e5f1b8ce5/t/534f8d5fe4b053dc26f7a611/1397722463112/1400407_EDD-UJ_RECBP_Project+Report_App12_Case+Study+-+Construction+and+Cartels_Final.pdf)

<sup>215</sup> See Gibson Dunn, *2013 Year-End Criminal Antitrust and Competition Law Update*, January 8, 2015, available at [www.gibsondunn.com/publications/pages/2013-Year-End-Criminal-Antitrust-and-Competition-Law-Update.aspx](http://www.gibsondunn.com/publications/pages/2013-Year-End-Criminal-Antitrust-and-Competition-Law-Update.aspx) with reference to Matthew Heller, *S. Africa Fines Builders \$140M for World Cup Bid-Rigging*, Law 360 (June 24, 2013), available at [www.law360.com/articles/452438](http://www.law360.com/articles/452438)

<sup>216</sup> See for example, Gibson Dunn, *2014 Year-End Criminal Antitrust and Competition Law Update*, January 8, 2015, available at [www.gibsondunn.com/publications/pages/2014-Year-End-Criminal-Antitrust-and-Competition-Law-Update.aspx](http://www.gibsondunn.com/publications/pages/2014-Year-End-Criminal-Antitrust-and-Competition-Law-Update.aspx). It is reported that KFTC has imposed KRW 100 billion (\$90.9 million) against bid riggers during the second half of the year.

<sup>217</sup> See Miriam Kenner, *Korea fines builders €150 million for bid rigging*, available at [www.globalcompetitionreview.com/news/article/38574/korea-fines-builders-150-million-bid-rigging/](http://www.globalcompetitionreview.com/news/article/38574/korea-fines-builders-150-million-bid-rigging/)

#### 4.4. *Other factors*

244. The following additional factors are among those mentioned by competition authorities: demand fluctuations, high fixed costs, product homogeneity and cultural factors.

245. The Swiss competition authority reported that the strong variations of the industry volumes were also important, since firms tended to compensate losses through collusive practices.<sup>218</sup> This is also linked to the fact that construction projects, as already mentioned, present a high risk of operation with substantial uncertainties for construction companies.

246. As highlighted by the KFTC, construction firms face high fixed costs, in order to maintain human and material resources for potential new projects (OECD, 2008). High fixed costs are also due to the specialised equipment required for larger projects. Once they are in the market and they have invested in equipment, construction companies have an incentive to submit low bids in order to cover their fixed costs and also to keep their track record and experience requirements for future bids.

247. In addition, as highlighted by the OFT,<sup>219</sup> firms bidding for specialist work offer very similar products under very similar bids with a high level of information regarding competing bidders (also due to the high level of sub-contracting).

248. The Dutch competition authority also highlights a cultural factor of the construction industry. Apart from other factors such as low level of innovation and labour productivity, the authority points out that the sector appears quite closed and regional which may lead to frequent contact among the main players.<sup>220</sup> According to the authority, this constitutes a cultural aspect that might facilitate collusion in the construction industry. The Hungarian authority (GVH) has also raised concerns that good personal relations between managers may not only facilitate collusion, but also make leniency programmes ineffective.<sup>221</sup>

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<sup>218</sup> OECD, DAF/COMP (2008) 36, Competition in the Construction Industry (2008), p. 95.

<sup>219</sup> Office of Fair Trading, *Evaluation of the impact of the OFT's investigation into bid rigging in the construction industry: A report by Europe Economics*, (OFT 1240 June 2010), at paragraphs 5.11 to 5.13.

<sup>220</sup> OECD, DAF/COMP (2008) 36, Competition in the Construction Industry (2008), p. 79

<sup>221</sup> OECD (2008), p. 62.

## MAIN REFERENCES

- Allain, M.-L., Boyer, M., Kotchoni, R. and J.-P. Ponsard (2013) “Are cartel fines optimal? Theory and evidence from the European Union”, CIRANO -Scientific Publications, 2013s-2.4
- Armstrong, M. and S. Huck (2010), “Behavioral economics as applied to firms: A primer”, *Competition Policy International*, 2010, Vol. 6 /1, 3-45.
- Antonielli, M. and M. Mariniello (2014), “Antitrust risk in EU manufacturing: A sector-level ranking”, Bruegel Working Paper 2014/7, <http://www.bruegel.org/publications/publication-detail/publication/836-antitrust-risk-in-eu-manufacturing-a-sector-level-ranking>.
- Bejger, S. (2011), “Polish cement industry cartel - preliminary examination of collusion existence,” *BEH - Business and Economic Horizons*, vol. 4 (1), pp. 88-107, available at [dx.doi.org/10.15208/beh.2011.8](http://dx.doi.org/10.15208/beh.2011.8).
- Barenes, M. and G. Wolf (2011), “Cartel recidivism in the mirror of EU case law”, *Journal of European Competition Law and Practice*.
- Becker, Gary (1968) “Crime and punishment: an economic approach”, *Journal of Political Economy*, Vol. 76, No. 2. pp. 169-217.
- Bernheim, B and M. Whinston (1990), “Multimarket contact and collusive behaviour”, *RAND Journal of Economics*, Vol. 21, pp. 1 – 26.
- Bertrand, O., Lumineau, F., Fedorova, E., (2014), “The Supportive Factors of Firms' Collusive Behavior: Empirical Evidence from Cartels in the European Union *Organization Studies*” June 1, 2014 35:6 881-908.
- Bigoni, M., Fridolfsson, S.-O., Le Coq, C. and G. Spagnolo (2012), “Fines, leniency, and rewards in antitrust”, *RAND Journal of Economics*, Vol. 43/2, pp. 368 – 390.
- Bishop, S. and M. Walker (2010), *The Economics of EC Competition Law: Concepts, Application and Measurement*, Sweet & Maxwell, United Kingdom.
- Bosch, C. and E. W. Eckard (1991), “The profitability of price fixing: Evidence from stock-market reaction to federal indictments”, *Review of Economics and Statistics*, Vol. 73/2, 309 – 317.
- Bos, I. and J. E. Harrington (2010), “Endogenous cartel formation with heterogeneous firms”, *RAND Journal of Economics*, Vol. 41, pp. 92 - 117.
- Boyer, M. and Ponsard, J.-P. (2013), “Economic analysis of the European cement industry. CIRANO - Scientific Publication No. 2013s-47, p. 9, available at [dx.doi.org/10.2139/ssrn.2370476](http://dx.doi.org/10.2139/ssrn.2370476).

- Buccirossi, P., Marvão, C. and G. Spagnolo (2014), “Leniency and damages”, CEPR Discussion Paper, No 10682.
- Buccirossi, P., and G. Spagnolo, 2008, Corporate Governance and Collusive Behavior, in Issues in Competition Law and Policy 1 (W.D. Collins ed., 2008), American Bar Association.
- Chang, M-H and Harrington, J. E., (2014), “When can we expect a corporate leniency program to result in fewer cartels?”, [http://assets.wharton.upenn.edu/~harrij/pdf/Leniency\\_08.11.14.pdf](http://assets.wharton.upenn.edu/~harrij/pdf/Leniency_08.11.14.pdf)
- Chen, Z. and P. Rey (2013), “On the design of leniency programs”, *Journal of Law and Economics*, Vol. 56, pp. 917.
- Combe, E. and C. Monnier (2012), “Les cartels en Europe: Une analyse empirique”, *Revue française d'économie*, Vol. 27 / 2.
- Compte, O., Jenny, F. and P. Rey (2002), “Capacity constraints, mergers and collusion”, *European Economic Review*, Vol. 46, pp. 1 – 29.
- Connor, J. (2010), “Recidivism revealed: Private International Cartels, 1990 – 2009”, *Competition Policy International*, Vol. 6/2, pp. 101 – 127.
- Connor, J. M., (2008) “The Great Global Vitamins Conspiracies, 1985-1999”. Available at SSRN:<http://ssrn.com/abstract=1120936> or <http://dx.doi.org/10.2139/ssrn.1120936>
- Connor, J. & Gustav Helmers (2007), Statistics on Modern Private International Cartels, Working Paper 07-01: American Antitrust Institute.
- Connor, J. M., (2006) “The Great Global Vitamins Conspiracy: Sanctions and Deterrence”. *American Antitrust Institute Working Paper* No. 06-02. Available at SSRN: <http://ssrn.com/abstract=1103604> or <http://dx.doi.org/10.2139/ssrn.1103604>
- Davies, S. and P. Ormosi (2014), “The economic impact of cartels and anti-cartel enforcement”, ESRC Centre for Competition Policy, University of East Anglia, CCP Working Paper 13-7 v2.
- Dick, A. (1996), “When are cartels stable contracts?”, *Journal of Law and Economics*, Vol. 39/1, pp. 241 – 283.
- Dick, A. (1995), “Where do cartels form?: Antitrust screens and the cost of cartel transactions”, Working Paper 729, University of California, Los Angeles, <http://www.econ.ucla.edu/workingpapers/wp729.pdf>
- Dorée, A. (2004). “Collusion in the Dutch construction industry: an industrial organization perspective”. *Building Research & Information*, 32(2), March-April, 146-156, available at [www.utwente.nl/ctw/p3bi/te\\_downloaden\\_publicaties/bri\\_collusie\\_definitief.pdf](http://www.utwente.nl/ctw/p3bi/te_downloaden_publicaties/bri_collusie_definitief.pdf)
- Dorée, A., Holmen, E. and J. Caerteling, (2013), “Co-operation and competition in the construction industry of the Netherlands,” 19e conférence annuelle de l'ARCOM (Association of Researchers in Construction Management), Vol. 2 (2003), pp. 817 - 826.
- Engel, C. (2015), “Tacit Collusion - The Neglected Experimental Evidence”, Preprints of the Max Planck Institute for Research on Collective Goods, Bonn 2015/4. Available at: [http://www.coll.mpg.de/pdf\\_dat/2015\\_04online.pdf](http://www.coll.mpg.de/pdf_dat/2015_04online.pdf)

- Evans, W. and I. Kessides (1994), “Living by the ‘Golden Rule’: Multimarket contact in the US airline industry”, *Quarterly Journal of Economics*, Vol. 109, pp. pp. 41 – 366.
- European Chemical Industry Council (2015), *Chemical Connections*, available at <http://www.cefic.org/Documents/PolicyCentre/Competitiveness/Chemical-Connections.pdf>
- European Chemical Industry Council (2014), *Landscape of the European Chemical Industry*, available at <http://www.cefic.org/Documents/Landscape-European-chemical-industry/Landscape-of-the-European-Chemical-Industry-March-2014.pdf>
- Fonseca, M. and H.-T. Normann (2014), “Endogenous cartel formation: Experimental evidence”, Discussion Paper No. 159, Düsseldorf Institute for Competition Economics, [http://www.vfs.hhu.de/fileadmin/redaktion/Fakultaeten/Wirtschaftswissenschaftliche\\_Fakultaet/DICE/Discussion\\_Paper/159\\_Fonseca\\_Normann.pdf](http://www.vfs.hhu.de/fileadmin/redaktion/Fakultaeten/Wirtschaftswissenschaftliche_Fakultaet/DICE/Discussion_Paper/159_Fonseca_Normann.pdf)
- Ginsburg, D. and J. Wright, (2010), “Antitrust Sanctions”, (Autumn 2010): 3-39
- Golub, A., Detre, J. and J. Connor (2005), “The profitability of price fixing: Have stronger antitrust sanctions deterred?” (April 2005).
- González, T.A. and Schmid, M., (2012), “Corporate governance and antitrust behavior”. Gallen, Switzerland: Swiss Institute of Banking and Finance, University of St. Gallen.
- Govinda, H., Khumalo, J. & Mkhwanazi, S. (2014), “On measuring the economic impact: savings to the consumer post cement cartel burst”, *Competition Law, Economics and Policy Conference*, 4 & 5 September 2014, available at [www.compcom.co.za/wp-content/uploads/2014/09/On-measuring-the-economic-impact-savings-to-the-consumer-post-cement-cartel-burst-CC-15-Year-Conference.pdf](http://www.compcom.co.za/wp-content/uploads/2014/09/On-measuring-the-economic-impact-savings-to-the-consumer-post-cement-cartel-burst-CC-15-Year-Conference.pdf)
- Grimbeek, S. & Lekezwa, B. (2012). “The emergence of more vigorous competition and the importance of entry – comparative insights from flour and poultry”. Paper presented at the Sixth Annual Conference on Competition Law, Economics and Policy in South Africa, University of the Witwatersrand, 6-7 September 2012, available at [www.uj.ac.za/EN/Faculties/ecofin/economics/research/cce/Documents/CCE%20Working%20Paper%2001-2013%20PoultryandMilling.pdf](http://www.uj.ac.za/EN/Faculties/ecofin/economics/research/cce/Documents/CCE%20Working%20Paper%2001-2013%20PoultryandMilling.pdf)
- Green, E. and R. Porter (1984), “Noncooperative collusion under imperfect price information”, *Econometrica*, Vol. 52/1, pp. 87 – 100.
- Grout, P.A. and S. Sonderegger (2005), “Predicting cartels: A report for the Office of Fair Trading”, Economic working paper OFT 773, [http://webarchive.nationalarchives.gov.uk/20140402142426/http://www.offt.gov.uk/shared\\_offt/reports/comp\\_policy/oft773.pdf](http://webarchive.nationalarchives.gov.uk/20140402142426/http://www.offt.gov.uk/shared_offt/reports/comp_policy/oft773.pdf)
- Gual, J. and N. Mas (2011) “Industry characteristics and anti-competitive behavior: Evidence from the European Commission’s decisions”, *Review of Industrial Organization* No. 39.3: 207-230.
- Harding, C., Joshua, J. (2010), “Regulating Cartels in Europe”, *Second Edition Oxford University Press*.
- Harrington, J. E., Hüschelrath, K., Laitenberger, U. and F. Smuda (2014), “The discontent cartel member and cartel collapse: The case of the German cement cartel”, ZEW - Centre for European Economic

Research Discussion Paper No. 14-084. Available at SSRN:[ssrn.com/abstract=2523347](http://ssrn.com/abstract=2523347) or <http://dx.doi.org/10.2139/ssrn.2523347>.

Harrington, J. E. (2013), “Corporate leniency programs when firms have private information: The push of prosecution and the pull of pre-emption”, *Journal of Industrial Economics* 61 (1), 1–27.

Harrington, J.E. (2011), “When is an antitrust authority not aggressive enough in fighting cartels?”, *International Journal of Economic Theory*, Vol. 7, pp. 39 – 50.

Harrington, J.E. (2008), “Optimal corporate leniency programs”, *Journal of Industrial Economics*, Vol. 56, Issue 2, pp. 215–246.

Harrington, J. (1989a), “Collusion among asymmetric firms: The case of different discount factors”, *International Journal of Industrial Organization*, Vol. 7, pp. 289 – 307.

Harrington, J. (1989b), “Collusion and predation under (almost) free entry”, *International Journal of Industrial Organization*, Vol. 7, pp. 381 – 401.

Horstmann, N., J. Kraemer, and D. Schnurr (2015), “Number effects in oligopolies: How many competitors are enough to ensure competition?”, Available at SSRN: <http://ssrn.com/abstract=2535862>

Hüschelrath K., and T. Veith (2014), “Cartel detection in procurement markets”, *Managerial and Decision Economics* 35, 404–422.

Hüschelrath, K., (2010) “How Are Cartels Detected? The Increasing Use of Pro-active Methods to Establish Antitrust Infringements” in *Journal of European Competition Law & Practice*, 2010, Vol. 1/6.

Hyytinen, A., Steen, F. and O. Toivanen (2013), “Anatomy of cartel contracts”, CEPR Discussion Paper No. 9362.

ICN, (2010) *Anti-Cartel Enforcement Manual—Cartel Working Group— Subgroup 2: Enforcement Techniques*.

Jacquemin, A., T. Nambu, and I. Dewez (1981), “A dynamic analysis of export cartels: The Japanese case,” *Economic Journal*, Vol. 91, n. 363, pp. 685 - 696.

Katsoulacos, I. and D. Ulph (2013), “Antitrust penalties and the implications of empirical evidence on cartel overcharges”, *The Economic Journal*, Volume 123 / 572.

A.T. Kearney (2012), *Chemical Industry Vision: a European perspective*, <https://www.atkearney.com/documents/10192/536196/Chemical+Industry+Vision+2030+A+European+Perspective.pdf/7178b150-22d9-4b50-9125-1f1b3a9361ef>

Klawiter, D.C. (2011), “Enhancing international cartel enforcement: Some modest suggestions”, *CPI Antitrust Chronicle*, September 2011 (2).

Kovacic, William E., Marshall, Robert C., Marx, Leslie M. and Raiff, Matthew E (2007), “Lessons for Competition Policy from the Vitamins Cartel”, in Vivek Ghosal, Johan Stennek (ed.) *The Political Economy of Antitrust* (Contributions to Economic Analysis, Volume 282) Emerald Group Publishing Limited, pp.149 – 176

- Kudo, Y. and H. Odagiri (2014), “Empirically investigating structural factors facilitating cartels: A case of Japanese manufacturing”, Competition Policy Research Center Discussion Paper Series, CPDP-61-E, <http://www.jftc.go.jp/cprc/discussionpapers/h26/index.files/CPDP-61-E.pdf>.
- Kühn, K.-U. (2012), “How market fragmentation can facilitate collusion”, *Journal of the European Economic Association*, Vol. 10/5, pp. 1116 – 1140.
- Levenstein, M. and V. Suslow (2015), “Cartels and collusion: Empirical evidence”, in Blair, R.D. and D. D. Sokol (eds.), *The Oxford Handbook of International Antitrust Economics*, Volume 2.
- Levenstein, M. and V. Suslow (2011), “Breaking up is hard to do: Determinants of cartel duration”, *Journal of Law and Economics*, Vol. 54 / 2, pp. 455 – 492.
- Levenstein, M. and V. Suslow (2006), “What determines cartel success?”, *Journal of Economic Literature*, Vol. 44, pp. 43 – 95.
- Levenstein V. and M. Suslow, with L. Oswald (2003), “International price-fixing cartels and developing countries: A discussion of effects and policy remedies”, William Davidson Working Paper Number 538, University of Michigan, available at <http://deepblue.lib.umich.edu/bitstream/handle/2027.42/39923/wp538.pdf&embedded=true?sequence=2>
- Lianos, I., Jenny, F., Wagner von Papp, F., Motchenkova E., David, E., (2014), “An optimal and just financial penalties system for infringements of competition law: A comparative analysis”, CLES Research paper series 3/2014, UCL Faculty of Laws, London, [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2542991](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2542991)
- Lieberman, B. M. (1989), “The Learning Curve, Technology Barriers to Entry, and Competitive Survival in the Chemical Processing Industries”, *Strategic Management Journal*, Volume 10, Issue 5 (Sep. – Oct., 1989), 431-447
- Lieberman, M. (1987), “Market growth, economies of scale, and plant size in the chemical processing industries”, *Journal of Industrial Economics*, Vol. 36/2, pp. 175 – 191.
- London Economics (2011), “The impact of competition interventions on compliance and deterrence: A report for the Office of Fair Trading”, <http://londoneconomics.co.uk/blog/publication/the-impact-of-competition-interventions-on-compliance-and-deterrence/>
- Marshall, R. and L. Marx (2012), *The Economics of Collusion: Cartels and Bidding Rings*, MIT Press.
- Marvão, C. (2015), “The EU leniency programme and recidivism”, *Review of Industrial Organization*, forthcoming.
- Marvão, C. (2014), “Heterogeneous penalties and private information”, *Konkurrensverket Working Paper Series in Law and Economics*, Working Paper 2014:1.
- Marvão, C. and G. Spagnolo (2014), “What do we know about the effectiveness of leniency policies? A survey of the empirical and experimental evidence”, *Stockholm Institute of Transition Economics*, <http://swopec.hhs.se/hasite/papers/hasite0028.pdf>.
- McKinsey & Company (2015), “Oil-price shocks and the chemical industry: Preparing for a volatile environment”, *McKinsey on Chemicals May 2015*.

DAF/COMP/GF(2015)4

Mncube, L., (2014), “The South African wheat flour cartel: Overcharges at the mill”, *Journal of Industry, Competition and Trade*, 2014 (14) 4: 487-509

Motta, M. (2004), *Competition Policy: Theory and Practice*, Cambridge University Press, United States.

OECD (2015), *Hearing on Competition enforcement in oligopolistic markets*, DAF/COMP(2015)/2.

OECD (2014a), “Challenges of International Co-operation in Competition Law Enforcement”, OECD Publishing, Paris <http://www.oecd.org/daf/competition/Challenges-Competition-Internat-Coop-2014.pdf>

OECD (2014b), *Policy Roundtable on Competition issues in the food chain industry*, DAF/COMP(2014)16.

OECD (2013), *Policy Roundtable on Ex officio cartel investigations and the use of screens to detect cartels*, DAF/COMP(2013)27.

OECD (2012), *Policy Roundtable on Unilateral disclosure of information with anticompetitive effects*, DAF/COMP/(2012)17.

OECD (2011), *Policy Roundtable on Promoting compliance with competition law*,

OECD (2008), *Policy Roundtable on Competition in the construction industry*”, DAF/COMP(2008)36.

Parker, P. and L.-H. Röller (1997), “Collusive conduct in duopolies: Multimarket conduct and cross-ownership in the mobile telephone industry”, *RAND Journal of Economics*, Vol. 28, pp. 304 – 322.

Posner, R. (1970), “A statistical study of antitrust enforcement”, *Journal of Law and Economics*, Vol. 13/2, pp. 365-419.

PwC (2015), *Global Top 100 Companies by market capitalisation*, 31 March 2015 update, <http://www.pwc.com/gx/en/audit-services/capital-market/publications/assets/document/pwc-global-top-100-march-update.pdf>.

Salvo, A. (2010), “Inferring market power under the threat of entry: the case of the Brazilian cement industry”, *RAND Journal of Economics*, Vol. 41/2, pp. 326 – 350.

Snyder, C. (1996), “A dynamic theory of countervailing power”, *RAND Journal of Economics*, Vol. 27/4, pp. 747 – 769.

Spagnolo, G., (2005), “Managerial incentives and collusive behavior”, *European Economic Review* 49, 1501-1523.

Suslow, V. (2005), “Cartel contract duration: Empirical evidence from inter-war international cartels”, *Industrial and Corporate Change*, Vol. 14/5, pp. 705 – 744.

Symeonidis, G. (2003), “In which industries is collusion more likely? Evidence from the UK”, *Journal of Industrial Economics*, Vol. 51/1, pp. 45 – 74.

Tirole, J. (1988), *The Theory of Industrial Organization*, MIT Press, United States.

- Veljanovski, C. (2007), “Cartel fines in Europe: Law, practice and deterrence”, *World Competition*, Vol. 29.
- Weishaar, S. (2013), “Cartels, Competition and Public Procurement: Law and Economic Approaches to Bid Rigging”, Edward Elgar Publishing.
- Werden, G., Hammond, S. and B. Barnett (2011), “Recidivism eliminated: cartel enforcement in the United States since 1999”, *Competition Policy International Antitrust Chronicle*, October 2011 (1).
- Wils, Wouter P. J. (2012), “Recidivism in EU antitrust enforcement: A legal and economic analysis”, *World Competition: Law and Economics Review*, Vol. 35, No. 1, March 2012.
- Zengeni T., and P. Mondliwa, (2015), “Consolidation and entry: changing dynamics in the regional cement”, undertaken by The Centre for Competition, Regulation and Economic Development, available at [www.competition.org.za/review/2015/2/18/consolidation-and-entry-changing-dynamics-in-the-regional-cement](http://www.competition.org.za/review/2015/2/18/consolidation-and-entry-changing-dynamics-in-the-regional-cement)