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Impact of Cartel Enforcement on Compliance in the Chemical Industry

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ABSTRACT

This paper undertakes a qualitative analysis of the relationship between EU cartel enforcement in the chemical industry in the period 1997-2010 and compliance measures announced in the Annual Reports of the undertakings involved. It goes on to focus on Akzo Nobel NV's unique use of an internal amnesty programme, and the level of compliance in the industry following this period of enforcement. Its findings are consistent with cartel enforcement prompting significant investment in compliance measures, with some evidence of those measures resulting in the earlier reporting of cartels in return for leniency and in enforcement action against only one hard core cartel in the decade that followed.

JEL: K21; L41.

I. INTRODUCTION

The chemical industry was once synonymous with cartel practices, some of which dated back to the early 1900s.[1] Whether in periods where cartels were openly encouraged or were outlawed, the characteristics of chemical products put them at very high risk of collusive practices. This is because chemicals are typically homogenous products with little product differentiation. Also, buyers tend to be sensitive to price, and the significant overheads associated with chemical production make new entry into the industry difficult.[2] Prior to the antitrust enforcement efforts of the 1990s and early 2000s, there was also a very strong culture of cartelisation among US, European and Japanese companies in the industry. So much that our perception of cartels has been shaped predominantly by the covert FBI film of chemical companies engaged in the price fixing of Lysine, in which executives mocked competition authorities and their customers, infamously declaring, "our customers are our enemies".[3] This was despite the fact there had already been some enforcement in the chemical industry prior to this period.[4]

The Lysine cartel sparked the biggest wave of international cartel enforcement the world had ever seen. The Lysine case itself started off as an investigation into corporate espionage that transformed into a covert price fixing operation, thanks to the troubled cooperation of Archer Daniels Midland executive, Mark Whitacre. We know from Eichenwald's book *The Informant* (turned into a Hollywood film starring Matt Damon) that the FBI

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[1] See Diarmuid Jeffreys, *Hell's Cartel* (Bloomsbury 2008) on a discussion of collusion in the early German chemical industries, for example.

[2] Margaret C Levenstein, Catarina Marvao and Valerie Y Suslow, *Preventing Cartel Recidivism*, 30(3) ANTITRUST 81, 81. (2016).

[3] Michael Andreas, Archer Daniels Midland. FBI covert recording of a Lysine Cartel meeting in Hawaii, March 1994. The transcripts of the Lysine cartel recorded meetings are available in the Department of Justice website as public documents at https://www.justice.gov/atr/speech/caught-act-inside-international-cartel (last accessed 23 April 2021).

[4] E.g. European Commission decisions of 23 November 1984 (IV/30.907 - *Peroxygen products*), of 23 April 1986 (IV/31.149 - *Polypropylene*) and of 2 December 1986 (IV/31.128 - *Fatty Acids*).

was made aware of parallel cartels in Citric Acid and Sodium Gluconate at an early stage of their investigation.[5] Thanks to the use of leniency and 'amnesty plus' by the US Department of Justice (US DOJ) that was mirrored by the European Commission's own leniency programme, Lysine was ultimately the first of 28 cartels in the chemicals industry to be uncovered and fined in Europe between 1997 and 2010.[6] Six of these had direct links with the Lysine or the Vitamins cartels and many more were similarly connected to each other by virtue of common membership between chemical firms.[7]

Unlike earlier periods of cartel enforcement in the chemical industry, the new age of international enforcement and the growth in active competition law jurisdictions required a fundamental change in compliance culture. The availability of immunity to the first firm to report, the active imprisonment of executives by the US DOJ and the threat of significant exposure to follow-on actions for damages, caused chemical companies to take seriously the need to manage and prevent potential infringements of competition law. There was also a heightened need to focus more on efficiency and competition, in response to Chinese entry into the market that had brought about expansions in capacity. This new entry meant that many of the cartels were already failing by this period, spurring on the use of leniency applications to limit exposure to fines.[8]

This paper undertakes a qualitative analysis of the compliance measures taken by the chemical industry during the period of EU cartel enforcement in the late 1990s and 2000s, drawing on the Annual Reports and related public statements of 107 corporate groups mentioned as addressees in the 28 chemical cartel decisions delivered by the European Commission between 2000-2010. A detailed empirical study was not possible because of the nature of the data and the difficulty in controlling for factors that might have encouraged investment in compliance, other than enforcement. In particular, there is no obligation on companies to publish details of their compliance measures in Annual Reports and so their decision to do so – along with the timing and level of detail – is voluntary. Indeed, of the 107 corporate groups examined, only 26 larger undertakings made any reference to compliance measures in their Annual Reports. In addition, as compliance is an entirely internal matter for the undertaking, there is no other source of information available or way of corroborating the contents of Annual Reports, except other public statements made by the undertaking. So, the information available from Annual Reports is not consistent or complete and should be interpreted with some caution. Nevertheless, by comparing enforcement against undertakings with the timing and content of compliance announcements in their Annual Reports, we find evidence of a causal link between the two in relation to 16 of the undertakings, with a strong likelihood that this is also true of the remaining 10 undertakings and broader industry trends. This is supported by the original insight we provide into the experience of AkzoNobel NV and its unique use of an internal amnesty programme. The paper then goes on to discuss the immediate benefits of compliance in helping companies reduce their liability through early reporting to the leniency programme. All of the 28 chemical cartel investigations involved leniency (though in one case no immunity was granted), and there is evidence to suggest investment in compliance helped undertakings secure immunity in relation to eleven of the investigations. Finally, we discuss the possible longer-term benefits to the compliance initiatives reported during this period. The paper begins with some further background to cartels in the chemicals industry.

II. MAGNITUDE OF THE CARTELS IN THE CHEMICAL INDUSTRY

For the purposes of this paper, information was first drawn from the decisions, press releases and statistics published by the European Commission on its website and on the Official Journal.[9] These show that of the 69 cartel decisions delivered by the Commission between 2000-2010, 28 involved products of the chemical industry. They represent just over €5 billion in fines before appeal, or just under a third of all cartel fines imposed by the EU during this period. As well as dominating much of the Commission's work over this decade,

[5] Kurt Eichenwald, *The Informant* (New York: Broadway 2000).
[6] For an analysis of European Antitrust Policy for the period 1957-2004, see: Martin Carree, Andrea Günster and Maarten Pieter Schinkel, *European Antitrust Policy 1957-2004: An Analysis of Commission Decisions* 36 REVIEW OF INDUSTRIAL ORGANISATION 97 (2010).
[7] See Andreas Stephan, *An Empirical Assessment of the European Leniency Notice*, 5(3) JOURNAL OF COMPETITION LAW & ECONOMICS 537 (2009).
[8] Ibid.
[9] The identification of cartels decided between 2000-2010 was based on the combined assessment of: (i) 72 cartel decisions issued by the Commission from 1 January 2000 to 31 December 2010, retrieved from the Commission website at https://ec.europa.eu/competition/elojade/isef/index.cfm?clear=1&policy_area_id=1 and (ii) decisions at the Commission "cartels cases" webpage available at https://ec.europa.eu/competition/cartels/cases/cases.html (both accessed 31 March 2021).

the chemical cartels also constitute a large proportion of the success of their leniency programme, first introduced in 1996 and reformed in 2002.[10]

Table 1 below lists the 28 chemical cartels subject to this study, indicating which firm was the first to report the cartel in each case and whether they received immunity. It is notable under the original 1996 leniency notice, firms were not eligible for immunity where they were first to approach the Commission *after* an investigation had been opened.

Table 1. EU Chemical Cartel Cases, 2000-2010.

Cartel (year of Commission decision)	Number of Undertakings[11]	Fine (€)	First to Report	Immunity / Leniency	Immunity triggered by Compliance
1. Lysine / Amino Acids (2000)	5	109,900,000	Ajinomoto / Sewon[12]	50%	N/a
2. Zinc Phosphate (2001)	6	11,950,000	Waardals[13]	50%	N/a
3. Citric Acid (2001)	5	135,220,000	Cerestar[14]	90%	N/a
4. Vitamins (2001)	8[15]	855,230,000	Aventis[16]	Yes	No[17]
5. Sodium Gluconate (2001)	5	37,130,000	Fujisawa[18]	80%	N/a
6. Food Flavour Enhancers (2002)	4	20,560,000	Takeda	Yes	No[19]
7. Methylglucamine (2002)	2	2,850,000	Merck	Yes	No[20]
8. Methionine (2002)	3	127,000,000	Aventis	Yes	No[21]
9. Industrial and Medical Gases (2002)	7	25,720,000	None[22]	No	N/a
10. Speciality Graphites (2002)	7	60,600,000	GraphTech UCAR	Yes	No[23]
11. Organic Peroxides (2003)	5	70,000,000	AkzoNobel	Yes	Yes[24]

[10] Commission Notice on the non-imposition or reduction of fines in cartel cases, [1996] OJ C207/4 ("Leniency Notice"), which was amended in [2002] OJ C45/3. The current Leniency Notice dates from [2006] OJ C298/17, and was amended in [2015] OJ C256/1, after the Directive (EU) No 104/2014 of 26 November 2014 on certain rules governing actions for damages under national law for infringements of the competition law provisions of the Member States and of the European Union [2014] OJ L349/1.

[11] Owing to the wide meaning of 'undertaking' in EU law, many of these cartel decisions make reference to multiple entities that fall within the same undertaking, but only one fine is imposed per undertaking.

[12] Immunity was not granted because Ajinomoto revealed the cartel but did not benefit from immunity because it had acted as ringleader and had failed to disclose another cartel to the Commission. See European Commission Press Release IP/00/589, 'Commission fines ADM, Ajiinomoto, others in lysine cartel' (7 June 2000).

[13] Immunity was not granted because Waardals approached the Commission shortly after the surprise investigations were carried out. See Commission Press Release IP/01/1797, 'Commission fines six companies in zinc phosphate cartel' (11 December 2001).

[14] Immunity was not granted because Cerestar only came forwards after it became fully aware of the Commission's investigation. See Commission Press Release IP/01/1743, 'Commission fines five companies in citric acid cartel' (5 December 2001).

[15] Five other companies were not fined because the cartels in which they were involved ended five years or more before the Commission opened its investigation. See Commission Press Release IP/01/1625, 'Commission imposes fines on vitamin cartels' (21 November 2001).

[16] A fine was, however, imposed on Aventis for its passive participation in the vitamin D3 infringement, on which it provided no information to the Commission. Ibid.

[17] Aventis applied for immunity on 19 May 1999. No annual reports available before this date.

[18] Immunity not granted for the same reason as in *Citric Acid* (see footnote No 14 above).

[19] Takeda applied for immunity on 09 September 1999. No annual reports available before this date.

[20] Merck applied for immunity on 27 Sep 1999. No annual reports available before this date.

[21] Aventis applied for immunity on 26 May 1999. No annual reports available before this date.

[22] While no company was the first to report the cartel, AGA and Air Products were granted a 25% reduction for providing additional evidence as well as explanations on the documents found during the inspections and for not contesting the facts. See Commission Press Release IP/02/1139, 'Commission fines seven companies in Dutch industrial gases cartel' (24 July 2002).

[23] Graftech applied for immunity on 13 April 1999. No annual reports available before this date.

[24] AkzoNobel applied for immunity on 7 April 2000. That same year, it created its antitrust program.

12.	Sorbates (2003)	5	138,400,000	Chisso	Yes	No[25]
13.	Choline Chloride (2004)	6	66,340,000	Bioproducts[26]	30%	N/a
14.	Rubber Chemical (2005)	4	75,860,000	AkzoNobel / Flexsys	Yes	Yes[27]
15.	MCAA Chemicals (2005)	4	216,910,000	Clariant / Hoechst	Yes	No[28]
16.	Synthetic Rubber (2006)	2	519,050,000	Bayer	Yes	~Yes[29]
17.	Methacrylates (2006)	5	344,562,500	Degussa	Yes	Yes[30]
18.	Hydrogen Peroxide (2006)	8	388,128,000	Degussa	Yes	Yes[30]
19.	Dutch Bitumen (2006)	14	266,717,000	BP	Yes	Yes[31]
20.	Chloroprene Rubber (2007)	9	243,210,000	Bayer	Yes	~Yes[29]
21.	Spanish Bitumen (2007)	5	183,651,000	BP	Yes	Yes[31]
22.	Paraffin Wax (2008)	10	676,011,400	Shell	Yes	Yes[32]
23.	Aluminium Fluoride (2008)	6	4,970,000	Boliden Odda	Yes	No[33]
24.	Sodium Chlorate (2008)	4	73,401,000	AkzoNobel	Yes	Yes[34]
25.	Nitrile Butiadene Rubber (2008)	2	34,230,000	Bayer[35]	30%	N/a
26.	Heat Stabilisers (2009)	8	173,860,400	Chemtura	Yes	No[36]
27.	Calcium Carbide (2009)	8	61,120,000	AkzoNobel	Yes	Yes[37]
28.	Animal Feed Phosphates (2010)	6	175,647,000	Kemira / Yara	Yes	No[38]

Note: The amounts reflect the European Commission's original decisions and are not adjusted for appeals.
Source: The Official Journal of the European Union.

Leniency was both successful in ensuring a high level of cooperation by the companies involved and in facilitating the reporting of cartels other than those already under investigation by the Commission. It is thanks to the significant overlap in membership, described above, that companies were well placed to reveal other infringements.[39] This level of reporting might also be considered a success in compliance, where these companies were able to quickly identify other potential infringements (compare Table 1 above and Table 2 below). The fact many of these cartels may already have been failing would certainly also have provided an incentive to cooperate fully.[40] What is revealing is that among the chemical companies involved in multiple

[25] Chisso applied for immunity on 29 September 1998. No annual reports available before this date.
[26] This was a North American producer that had made the Commission aware of the cartel in April 1999, but which was not subject to the Commission decision. See Commission Decision of 9 December 2004 in *Choline Chloride* (Case C.37.533).
[27] Akzo/Flexys applied for immunity on 22 April 2002. Two years before it had created its antitrust program.
[28] Clariant applied for immunity on 6 December 1999. No annual reports available before this date.
[29] Bayer applied for immunity before the first surprise inspection, which happened on 27 March 2003. Bayer had introduced a general compliance code in 1998. See Bayer 1998 Annual Report, p. 21.
[30] Degussa applied for immunity on 20 December 2002. That same year, its compliance efforts occurred.
[31] BP applied for immunity on June 2002. BP had implemented measures focused on compliance in competition, in response to prior enforcement in other industries. See footnote No 112.
[32] Shell's 2010 Annual Report referred to the existence of a "globally co-ordinated antitrust training programme since 2000", see 2010 Shell Sustainability Report.
[33] Boliden applied for immunity on 23 March 2005. No annual reports are available.
[34] EKA Chemicals/AkzoNobel applied for immunity on 28 March 2003. In 2000 the group had created its antitrust program.
[35] Immunity was not granted because Bayer, the first company to contact the Commission expressing its wish to cooperate, did not disclose the first period of the cartel (which was disclosed by the other cooperating company, Zeon, which benefited from a further reduction). See Commission Decision of 23 January 2008 in *Nitrile Butadiene Rubber* (Case COMP/38.628), paras 21 and 192-97.
[36] Chemtura applied for immunity before the first surprise inspections on 12 and 13 February 2003. No annual reports are available.
[37] AkzoNobel applied for immunity before 20 December 2006. In 2000 the group had created its antitrust program.
[38] Kemira applied for immunity on 28 November 2003. Nothing was found for the years 1999-2003.
[39] For a detailed analysis of how cartels operated in the chemicals industry, see Joseph E Harrington, *How Do Cartels Operate?* 2(1) FOUNDATIONS AND TRENDS IN MICROECONOMICS 1 (2006).
[40] See e.g. *Vitamins*, see footnote 15 above.

cartels during this period, the firm that was first to report was not the same across all the related investigations. In the absence of any evidence to suggest this was somehow coordinated (discussed later in this paper), this pattern is indicative of companies struggling to use internal compliance tools to identify the scope and extent of their potential liability. This would have been compounded by the complex international nature of many of these businesses, with various divisions and subsidiaries: while the 28 chemical cartel decisions impose fines on 107 separate undertakings, a total of 236 legal entities were identified in the cases.

III. COMPLIANCE MEASURES TAKEN IN RESPONSE TO ENFORCEMENT

To analyse the impact of enforcement on the compliance efforts of these 107 separate undertakings, information was primarily gathered from Annual Reports.[41] Our starting point was the Annual Report published for each company in the same year as the relevant Commission decision, on the basis that this would be the first opportunity to address publicly the issue of compliance, following the completion of the Commission's investigation. We then looked at the reports of subsequent and earlier years, and in particular those published in the same year as the firm applied for leniency or was first subject to an EU cartel investigation.[42] The study was not able to distinguish the pro-compliance effect of enforcement from the particular incentives created by the EU leniency programme over this period.[43] Neither does it capture the efforts of companies who invested in compliance but chose not to publicly disclose their efforts. Nevertheless, it is not unreasonable to assume that undertakings viewed leniency as an additional feature of enforcement that heightened the need to take antitrust compliance more seriously. In particular, better compliance strengthens an undertaking's ability to detect infringements internally and benefit from early cooperation. Neither is it unreasonable to assume that undertakings would generally want investment in compliance to be known – especially among shareholders and customers in whose eyes the firm's reputation will have suffered as a result of enforcement action.[44]

Of the 107 undertakings[45] or groups (out of 236 legal entities) involved in the 28 EU chemical cartel decisions in the period 2000-2010, we found that 26 (or just under a quarter) announced investment in antitrust specific compliance measures. Significantly, these 26 companies accounted for 65% of the fines on chemical cartels during this period.[46] Moreover, companies that were more heavily fined appear to have made the biggest investment in such measures. These included Sasol Wax (fined for €318,2 million in 2008 for the *Paraffin Wax* cartel), BASF (fined for €296 million in 2001 for the *Vitamins* cartel), and Hoffman La-Roche (fined twice in 2001: €462 million for the *Vitamins* cartel and €63.5 million for the *Citric Acid* cartel).

As discussed in the introduction, the absence of any obligation on undertakings to publicly report their compliance efforts makes it difficult to establish empirically a causal link between enforcement and specific antitrust compliance initiatives. In particular, we have no way of capturing compliance efforts that were implemented before the first antitrust investigation was opened but which were not publicly announced. We can, however, go some way in examining the relationship between enforcement and compliance by considering: (i)

[41] A list of these companies is available in Appendix 1.
[42] The key search terms included: antitrust, anti-trust, compliance, competition law, cartel, integrity, fines, training, European Commission. Finally, we checked the official press releases of the involved companies in the years around the Commission decision.
[43] Wouter Wils, *The Use of Leniency in EU Cartel Enforcement: An Assessment after Twenty Years* 39(3) WORLD COMPETITION 327 (2016), shows how leniency applications increased from 10% in 1996-2000 to 81% in the 2006-10 period, and how cartel decisions tripled following the introduction of the leniency program in Europe.
[44] See Luca Aguzzoni, Gregor Langus and Massimo Motta, *The effect of EU Antitrust Investigations and Fines on a Firm's Valuation*, 61(2) THE JOURNAL OF INDUSTRIAL ECONOMICS 290 (2013).
[45] These 107 involved companies include entities that were independent for a time, but were also subsidiaries of another involved company for a time. See for example Arkema (previously known as Atochem/Atofina) officially created by Total in 2004, whose IPO occurred on the Paris Stock Market in 2006.
[46] The 26 companies were fined €3,259,426,650 of the total €5,008,475,300 imposed in fines across the 28 chemical cartel decisions. We counted only once the fines (€78.6 million) jointly applied to Total, Arkema, Elf Aquitaine in *Hydrogen Peroxide* in 2006 and fines (€219 million) jointly applied to Arkema, Altuglas, Altumax, Total and Elf Aquitaine in *Methacrylates* in 2006 (should the fines of respective the subsidiaries are included, the final amount would increase to €3,373,898,250 or 67%). We considered fines in the original Commission decisions, independently from the outcome of any appeals before the CJEU.

the timing of first public announcements on antitrust compliance initiatives and whether they coincided with either the opening of an investigation or a completed infringement decision; (ii) where an explicit link between the two is identified by the undertaking, for example as part of an acknowledgement of wrongdoing; and (iii) whether there were any specific compliance initiatives announced by the undertaking prior to the first EU cartel investigation, or whether reference was made to such initiatives in subsequent annual reports. For these purposes, we are interested in compliance measures focused on antitrust violations and not general statements of compliance with the law more generally. One significant limitation of relying on Annual Reports is that many from the chemicals industry prior to 1999 are not available.[47] However the Annual Reports we do have generally make clear whether antitrust specific compliance efforts were being introduced for the first time and how they built on previous policies. We found virtually no references to antitrust specific compliance measures that predated the period of enforcement, other than general codes of conduct,[48] but we were able to capture one antitrust initiative that occurred prior to this period but which was not reported in the year it was introduced: Shell's 2010 Annual Report referred to the existence of a "globally co-ordinated antitrust training programme since 2000".[49] Our findings are summarised in Table 2:

Table 2. Companies that reported antitrust compliance measures during / following periods of enforcement

Company		Cartel, investigation period and fine amount	Announcements of antitrust compliance initiatives and acknowledgement of wrongdoing
1.	Hoffman La Roche	*Vitamins* (1999-2001)[50]: €462m; *Citric Acid* (1997-2001)[51]: €462m.	**1999**: Acknowledgment of wrongdoing; Letter from Chairman; Antitrust specific trainings; Review/creation of antitrust specific program. 2001: Creation of Compliance department; Appointment of Compliance Officer.
2.	BASF	*Vitamins* (1999-2001): €296.1m; *Choline Chloride* (1999-2006)[52]: €34.97m.	**1999**: Acknowledgment of wrongdoing; Review/creation of Code of Conduct. 2001: Acknowledgment of wrongdoing; Letter of Chairman; Review/creation of Code of Conduct. 2002: Appointment of Compliance Officer. 2003-2004: Antitrust specific trainings. 2005: Updated antitrust material; Antitrust specific trainings. 2008: Comprehensive audits. 2009: Antitrust specific trainings.
3.	Eisai	*Vitamins* (1999-2001): €13.23m.	**1999**: Appointment of Chief Compliance Officer; 2000: Creation of Compliance department; Review/creation of Code of Conduct.
4.	Solvay	*Vitamins* (1999-2001): €9.1m; *Hydrogen Peroxide* (2002-2006): €192m	**2005**: Review/creation of antitrust specific Program; Acknowledgment of wrongdoing. 2006: Antitrust Specific Trainings. 2007: Creation of Compliance department; Antitrust specific trainings.

[47] Older Annual Reports are not published on the undertakings' websites and are not accessible from online repositories including the US Securities and Exchange Commission (SEC).
[48] For example, Bayer had introduced a general compliance code in 1998. See Bayer 1998 Annual Report, p. 21.
[49] 2010 Shell Sustainability Report, p. 7. See also 2006 Shell Sustainability Report, p. 20 referring to training programs since the mid-1990s.
[50] Hoffman La Roche had previously been subject to US enforcement action. See Commission Decision of 5 December 2001 in *Citric Acid* (Case COMP/E-1/36 604), para 54: "*In August 1995, the Commission was notified by the US Department of Justice of a Grand Jury investigation into the citric acid market. In April 1997, the Commission was informed of the plea-bargain agreements reached by Hoffmann-La Roche and Jungbunzlauer in the USA*".
[51] The Commission was first notified by the US Department of Justice in August 1995, but only sent requests for information in April 1997. See Commission Decision of 5 December 2001 in *Citric Acid* (Case COMP/E-1/36 604), paras 54-5.
[52] The Commission was first approached by Chinook in 1998, but only opened an investigation in 1999, when Bioproducts informed its participation in the cartel. See Commission Decision of 9 December 2004 in *Choline Chloride* (Case C.37.533), paras 45-46.

			2009: Compliance awards.
5.	Merck	*Vitamin*s (1999-2001): €9.24m; *Methylgucamine* (2002-2002): **Immunity**.	**2002**: Appointment of Chief Compliance Officer. 2004 and 2006: Antitrust specific trainings.
6.	AkzoNobel	*Sodium Gluconate* (1997-2001): €9m; *Organic Peroxides* (2000-2003): **Immunity**; *Choline Chloride* (2004): €20.9m; *MCAA Chemicals (2000*-2005): €84.3m; *Rubber Chemical* (2002-2005): **Immunity**[53]; *Hydrogen Peroxide* (2002-2006): €25.2m; *Sodium Chlorate* (2003-2008): **Immunity**. *Calcium Carbide* (2007-2009)[54]: **Immunity.** *Heat Stabilisers* (2007-2009)[55]: €40.6m	**2000**: Review/creation of antitrust specific program. 2004: Letter from Chairman; Review/creation of Code of Conduct. 2005: Antitrust specific trainings. 2008: Updated antitrust material. 2009: Compliance hotline. 2010: Antitrust specific trainings. 2012: Antitrust specific trainings.
7.	Fujisawa (Astellas)	Sodium Gluconate (1997-2001): €3.6m	**2005**: Review/creation of Code of Conduct; Appointment of Compliance Officer.
8.	Degussa (later Evonik)	*Methionine* (1999-2002): €118m *Organic Peroxides* (2000-2003): €16.73m *Hydrogen Peroxide* (2002-2006): **Immunity.** *Methacrylates* (2002-2006)[56]: **Immunity.** *Calcium Carbide* (2007-2009): €4.68m.	**2002**: Review/creation of Code of Conduct. 2003: Review/creation of Code of Conduct. 2008: Review/creation of Code of Conduct. 2009: Appointment of Compliance Officer. 2010: Antitrust specific trainings.
9.	Nippon Soda Company	*Methionine* (1999-2002): €9m	**2005**: Review/creation of Code of Conduct.
10.	SGL Carbon	*Speciality Graphite* (1999-2002): €27.75m	**2001**: Review/creation of Antitrust Program; Antitrust specific trainings. 2005: Review/creation of Code of Conduct.
11.	Tokai Carbon	*Speciality Graphite* (1999-2002): €6.97m.	**2002**: Acknowledgment of wrongdoing; Letter of Chairman.
12.	Le Carbone Lorraine[57]	*Speciality Graphite* (1999-2002): €6.97m	**1999**: Review/creation of antitrust Program. 2002: Acknowledgment of Wrongdoing. 2003: Review/creation of Code of Conduct. 2004: Updated antitrust material.
13.	Arkema	*Organic Peroxides* (2000-2003): €43.47m *MCAA* (2001-2005): €58.5m *Hydrogen Peroxide* (2002-2006): €78m *Methacrylates* (2002-2006): €219m *Sodium Chlorate* (2003-2008): €43.13m *Heat Stabilisers* (2007-2009): €20.9m	**2006**: Review/creation of Antitrust Program.
14.	Clariant	*MCAA Chemicals* (2000-2005): **Immunity.**	**2007**: Review/creation of Code of Conduct.
15.	Dow Chemical	*Synthetic Rubber* (2003-2006): €64.75m *Chloroprene Rubber* (2003-2007): €48.67m	**2003**: Review/creation of Code of Conduct.
16.	Shell	*Synthetic Rubber* (2003-2006): €160m *Dutch Bitumen* (2002-2006)[58]: €108m *Paraffin Wax* (2005-2008)[59]: **Immunity.**	**2004**: Appointment of Compliance Officer. 2005: Compliance hotline.

[53] The involved company was Flexsys, a joint venture between Solutia (former Monsanto) and AkzoNobel.
[54] Unclear when AkzoNobel applied for immunity. The Commission granted immunity to AkzoNobel in 2006. See Commission Decision of 22 July 2009 in *Calcium Carbide* (Case COMP/39.396), para 47.
[55] Unclear when Chemtura applied for immunity. The Commission carried out its first surprise inspection in 2003. See Commission Decision of 11 November 2009 in *Heat Stabilisers* (Case COMP/38.589), paras 79-81.
[56] Unclear when Degussa submitted for leniency. The Commission carried out its first surprise inspection in 2002. See Commission Decision of 31 May 2006 in *Methacrylates* (Case COMP/F/38.645), para 55.
[57] Later called Mersen
[58] Unclear when BP applied for immunity. The first surprise inspection took place in 2002. See Commission Decision of 13 September 2006 in *Dutch Bitumen* (Case COMP/38.456), para 30.
[59] Unclear when Shell applied for immunity. The first surprise inspection took place in 2005. See Commission Decision of 1 October 2008 in *Paraffin Wax* (Case COMP/39.181), paras 72-75.

			2006: Acknowledgement of wrongdoing; Letter from Chairman. Review/creation of training programs occurred from mid-1990's. 2010: Review/creation of Antitrust Program occurred from 2000.
17.	Total	*Dutch Bitumen (2002-2006):* €20.5 *Hydrogen Peroxide* (2002-2006): €78.6m[60] *Methacrylates* (2002-2006): 219m *Paraffin Wax* (2005-2008): €128m	**2009**: Introduced a general Compliance Program. 2012: Review/creation of Antitrust Program.
18.	Kemira	*Hydrogen Peroxide* (2002-2006): €33m *Sodium Chrlorate* (2003-2008)[61]: €10m *Animal Phosphates* (2005-2010): **Immunity.**	**2006**: Review/creation of Code of Conduct. 2011: Review/creation of Antitrust Program; Antitrust specific trainings.
19.	L'Air Liquide	*Hydrogen Peroxide* (2002-2006): No fine imposed.[62]	**2007**: Appointment of Compliance Officer 2009: Antitrust specific trainings.
20.	Tosoh	*Chlorprene Rubber* (2003-2007): €4.8m.	**2007**: Updated antitrust material. 2008: Created Compliance department.
21.	ENI	*Chloroprene Rubber* (2003-2007): €132.1m *Paraffin Wax* (2005-2008): €29.1m *Synthetic Rubber* (2003-2008): €272m.	**2008**: Review/creation of Code of Conduct.
22.	Zeon	*Nitrile Butadiene Rubber* (2003-2008): €5.36m	**2003**: Updated antitrust material. 2006: Review/creation of Antitrust Program. 2007: Creation of Compliance Department. 2008: Acknowledgment of wrongdoing; Letter of Chairman. 2011: Antitrust audits.
23.	Sasol Wax	*Paraffin Wax* (2005-2008): €318.2m	**2003**: Compliance hotline. 2008: Acknowledgment of wrongdoing; Letter from Chairman. 2009: Acknowledgement of wrongdoing; Letter from Chairman. 2010: Creation of Compliance Department; Antitrust specific trainings.
24.	H&R	*Paraffin Wax* (2005-2008): €24m	**2009**: Comprehensive audits. 2010: Antitrust specific trainings. 2011: Antitrust specific trainings.
25.	The GEA Group	*Heat Stabilisers* (2007-2009): €3.3m.	**2010**: Creation of Compliance Department; Review/creation of Code of Conduct.
26.	Tessenderlo	*Animal Feed Phosphates* (2005-2010): €83.7m	**2009**: Comprehensive audits. 2010: Appointment of Compliance Officer; Review/creation of Antitrust Program.

Note: The companies appear in the chronological order of first enforcement action by the European Commission.
Source: The Official Journal of the European Union and Company Annual Reports.

We can make a couple of observations that speak to the question of whether there is a causal link between enforcement and compliance. The first is that the contents of the Annual Reports of 16 of the 26 companies suggest antitrust specific compliance was *introduced in response* to EU enforcement action. BASF, AkzoNobel and DowChemical announced the *creation* of such initiatives in the same year the first cartel investigation began, with no mention of such initiatives in previous years' Annual Reports that we could access. The same is true of ENI, Kemira and Tessenderlo, but in relation to the year of the first fining decision. H&R, GEA Group and Clariant[63] introduced antitrust compliance measures after the year of the first fining decision, with none announced previously. In addition, the following companies explicitly linked the strengthening of compliance efforts with the enforcement action they were being subject to, typically through a public acknowledgement of wrongdoing that accompanied details of these compliance initiatives in the relevant Annual Reports: Hoffman La Roche, Sasol Wax, BASF (also listed above), Shell, Le Carbone Lorraine, Zeon, Tokai and Solvay. For the remainder, the wording of the Annual Reports appears to suggest new antitrust specific compliance initiatives,

[60] Fine applied to Arkema S.A.
[61] Fine applied to Finnish Chemicals acquired by Kemira in 2005.
[62] Too many years had lapsed since the end of the company's involvement in the infringement.
[63] Clariant received immunity for reporting MCAA Chemicals in 2000, but there is no mention in the infringement decision or any public statement of that being associated with internal compliance measures.

but we were not able to access previous Annual Reports to confirm this: Eisai, Merck, Fujisawa, Degussa, Nippon Soda, SGL Carbon, Arkema, Total, L'Air Liquide and Tosoh. It is difficult to fully distinguish the effect of enforcement from other factors that may have brought rise to the introduction of antitrust compliance measures. For example, the introduction and increased use of leniency as a detection tool may have spurred a broader growth in antitrust compliance during this period, that was not peculiar to the chemicals industry. A far broader study of Annual Reports and other publicly available materials would be needed to investigate that further. Nevertheless, while many of the Annual Reports make reference to enforcement action alongside announcements of compliance initiatives, we found no references to other motivations.

A related concern is whether the statements made in Annual Reports should be taken at face value or whether they represent little more than gestures to appease shareholders' concerns or limit the reputational damage caused by enforcement, without making any genuine and substantive commitments to comply with competition law in the future. Yet this period is characterised by the announcement of objectively significant sets of compliance initiatives that would have required some substantial level of investment, engagement and commitment within the undertakings. In addition, the temporal coincidence between the adoption of such compliance initiatives and the leniency applications in subsequent cartels (see the compared reading of Tables 1 and 2 above) makes it less likely these were merely gestures.

After the adoption of a written code of conduct or compliance programme, the most common investment was in **staff education**, with 14 of the 26 identifying dedicated competition compliance training. Following enforcement action that began in 1999, Hoffman La Roche announced in its Annual Report of the same year that, 'Over a four-month period ... Roche's corporate principles and a range of issues relating to behaviour in competition were explained and discussed in a Groupwide programme attended by a total of about 7500 management-level employees from all four divisions and Roche's central corporate departments.'[64] BASF reported in 2001 how, '... In order to familiarize employees with the Code of Conduct, BASF has, for example, established a Legal Compliance Education Center (lcec) in the United States'.[65] In addition, in 2003 it reported that more than 200 antitrust training seminars had been completed for employees in marketing and sales.[66] In 2009 it involved more than 25,000 employees in compliance training[67], increasing to 41,000 in 2010[68]. It also reported that all new employees received mandatory basic training supplemented by subsequent refresher courses on special topics including competition law.[69] In 2003 AkzoNobel began an extensive Business Principles training programme, which was, '… based on daily life experiences, [and involved] all levels in the organization through a top down approach'.[70] They also announced that 'the Board of Management will not hold Management accountable for any loss of business resulting from compliance with Akzo Nobel's Business Principles'.[71] This was an acknowledgement that competition compliance had to be put before profit. It was followed up in 2004 with a statement from the Chairman that, 'I want to make it absolutely clear that any and all compliance violations are totally unacceptable within this company and will not be tolerated. We have a very strict code of ethics laid down in our corporate Business Principles, and we will rigorously endeavour to adhere to these in all our business dealings and day-to-day operations'.[72] Similar statements were made by senior figures in other firms, for example the President of the Nippon Soda Company in 2003.[73]

In 2009, AkzoNobel presented a comprehensive competition law compliance framework it had put in place, that included 'a new company-wide corporate complaints procedure called Speak Up!, which enable[ed] all our employees to report irregularities in relation to our Code of Conduct', and reported that around 95% of employees had received Code of Conduct Training.[74] Other targeted competition law training was created for specific high risk groups and all employees exposed to competition law issues (around 10,000 in 2009) were 'trained annually and sign a declaration to confirm adherence to the Competition Law Compliance Manual'.[75] Similar initiatives were taken by other companies, including Sasol Wax who reported in 2010 how, '…more

[64] See Letter from the Chairman in Roche Group Annual Report and Group Accounts 1999, p. 6.
[65] See BASF Social Responsibility Report 2001, p. 52.
[66] See BASF Corporate Report 2003, p. 15.
[67] See BASF Corporate Report 2009, p. 120.
[68] See BASF Corporate Report 2010, p. 120.
[69] Ibid.
[70] Ibid. p. 42.
[71] See 2003 AkzoNobel Annual Report, p. 45.
[72] See 2004 AkzoNobel Annual Report, p. 5.
[73] See 2003 Nippon Soda Annual report.
[74] See 2009 AkzoNobel Annual Report, p. 77.
[75] Ibid., p. 139.

than 13 000 employees certified that they had received and read the guideline. In addition, we have provided face-to-face training for more than 4000 employees covering relevant aspects of compliance with competition law. The extensive face-to-face training augmented the online training conducted the previous year'.[76] The introduction of training programmes was typically identified as being integral to the success of the compliance programme and in the case of Le Carbone Lorraine (later Mersen), it was reported as sitting alongside 'written undertakings by senior executives and external audits'.[77] What is more, it is clear from looking at more recent Annual Reports, that training has become a long-term commitment for some of these companies. For example, in its 2019 Annual Report, SGL Carbon reflects how it 'introduced its comprehensive worldwide antitrust law compliance program already in 2001. One key element is regular mandatory training, which is offered as face-to-face and eLearning sessions'.[78] Other companies reporting significant staff training programmes included: Kemira[79], Tosoh[80], Solvay, Fujisawa, Degussa (later Evonik), Arkema, Shell, Total, and H&R.

The next most common investment was the appointment of a dedicated person or team to monitor competition compliance. This was reported by 13 of the 26 companies. Hoffman La Roche, for example reported in 1999 how, 'a team whose main job will be to monitor compliance with Group principles and guidelines worldwide was set up in the internal auditing unit'. [81] In 2006, BASF reported having become one of the first German companies to appoint a Chief Compliance Officer.[82] While in 2002, Eisai described how an executive was appointed in October 1999 to lead a new corporate ethics department. It also 'created a compliance committee involving external legal experts from Japan and overseas to give specialist guidance on these issues', adopted a Charter of Business Conduct and a Code of Conduct in April 2000, and established a point of contact for staff with compliance queries.[83] Solvay, who had relaunched their compliance programme in 2005, reported two years later the setting up of a network of compliance officers to better monitor the group, 'given the problems recently encountered again with regard to compliance with competition rules'.[84] In some of the firms the dedicated person's responsibility was not exclusive to competition. For example, in 2002 Merck reported the appointment of a compliance officer responsible for 'high-risk sectors of law, such as antitrust'.[85] In others, the monitoring was a more complicated global arrangement, for example Degussa (later Evonik) set up 'a global compliance organization headed by a Chief Compliance Officer'.[86] In 2012, Total announced, '…over 350 Compliance Officers have been appointed and trained at the business segments, subsidiaries and entities. Their role is to ensure that the program is implemented at the local level'.[87] The appointment of the dedicated person or team was sometimes closely linked to systems of reporting. For example, in response to the investigations into *Dutch Bitumen* and *Synthetic Rubber*, Shell announced a review of its overarching compliance programme: 'A Group Compliance Officer, reporting to the Group's Legal Director and with direct access to our Group Chief Executive, has been appointed. ... Royal Dutch Petroleum Company also launched its global whistleblowing procedure to protect employees who report any breach or suspected breach of any law, regulation or company policy or guideline, including the Shell General Business Principles'. In 2005, Shell successfully applied for immunity in return for disclosing the *Paraffin Wax* cartel to the Commission.[88] Other companies that reported the appointment of a dedicated person or team to monitor competition compliance included: L'Air Liquide[89], H&R[90], AkzoNobel, The GEA Group[91], Tosoh, Sasol Wax, and Tessenderlo.

In summary, we observe that 26 of the 107 undertakings (generally the largest) subject to EU cartel enforcement action during the period 1997-2010, reported significant antitrust compliance initiatives that appear to have been in response to that enforcement action. We are confident of some causal link between enforcement and compliance, because for 16 of these undertakings, antitrust compliance initiatives are explicitly linked to

[76] See 2010 Sasol Wax Annual Report, p. 80.
[77] Le Carbone Lorraine: *Specality Graphite* in 2002 (€6.97 million).
[78] See Interview with the Chairman in 2002 Group Carbone Lorraine Annual Report, p. 5
[79] See 2011 Kemira Annual Report, p. 73.
[80] See 2008 Tosoh Corporation Annual Report, p. 12.
[81] See Letter from the Chairman in Roche Group Annual Report and Group Accounts 1999, p. 6.
[82] See BASF Corporate Report 2006, p. 18.
[83] See Eisai Annual Report 2002, p. 17.
[84] See Solvay Global Annual Report 2007, p. 143.
[85] See 2002 Merck Annual Report, p. 42.
[86] See 2009 Evonik Industries Annual Report, p. 83.
[87] See 2012 Total Registration Document, p. 116.
[88] The exact date of Shell's leniency application is unclear. The first inspections were conducted in April 2005.
[89] See 2008 L'Air Liquide Reference Document, p. 50.
[90] See 2010 H&R Annual Report, p. 17.
[91] See 2014 Gea Group Annual Report. p. 12.

enforcement action, or are strengthened in the year the first investigation opened or when the first decision was adopted, with no mention of antitrust specific compliance in the previous Annual Reports available. For the remaining 10 undertakings there is also reason to believe such measures were being adopted for the first time, but it is not possible to confirm that because previous Annual Reports were not available. From Table 2, we can also see how the investment in compliance coincided in some cases, with the opening of a new investigation in which the company successfully applied for immunity (see also Table 1). To look at how investment in compliance assisted companies in successfully applying for leniency and reducing their cartel liability, we now turn to the specific case of AkzoNobel and its use of an internal amnesty programme.

IV. AKZONOBEL'S USE OF AN INTERNAL AMNESTY PROGRAMME

AkzoNobel was involved in nine cartels and secured immunity from fines in four different cartel infringements, as illustrated in Table 1. These were *Organic Peroxides* (2003), *Rubber Chemical* (2005), *Sodium Chlorate* (2008) and *Calcium Carbide* (2009). It was beaten to immunity in the other five cartels but secured discounts in return for its cooperation in *Hydrogen Peroxide* (40%), *MCAA Chemicals* (25%), *Choline Chloride* (30%) and *Sodium Gluconate* (20%). In some cases it contested the Commission's treatment of AkzoNobel subsidiaries as falling within the same undertaking as the rest of the company.[92] It appealed this point, but was unsuccessful: the Court of Justice of the European Union (CJEU) confirmed that undertakings are to be understood as economic units, even if they consist of several legal entities, and that the fact the subsidiary was wholly owned by AkzoNobel was enough to presume it exercised decisive control over the subsidiary, without the need for additional evidence.[93] This approach to parent liability heightens the need for companies to ensure their compliance efforts engage all corners of the undertaking, but also overlooks the difficulties associated with managing risk across complicated and diverse corporate structures that are all considered one economic unit in competition law.

AkzoNobel was involved in more cartel infringement decisions during the 2000-2010 period than any of the other 107 companies. All nine were infringements that were already in existence by the beginning of the decade and its immediate challenge was to fully identify its exposure to competition law sanctions and do so in a timely manner so as to benefit from the European Commission's leniency programme. Some of these infringements were already under investigation in the United States, but others were coming to light. From a compliance perspective, securing immunity in four investigations and significant discounts in fines in all but one of the others, was a positive outcome given the circumstances. In order to achieve this, it took a unique internal approach to identifying potential cartel involvement. This involved offering its entire business population an internal employee amnesty programme.

Under this scheme, all AkzoNobel employees were given a one-time opportunity (within a fixed window of time) to come forward with information about possible violations of competition law, in exchange for a guarantee that the company would not take any retaliatory action against them.[94] What triggered this unique approach was US enforcement and later related US civil action settlement. The prospect of further exposure to treble damages was as much of a deterrent factor as corporate fines, if not more. So at the end of 1999, a multi-million settlement in the *Choline Chloride* case[95] convinced the AkzoNobel board to adopt an internal amnesty program at the beginning of 2000.[96] In doing so, they drew inspiration from the principles underpinning the EU

[92] Most notably, in *Choline Chloride*, it unsuccessfully tried to rebut the Commission's presumption that AkzoNobel NV exercised decisive influence over its subsidiaries.

[93] Case C-97/08 *Akzo Nobel NV and Others v Commission*. Judgment of 10 September 2009, para 74; For analysis see F Wenner and B Van Barlingen, 'European Court of Justice Confirms Commission's approach on parental liability' (2010) Competition Policy Newsletter 1, pp. 23-27.

[94] Jan Eijsbouts, former AkzoNobel General Counsel, talks about the company internal amnesty program in a 2015 interview available (in Dutch) at https://www.goodgovernance.nu/interviews/jan-eijsbouts-deel-1 See also the 2002 Annual Report, p. 25: *"*since 2000 a special project to reduce such risks has been in *place".*

[95] In Re: Vitamins Antitrust Litigation, Misc. No. 99-197 (TFH), MDL 1285 (D.D.C. Jul. 18, 2001), available at https://casetext.com/case/in-re-vitamins-antitrust-litigation-223. See also AkzoNobel Annual Report 2000, p. 79: "the Company is involved in civil damage claims in relation to some of these alleged antitrust violations. Legal costs and civil damage settlements incurred in 2000 in connection with these cases amounted to EUR 30 million".

[96] It was topical from a commercial perspective that a European company had to pay a high figure to civil plaintiffs in a jurisdiction where the company was not selling its products: the investigated conduct included a

leniency programme, introduced only four years earlier, by the European Commission. Like leniency, the internal amnesty was conditional on continuous and complete cooperation and it protected the employee against all internal adverse consequences from involvement in the cartel, but it was available to all employees and not just those who were first to report. However, it amounted to drawing a line in the sand, in that alongside the amnesty targeted at existing infringements, all future cartel activity would not be tolerated.

The internal amnesty involved three crucial elements. The first was strict confidentiality, to ensure that information about potential cartel liability was not leaked to competitors who might beat AkzoNobel to immunity, or to customers, which would have resulted in earlier negative commercial consequences. The second was that the involvement of outside counsel was essential, to maintain legal professional privilege. As would be confirmed by the CJEU a decade later in a landmark judgment involving AkzoNobel, communications between employees and in-house lawyers are not protected by legal professional privilege in EU competition law.[97] The third was to have a dialogue with the US Department of Justice and the European Commission about the internal amnesty – as part of AkzoNobel's ongoing cooperation with the authorities – to ensure it would be of assistance to their future investigations.

The approach was not without controversy – even at the time – as it amounted to the suspension of the enforcement of company rules, with a view to safeguarding the interests of stakeholders in the company, including all employees and shareholders. From a compliance perspective, it amounted to a no-fault approach to correcting employee behaviour, on the basis that the use of a carrot as well as a stick risked discouraging some employees from coming forward, thereby potentially delaying or jeopardising the prospect of AkzoNobel securing immunity in relation to yet undiscovered cartel arrangements.[98] It meant that even those employees who had instigated, organised or encouraged others to participate would also benefit from the amnesty. For example, an AkzoNobel executive who cooperated under the internal amnesty programme in relation to the *MCAA Chemicals* cartel, pleaded guilty in the US and served a three-month jail sentence.[99] To maintain the credibility of the internal amnesty program, and deliver on the guaranteed lack of consequences, this executive remained with AkzoNobel until his retirement.[100]

While some observers may feel this runs strongly counter to the need for deterrence, AkzoNobel reasoned this was no different to the competition authority providing immunity or lenient treatment in return for cooperation. Both were utilitarian devices that served bringing an end to infringements of competition law, on the basis that this interest outweighed the need to punish those actors.[101] Afterall, the amnesty only protected the employees from internal consequences of their actions, not from any individual sanctions imposed by competition authorities. It should also be noted that while internal amnesty programmes are rare in competition law, they are more common in relation to compliance of anti-bribery and corruption rules.[102] That may be explained by how

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market sharing arrangement by which European producers would not export to the North American market and vice versa.

[97] AkzoNobel challenged the Commission Decision of 11 November 2009 in *Heat Stabilisers* (Case COMP/38589), which refused the legal professional privilege to 2000 exchanges between the competition law in-house counsel and a manager, thus triggering the landmark EU judgment stating that legal professional privilege is available only when an EU qualified outside counsel is advising the company, see the judgment of the Court of 14 September 2010, *Akzo Nobel Chemicals Ltd and Akcros Chemicals Ltd v Commission*, Case C-550/07 P, ECLI:EU:C:2010:512.

[98] Interview of the author with Jan Eijsbouts, former AkzoNobel General Counsel, and currently Professor of Corporate Social Responsibility at the Maastricht University.

[99] See US DOJ Press Release, 'European Executive Agrees to Serve a Jail Sentence in the United States' (27 June 2001. While other executives were carved-in in the company plea agreements and could thus be covered by the US leniency program, that was not possible for this executive due to his significant involvement in the conduct.

[100] Based on explicit agreement with the US DOJ, which otherwise would have insisted on dismissal as a general rule in these cases.

[101] The Leniency Notice of 1996 (n 10) at recital 4 reads "the Commission considers that it is in the Community interest in granting favourable treatment to enterprises which cooperate with it ... The interests of consumers and citizens in ensuring that such practices are detected and prohibited outweigh the interest in fining those enterprises which cooperate with the Commission, thereby enabling or helping it to detect and prohibit a cartel". This language has remained the same in the Leniency Notice of 2006, at recital 2.

[102] For example, in 2013, Canada-based engineering and construction company SNC Lavalin launched a 90-day amnesty period for employees who came forward with information about potential corruption and competition law matters, see Jaclyn Jaeger, 'Employee amnesty programs: Strategic move or act of desperation?' (*Compliance Week*, 14 November 2017) available at https://www.complianceweek.com/employee-amnesty-programs-strategic-move-or-act-of-desperation/2462.article. For a competition law example, see the 2013

anti-bribery compliance programs receive more credit by authorities than is currently the case for competition compliance.[103] There is a long running debate about the extent to which effective compliance measures should be reflected in competition law sanctions,[104] with diverging approaches across jurisdictions and some arguing that the threat of high fines should be incentive enough to maintain good compliance.[105]

If we assume the primary purpose of compliance is to protect and limit the company's exposure to corporate fines, one possible critique to (or limitation of) an internal amnesty programme is being overwhelmed by the extent of its success. Indeed, while ensuring employees report infringements will undoubtedly give the corporation an edge in any leniency applications, it also risks uncovering past infringements that might not otherwise come to light – especially in relation to those that have remained hidden for some time, despite the existence of the EU's leniency programme.

V. THE IMPACT OF STRENGTHENED COMPLIANCE

The various compliance measures and initiatives described in sections III and IV of this paper had a profound impact on the culture of the chemical industry and on future enforcement that occurred after the 2000-2010 period. An important final question that we now turn to, is the impact that compliance had on future anti-competitive conduct within the industry.

A. Short term effect: more leniency applications

It is clear from the analysis in section III that at least some compliance efforts occurred in response to enforcement action by the European Commission (and in some cases also parallel US DOJ action). Investment in these compliance efforts was made all the more urgent by the consequences of missing out on immunity or a substantial reduction in fine, in return for being the first to report the cartel, or for providing valuable additional evidence. The wide cartelisation of the industry and overlapping membership meant that cartel enforcement sparked a domino effect that explains why such a large proportion of EU cartel enforcement in 2000-2010 is

amnesty program by the Germany-based ThyssenKrupp Steel carried, adopted in response to a German competition authority's investigation in the rail sector, leading to more than twenty leads, without however any serious or structural *compliance* infringements being identified, see https://webservice.thyssenkrupp.info/financial-reports/12_13/en/report/compliance.html.

[103] In the separate field of anti-bribery rules, the US DOJ has recognized the strength of Siemens amnesty program: "in consultation with the Department, [the company] designed and implemented a company-wide amnesty program to facilitate the internal investigation. ... The program provided that all but the most senior employees who voluntarily disclosed to [external law firm] truthful and complete information about possible violations of relevant anti-corruption laws would be protected from unilateral employment termination and company claims for damages. ... The creation of these two programs was a unique and effective way to further the investigation and it yielded impressive results. Over 100 employees provided information in connection with the programs, including numerous employees who previously provided incomplete or less than truthful information and employees who had not come forward previously. Shortly after the amnesty program began, the Department and the SEC identified various individuals and projects for more extensive debriefings by Siemens, referred to by the parties as 'deep dives'. The amnesty and leniency programs were vital to obtaining the types of detailed information needed for the deep dives". See US DOJ, Criminal Division, Fraud Section, and the US Attorney for the District of Columbia, Sentencing Memorandum (12 December 2018).

[104] Wouter PJ Wils, *Antitrust Compliance Programmes & Optimal Antitrust Enforcement*, 1(1) JOURNAL OF ANTITRUST ENFORCEMENT 52 (2013), to be contrasted with Damien Geradin, *Antitrust Compliance Programmes and Optimal Antitrust Enforcement: A Reply to Wouter P.J. Wils* 1(2) JOURNAL OF ANTITRUST ENFORCEMENT 325 (2013).

[105] US DOJ Antitrust Division, Evaluation of Corporate Compliance Programs in Criminal Antitrust Investigations, July 2019: "three-point reduction in a corporate defendant's culpability score if the company has an effective compliance program". Brazilian authority (CADE), Guidelines on Competition Compliance Programs, January 2016: "Compliance program ... in some situations it can have favorable effects when these sanctions are established. For example, it can remove specific prohibitions or even reduce the amount of the applicable fine". Contra, see European Commission, Compliance Matters, 2012: "Any effort by a company to ensure compliance with EU competition rules is laudable. But what matters ultimately is that the rules are actually complied with".

dominated by the chemical industry.[106] Unlike cartel infringements in other industries, there was a plethora of cartels that would soon be reported to, or discovered by, the authorities and this meant multiple opportunities to reduce liability.[107] Common membership of these cartels, increased the scope further for compliance efforts to uncover unreported infringements, as did the high level of merger and acquisition activity in the sector – for example Clariant blowing the whistle on the *MCAA Chemicals* cartel shortly after acquiring the MCAA business.[108]

By 2000, AkzoNobel was cooperating with competition authorities in multiple cases.[109] It applied for leniency in *Organic Peroxides* only a few months after launching its internal amnesty programme, securing immunity from fines as a result. Leniency applications for *Rubber Chemical* in 2002, *Sodium Chlorate* in 2003 and *Calcium Carbide* around the same time, all resulted in immunity and were directly attributable to AkzoNobel's internal compliance programme and amnesty.[110] While beaten in the race to report the five other infringements it was involved in, compliance nevertheless helped them secure a fine discount in four of those cases. In *Heat Stabilisers*, the company applied for leniency, but did not obtain any fine reduction in the final 2009 decision, because it had challenged the Commission's inspection decision in court. The Commission decided that, 'although each undertaking is of course entitled to defend its rights as it sees fit, the actions for annulment were central to the delay in this case. Therefore, it is not appropriate for [AkzoNobel] to benefit from the reduction in question'.[111]

Other examples of compliance giving companies the edge in applying for leniency, include Dow Chemical who reacted to enforcement in a previous cartel (*Synthetic Rubber*), increased compliance (adopting a code of ethics, see above) and filed for leniency in a later case (*Chloroprene Rubber*). Shell won the leniency race in the *Paraffin Wax* cartel in 2005, after having increased its compliance in response to its involvement in the *Dutch Bitumen* case from 2002 and in *Synthetic Rubber* from 2003. The company Odda Boliden applied for immunity in a chemical cartel even though that was likely due to increased attention as a reaction to enforcement in a non-chemical sector. The Commission fined Boliden for its participation in the *Copper Tubing* cartel in 2004 (fine for €32.6 million), and the company applied for immunity in 2005 in the *Aluminium Fluoride* cartel. We also found examples of companies who applied for immunity independently from any previous involvement in a chemical cartel investigation in the 2000-10 period. These included: Chisso, Cerestar Bioproducts, Chinook, Graftech. Another interesting example is BP plc (formerly known as BP Amoco) who obtained immunity from fines in *Dutch Bitumen* in 2006 and in *Spanish Bitumen* in 2007, after having disclosed the existence of these cartels to the Commission in 2002. It is notable that BP had implemented measures focused on compliance in competition, in response to prior enforcement in other industries.[112] This also demonstrates how cartel

[106] For example, the US Deputy Assistant Attorney General of the Antitrust Division declared "the lysine investigation eventually led the Division to evidence that exposed additional worldwide cartels operating in other chemical markets, including citric acid, sodium gluconate, sodium erythorbate, and maltol". Scott D. Hammond, 'Caught In The Act: Inside An International Cartel', 18 October 2005, available at https://www.justice.gov/atr/speech/caught-act-inside-international-cartel

[107] The high frequency of cartels in the chemicals sector is shown by several datasets and literature. OECD, 'Serial Offenders: A Discussion On Why Some Industries Seem Prone To Endemic Collusion' (9 October 2015), Background note by the Secretariat, indicates that the Private International Cartels database (a list of cartel cases around the world produced by Professor John Connor) records a total of 97 cartels in the chemical sector, out of which 37 are global cartels, in the period 1990-2014. See also OECD, 'Serial Offenders: A Discussion On Why Some Industries Seem Prone To Endemic Collusion' (29-30 October 2015), Summary of Discussion: "Out of 100 cases run by the European Commission during the period from 1998 to 2015, more than 25% affected the chemicals sector". Marco Antonielli and Mario Mariniello 'Antitrust risk in EU manufacturing: A sector-level ranking' (2014) Bruegel Working Paper 7, find that the Commission issued 65 cartel decisions and that 27 out of 65 (41.5%) concerned the chemical sector between 2000 and 2011. Emmanuel Combe and Contance Monnier 'Les cartels en Europe: Une analyse empirique' (2012) Revue française d'économie 27 / 2, pp. 187-226, find that 29% of the EU cartels between 1969 and 2009 were in the chemical sector.

[108] Combe and Monnier Ibid, report that all the cartels involving three recidivists were in the chemical sector.

[109] AkzoNobel Annual Report 2000, p. 79.

[110] The public version of the decision redacts the year of application for leniency, which however was under the 2002 Leniency Notice (n 10) and therefore one can infer that the application must have occurred between 2002 and 2006 when the new Leniency Notice entered into effect.

[111] *Heat Stabilisers* (n 55), para 772.

[112] See for example: "special case studies have been developed to stimulate debate on ethical dilemmas, but we find the most benefit is obtained when participants work together on real issues drawn from their own business experience. Amoco has run seminars on various aspects of ethical behaviour including ... compliance with anti-

enforcement coupled with the EU leniency programme, at least in some cases sparked compliance initiatives in businesses that permeated beyond the particular market or industry subject to the investigation.

Levenstein and Suslow raise the important question of whether leniency was used strategically to only uncover those cartels that were less profitable.[113] There is also some empirical work to suggest that most cartels are only uncovered by the leniency programme after they have failed for other reasons.[114] We did not find anything in our research to suggest leniency was being used strategically by firms in the chemical industry within the period of enforcement, although any such strategy would not be readily observable from the materials we engaged with. Instead, in at least some cases our findings are consistent with large corporations attempting to develop serious compliance efforts in response to a significant wave of enforcement and struggling with incomplete information about what is going on within each of their divisions and subsidiaries. In some instances, the companies reported being caught by a first investigation entirely by surprise. In its first Annual Report after being fined for involvement in *Parafin Wax*, Sasol Wax stated,

> 'Sasol was totally unaware of these activities. When we became aware of them in 2005, they were immediately stopped. We regret that this has occurred in one of Sasol's subsidiaries and that our due diligence and compliance programmes failed to identify this anti-competitive behavior when we acquired the business 13 years ago and thereafter'.[115]

The Chairman's statement of that same year hinted at the difficulty of detecting cartels within complicated corporate structures, given their secretive nature.[116] The report of the following year described a comprehensive review of compliance and acknowledged that, 'The review has revealed and still may reveal competition law contraventions or potential contraventions in respect of which we have taken or will take appropriate remedial and/or mitigating steps, including lodging leniency applications...'[117] To deal with this challenge, a number of the companies used investment in compliance as a way of ensuring effective cooperation with the European Commission in return for leniency, and in trying to determine any other exposure to liability. As can be seen from Table 2, this is evident in how investment in compliance appears to have coincided in some cases, with the opening of a subsequent investigation by the European Commission, in which the company received immunity for being the first to report (see also Table 1). For others, including Dow Chemical, investment in compliance in response to a first cartel investigation appear to have helped them secure reductions of fines in subsequent cases,

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trust" (1998 BP Amoco sustainability report of, p. 39); "our approach to ethical conduct emphasizes policy understanding, consultation and sound judgement. It is important that employees both understand the policy and feel able to discuss its implementation openly. Workshops are an important route towards developing employee understanding and some 75 events have been held in 2000" (2000 BP Amoco Annual Report, p. 18). In 2001, ethical conduct was again emphasized "there are two generic approaches to codes of ethical conduct in business. The first is based on rules and compliance. The second is value based and requires individuals to take personal responsibility for interpreting and understanding the code. We use a balanced mix of both approaches, with a strong emphasis on the personal responsibility of individuals to exercise judgement in a manner consistent with our values. This reflects our overall management ethos, which demands a high degree of responsibility and autonomy at all levels in the organization and helps us apply consistent principles in the many different circumstances in which we operate around the world" (2001 BP Amoco Annual Report, currently not public anymore). In 2002, the company continue to put efforts on compliance: "During 2002, 132 people were dismissed for unethical behaviour" (2002 BP Amoco Annual Report, p. 21).

[113] They 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". See Margaret Levenstein and Valerie Suslow, *Breaking Up Is Hard to Do: Determinants of Cartel Duration*, 54(2) JOURNAL OF LAW AND ECONOMICS 455 (2011).

[114] Andreas Stephan and Ali Nikpay, "Leniency Decision-Making from a Corporate Perspective: Complex Realities" in Caron Beaton-Wells and Christopher Tran, ANTI-CARTEL ENFORCEMENT IN A CONTEMPORARY AGE: THE LENIENCY RELIGION (Oxford: Hart Publishing 2015).

[115] See 2008 Sasol Annual Report, p. 84.

[116] Ibid. at 28.

[117] See 2010 Sasol Wax Annual Report, p. 80.

even if they were beaten to immunity.[118] One important factor that is not generally clear from the Annual Reports, is whether senior managers within the firm knew about the existence of cartel conduct (and so readily had the information needed to apply for leniency), or relied on compliance tools to uncover that conduct within their organisations. This is not to suggest strategy played no role in leniency applications, but it is hard to see how these firms would have felt it worthwhile trying to suppress the existence of a cartel, given the obvious domino effect described above and the high level of cooperation with the European Commission.

B. Long-term effect of compliance: fewer infringements?

The chemicals industry is sometimes cited as an example of a sector with a high level of cartel recidivism.[119] However, this is not an entirely accurate characterisation given that these cartels, and the investigations that relate to them, were generally contemporaneous to one another. If we instead compare the 2000-2010 enforcement period with 2011-2020, we find that of the 107 undertakings (or 236 legal entities) who were addressees of the EU infringement decisions in the relevant period, only one was investigated and fined by the Commission in a subsequent cartel. This was Clariant, who was involved in the *Ethylene* cartel (2020).[120] As mentioned above, this was the company who secured immunity for *MCAA Chemicals* (2005) after acquiring an MCAA business in 1999. Clariant had launched a compliance programme in 2007,[121] but appears to have been third to cooperate in the Commission's investigation, receiving a 30% discount. In a press release, they indicated that their involvement in the infringement had occurred due to a "single former employee"[122] and in 2017 had further strengthened their compliance efforts in response to the Commission's investigation.[123]

Beyond this, the level of compliance in the market appears to have increased significantly, as *Ethylene* was the only cartel to be discovered in the chemical industry, out of some 40 cartel decisions over the period 2011-2020.[124] So the proportion of chemical cartel cases fell from around a quarter to just 3% of EU cartel

[118] See 2006 Dow Chemical Annual Report, p. 58; Note that Veljanovski observes inconsistencies during these period in how leniency discounts are calculated: Cento Veljanovski, *Deterrence, Recidivism, and European Cartel Fines* 7(4), JOURNAL OF COMPETITION LAW & ECONOMICS 871 (2011).

[119] See for example, John M Connor, *Recidivism Revealed: Private International Cartels 1990-2009*, 6 COMPETITION POLICY INTERNATIONAL (2010).

[120] European Commission Press Release IP/20/1348, 'Antitrust: Commission fines ethylene purchasers €260 million in cartel settlement' (14 July 2020).

[121] See the 2007 Clariant Annual Report, p. 34: "the new Clariant Code of Conduct, launched in 2007 ... to respect and fully abide by a comprehensive set of rules on fair competition ... Using detail provided by line management, Clariant's General Counsel is the ultimate contact point for compliance questions, a responsibility that includes the tracking of all notifications of code breaches and other related legal issues. In the year under review, no instances were registered involving noncompliance with rules and regulations concerning corruption, unfair competition, or discrimination". See also the 2013-2014 Annual Report: "self-initiated obligations beyond the Code of Conduct and the Code of Conduct for Suppliers ... these include the topics of fair competition".

[122] Clariant press release (14 July 2020), available at https://www.clariant.com/en/Corporate/News/2020/07/Clariant-receives-fine-following-a-European-competition-law-investigation

[123] In 2017, Clariant responded to the Commission's enforcement by strengthening its compliance program. Clariant's Annual Report 2017: "Clariant believes that sustainable business success is closely linked to compliance with laws, regulations, and ethical standards and therefore implemented several measures in 2017 to emphasize the importance of Ethics and Compliance issues throughout the company. First, Clariant launched an ethical journal that discusses real cases from its businesses and how they were resolved. Through the campaign Excellence through Integrity, the members of the Executive Committee and the Regional Heads stated what integrity means to them and further raised awareness for ethical behavior. Clariant also continued its mandatory compliance trainings to avoid violations of the Code of Conduct, both via e-learning and in-person courses. Certain target groups received specific trainings on competition and anti-trust law". See also the Annual Report 2018: "among the initiatives to enhance integrity: (i) display of posters at all sites to increase the campaign's visibility; (ii) training of 5000 employees on a relaunched e-learning on antitrust law; (iii) initiation of a compliance risk assessment to identify gaps in the compliance framework in distinct markets; and (iv) implementation of grievance mechanisms pursuant the "Speak up" initiative to allow anonymous reports on any alleged violations of the Code of Conduct".

[124] Between 2011-20, the European Commission issued 46 cartel decisions, of which six decisions were re-adoptions earlier cartel decisions, which we excluded from the count; two re-adoption/amendment decisions involve chemical cartels, namely, the *Heat Stabilisers* and *Sodium Chlorate* cases. The identification of cartels decided between 2011-2020 was based on two queries: 41 results of cartel decisions from 01/01/2011 to

enforcement.[125] The *Ethylene* case was unusual in that it involved a purchasing cartel, while every one of the 28 previous cases principally involved selling cartels. It is also notable that the immunity applicant in the case, Westlake, had no previous record of cartel infringements but did have a competition compliance programme that may have helped identify the infringement.[126] The decreased need for cartel enforcement in the industry in recent years seems to apply also on a global level: a search of the OECD International Cartel database, shows no international chemical cartels since 2012 (which is as far back as the data goes) across approximately 50 jurisdictions.[127]

Although this is a positive picture, it comes with some important caveats. The first is that we would naturally expect (and hope) there would be a high level of compliance after such an intense decade of enforcement, very significant corporate fines and the existence of an effective leniency programme. The second is that the nature of cartel risk is likely to have changed in the more recent period. The smoke-filled rooms of the *Lysine* cartel are indicative of a period when competition enforcement was viewed as weak, leniency programmes were either absent or in their infancy, and chemical companies had not yet made serious efforts to invest in compliance and shake off their culture and legacy of cartelisation. Modern cartel risk is more likely to lie at the edges of cartel laws, or among small groups of employees who are either not properly engaged by compliance training or choose to deliberately ignore it. The third is that we cannot exclude the possibility that some market participants are continuing to collude but are not being detected. As mentioned earlier in this paper, many of the cartels uncovered in the chemicals industry during the 2000-2010 period were failing when they were uncovered. There could be instances of new cartels forming that are robust *despite* the availability of leniency, the threat of enforcement, and the compliance efforts of the undertakings. It could also be that less explicit forms of collusion have become common, which do not involve direct communication, and cannot easily be investigated and subject to infringement decisions. Even if these caveats all hold true, the case for investing in compliance is compelling nonetheless, in helping reduce the scope for hard-core cartel infringements and limiting liability by facilitating cooperation in return for leniency.

VI. CONCLUSION

This paper has provided an important and original contribution to our understanding of the relationship between cartel enforcement and competition compliance. Our qualitative study has shown that many of the larger companies operating in the chemical industry appear to have responded directly to cartel enforcement by the European Commission (and in many cases the US Department of Justice) by investing in competition compliance, through the adoption of a formal compliance programme, a code of conduct, staff training and dedicated in-house compliance officers and directors. Leniency proved very effective because of the unique proliferation of cartels in the industry and common membership between firms. This created a clear domino

14/08/2020 in the Commission's search field webpage, available at https://ec.europa.eu/competition/elojade/isef/index.cfm?clear=1&policy_area_id=1; and other decisions listed at the Commission's "cartels cases" list, available at https://ec.europa.eu/competition/cartels/cases/cases.html.

[125] Between 2000-10, the European Commission issued 76 cartel decisions, including seven re-adoption decisions, which were excluded from the count; this includes three 2000 re-adoption decisions in a chemical cartel, following annulment by the CJEU on procedural grounds. See the Commission Press ReleaseIP/00/1449, 'Commission readopts three decisions imposing fines on Solvay and ICI in the Soda ash case' (13 December 2000).

[126] Westlake requires from its employees a Code of Conduct acknowledgement (November 2019, available at https://www.westlake.com/sites/default/files/COC%20Final%202019.11.19%20WLK.pdf), and was considered by Forbes one of the Top 100 Most Trustworthy Companies in America in 2012 and 2015 (available at https://www.westlake.com/awards-recognitions). On the other hand, the company was named as a defendant in a class action in the District Court Western District of New York regarding a potential conspiracy to increase prices in the caustic soda market. See Erin Shaak, 'Class Action Claims Manufacturers Illegally Conspired to Fix Caustic Soda Prices' (27 March 2019), available at https://www.classaction.org/news/class-action-claims-manufacturers-illegally-conspired-to-fix-caustic-soda-prices#embedded-document).

[127] Only the following chemical cartels were found, in relation to single jurisdictions: Aggrenox, treatment for stroke, pay for delay, US; Aluminum sulfate, liquid, US (civil actions, no penalties); Personal Care Products, toiletries, France, 2014; Auto Refinishing Paints, imports, Hungary, 2014; Chemicals, specialty mining, Poland, 2013; Spolchemie, Czech Republic (pending); Detergents, Australia and New Zealand, 2016; Gases, industrial (nitrogen, oxygen, argon), South Africa, 2013; Surfactants, South Africa, 2017; Fertilizer, Zambia in 2013. The OECD database is available at https://qdd.oecd.org/subject.aspx?Subject=OECD_HIC

effect for enforcement, as the companies worked to identify the extent of their cartel exposure so as to achieve the maximum possible benefit under the leniency programme. We also saw how the intense period of enforcement in 2000-2010 was followed by a decade of apparent compliance with cartel laws, in which the number of cartel infringement decisions involving the chemical industry fell from 26 (or around a quarter of EU cartel enforcement) to just one (or 3% of all EU cartel decision in the relevant period).[128]

It is clear that at least in some cases enforcement caused significant investment in compliance among the larger companies in the chemical industry. Although we could not find any public statements of compliance investment for the three quarters of (predominantly smaller) companies subject to enforcement during the 2000s, this does not mean they did not take compliance more seriously. Indeed, it is not unreasonable to expect that the 26 out of the 107 companies who did openly announce their compliance efforts, encouraged others to do so and had a positive impact on the industry, in this respect.

Beyond the specific examples discussed in this paper, we are not able to accurately identify the extent to which compliance efforts have contributed to decartelising the chemical industry (if indeed that is what has happened), as distinguished from the effects of enforcement and leniency. It is perhaps best to view leniency and compliance as complementary, as we have seen a number of instances where the latter assists and incentivises companies to limit their exposure to fines under the former. Indeed, there is evidence in the literature to suggest that the morally ambiguous nature of anti-competitive behaviour makes some level of delinquency inevitable, unless there is also the building and acceptance of a moral commitment to obey the law.[129] That moral commitment can only come through clear statements of compliance and ethics, backed by rigorous training and reporting methods. It is nevertheless significant that the industry that arguably saw the biggest success in terms of leniency uncovering cartel infringements, did so alongside very significant investment in compliance by the largest chemical companies.

AkzoNobel's experience shows how innovative internal compliance methods can be effective at helping a company identify an infringement and be first through the competition authority's door to report it in return for immunity. In 2018, it sold its chemical business to focus on paints and coatings, but still adopts targeted internal amnesty programs for its newly acquired businesses.[130] Its internal amnesty programme has not been repeated in the same form, but its success raises the question of the extent to which employees who report behaviour should escape punishment within the firm. The circumstances that AkzoNobel found itself in were unique given the level of enforcement and number of suspected undetected cases. Today there is a clear expectation that employees follow competition compliance training and codes of conduct and that they will be disciplined or dismissed if they fail to do so. However, all large companies face a moral dilemma when it comes to leniency programmes because it is often the very individuals responsible for an infringement, that must be relied upon in order to help the company secure immunity or a reduced fine. This can make it very difficult to follow through with threats of discipline or dismissal. Yet the generalized use of internal amnesty could be viewed as unethical, as sending out the wrong signals to other employees and is also riddled with complexities around employment law, legal privilege, corporate disclosure and conflicts of interest where the individual is also under a criminal investigation.[131]

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[128] On the evaluation of competition policy more generally, see: Paolo Buccirossi et al., *Measuring the Deterrence Properties of Competition Policy: The Competition Policy Indexes* 7(1) JOURNAL OF COMPETITION LAW & ECONOMICS 165 (2011); Stephen Davies and Peter Ormosi, *Assessing Competition Policy: Methodologies, Gaps and Agenda for Future Research* CCP WORKING PAPER 10-19; Fabienne Ilzkovitz and Adriaan Dierx, *Ex-post economic evaluation of competition policy enforcement: A review of the literature*, (European Commission, June 2015).

[129] See Christine Parker, *The "Compliance" Trap: The Moral Message in Responsive Regulatory Enforcement,* 40(3) LAW AND SOCIETY REVIEW 591 (2006); Christopher Hodges and Ruth Steinholtz, ETHICAL BUSINESS PRACTICE AND REGULATION (Oxford: Hart Publishing 2018).

[130] Gianni De Stefano, *Compliance as Antitrust Cooperation: An Incentive for Cartel Enforcement* 9(10) JOURNAL OF EUROPEAN COMPETITION LAW & PRACTICE 617 (2018).

[131] See Anne Riley and Margaret Bloom, *Antitrust Compliance Programmes – Can Companies and Antitrust Agencies Do More?* 10(1) COMPETITION LAW JOURNAL 21, FN 32 (2011).

Appendix 1 – The 107 undertakings addressed in the 28 chemical cartel decisions.

AB Nynäs Petroleum
AC Treuhand
AGA AB
Air Liquide BV
Air Products Nederland BV
Ajinomoto
Akzo Nobel NV
Almamet GmbH
Archer Daniels Midland Company Inc (ADM)
Arkema SA (previously known as Atochem SA and Atofina)
Avebe BA
Aventis Pharma SA (previously known as Rhône-Poulenc)
Baerlocher Gmbh
Ballast Nedam NV
BASF
Bayer AG
BOC Group plc
Boliden Odda A/S
BP plc
Cerestar Bioproducts BV
Cheil Jedang Corporation (Cheil)
Chemson GmbH
Chemtura Corporation (previously known as Crompton Corporation)
Chinook Group Limited
Chisso Corp.
Clariant AG
Compagnie Financière et de Participation Roullier
Compañía Española de Petróleos SA (Cepsa-Proas)
Daesang
Daicel Chemical Industries Ltd
Daiichi Pharmaceutical Co Ltd
Degussa AG (formerly Evonik Degussa GmbH)
Denki Kagaku Kogyo KK (Denka)
Donau Chemie AG
Dow Chemical Company
DuPont de Nemours and Company
Dura Vermeer Groep NV
Eisai Co. Ltd
Eni S.p.A
Ercros S.A.
Esha Holding BV
Exxon Mobil Corporation
Faci SpA
Fluorsid SpA
FMC Corporation
Fujisawa Pharmaceutical Company Ltd
GEA Group AG
GrafTech International, Ltd
Hansen & Rosenthal (H&R)
Heijmans Nv
Heubach (Dr Hans Heubach GmbH & Co. KG)
Hoffman- La Roche AG
Holding Slovenske elektrarne doo (HSR/TDR)
Ibiden Co Ltd
Imperial Chemicals Industries PLC (ICI PLC)
Intech EDM bv
James M. Brown Ltd
José de Mello SGPS SA
Jungbunzlauer AG
Kongo Chemical Co Ltd
Koninklijke BAM Groep
KONINKLIJKE VOLKER WESSELS STEVIN NV (KWS)
Kuwait Petroleum Corporation
Kyowa Hakko Kogyo Company Limited
L'Air Liquide
Le Carbone-Lorraine S.A. (now Mersen)
Lonza AG
Lucite International Ltd
Merck KgaA
Messer Nederland BV
MOL Nyrt.
Nippon Soda Company Ltd
Nippon Steel Chemical Co Ltd
NV Hoek Loos
Petrogal (Galp Petróleos e Gás de Portugal, SGPS, SA)
Q.B. Industrias SAB de CV
Quinn Barlo Ltd.
Reagens SpA
Repsol YPF
Roquette Frères SA
RWE AG
Sasol Wax Gmbh
SGL Carbon AG
Shell Petroleum NV
Sideron Industrial Development BV
SKW-Stahl Metallurgie Holding (SKW)
Snia (Società di Navigazione Italo Americana)
Société des Industries Chimiques du Fluor
Société Nouvelle des Couleurs Zinciques AS (SNCZ)
Solvay NV
Sumitomo Chemical Co Ltd
Takeda Chemical Industries Ltd
Tanabe Seiyaku Co Ltd
Tessenderlo Chemie NV
Tokai Carbon Co Ltd
Tosoh Corporation
Total SA
Toyo Tanso Co., Ltd
Trident Alloys Limited (formerly Britannia Alloys and Chemicals Ltd)
UCB SA
Ueno Fine Chemicals Industry Ltd
UniPetrol AS
Uralita SA
Waardals Kjemiske Fabrikker
Westfalen Gassen Nederland BV
Yara Phosphates (formerly Kemira Oyj)
Zeon Corporation