ASSESSING THE STATE OF COMPETITION IN INDIAN MANUFACTURING SECTOR: PESTICIDES AND CEMENT INDUSTRIES

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Contents

PREFACE

This study has been completed in a period of about 6 months. The primary aim of the study has been to analyse the degree of competition prevailing in the Pesticides and Cement industries using secondary sources. While the emphasis has been on investigation of the Indian industries we have also tried to analyse the international structure of these industries with the prime motive of looking at the structure of concentration in these industries. We have also tried to highlight some anti-competition action by regulatory agencies in a few countries which are important as the major producers/consumers of Pesticides and Cement. In this analysis we have tried to focus on the basis on which anti-competition action has been taken. It is hoped that this would give the Competition Commission of India some information on the usual anti-competitive activity in these industries.

Our focus, however, has been on nature of competition in the Indian industries. Here, we have followed as a far as possible the Competition Act, 2002 in guiding our analyses. Since the focus of the Act has been on measuring *abuse* of dominance rather than dominance per se we have tried to identify quantitative measures that could be used to indicate this abuse of dominance. Here, we have relied mainly on economic measures of non-competitive behaviour.

I would like to thank the CCI for comments during a preliminary discussion with senior officials. We also benefited immensely from comments from participants in an open workshop. I would also like to thank the Ministry of Company Affairs which provided us access to important data. Finally, I would like to thank Mr. Hariprasad C G and Mr. Rabi Ranjan, the research associates without whom this report would not have been possible.

Manoj Pant
Delhi, Mar. 2007.

General Summary:

- At international level the Pesticides sector is characterized by what may be called monopolistic competition, while the Cement industry is dominated by a few big companies and is patently cartelized.

- International anti-competitive case studies indicate that the main emphasis seems to be the cartel like behavior of cement majors with the principal objective of market sharing and price fixation while there is some monopoly behavior particularly in the case of high tech seed industry in Pesticides case.

- India is both a dominant producer and consumer in the Insecticides segment of the Pesticides industry and further firm level analysis indicates that none of the M&A cases qualify for action under Section 5 of the Indian Competition Act, 2002.

- More detailed analysis indicates that the degree of competition in the Pesticides industry has been increasing in that the concentration levels in terms of sales has been decreasing over the 'nineties.

- There is some limited evidence that mergers in the Pesticides sector in high tech seed segment have been used for substantially increasing market shares.

- There seems to be some presumption that the M&As in cement industry which fall under the ambit of Section 5 of the Competition Act provisions on combinations are non-competitive in that the merging firms have a very similar average cost structure so that they could not have been guided only by efficiency considerations. However, there is no clear indication that these mergers have led to any substantial market share increase over time.

- It is clear that current data is available only at the firm level. However, most firms are multi-product and firm level data cannot be used efficiently to delineate the 'relevant product' for which competitive behaviour has to be defined as per Section 2(t) of the Competition Act, 2002. This also creates a problem in defining the 'relevant geographic area' as specified in Section 2(s) of the Act. Hence, it seems necessary to work with specific product and plant level data bases. These are not publicly available. Existing studies tend to look at concentration, market shares etc. at the national industry level and thus seriously understate the possibility of anti-competitive behaviour of firms.

- In this study cost-audit data provided by the Ministry of Company Affairs is used. Particularly in the case of the Cement industry the data allows us to study competitive behaviour at both 'product market' and 'relevant geographic market' levels. Our study indicates that there is some evidence of price fixation and market sharing agreements in the sense of Section 3(3)(a) and 3(3)(c) of the Competition Act. This however, merits further investigation.

ASSESSING THE STATE OF COMPETITION IN INDIA: Case Study of the Pesticides and Cement Industries

1 Introduction

1.1 This study has been conducted for the Competition Commission of India over a period of about 6 months. The main objective is to understand the structure of the Cement and Pesticides sectors with a view to gauge the state of competition in these sectors. The basic premise of the study is that the information obtained would serve as some guide to the CCI in terms of the quantification of parameters that could be used to assess anti-competitive behavior. In addition, the study would also serve as some guide as to the state of competition in these sectors.

1.2 The broad outline of the study is as follows. In Section 2 we will look at the structure of the two industries at the international level in terms of the dominant firms and the micro details of the two industries. Here we will rely on mainly published material. We will also, in this section, look at the broad production, consumption and price trends at the country level to identify the main countries which need to be looked at. This is essential to identify the possible international sources of anti-competitive behavior in application of the 'effects doctrine" (Competition Act, 2002, Sec 32 (f)). In addition, we will look at the regulatory structure of the main countries considered and try to present a few case studies of anti-competitive action taken at the international level. This would give some indication to the CCI as to the approach taken by regulatory agencies in other countries.

1.3 The next section 3 develops the methodology for detailed study of the Cement and Pesticides sectors in India after 1989 or so. Here we will first try to suggest measures or indicators that can be used to identify non-competitive behavior and apply these to the two sectors using available data. The methodology is then applied to the Pesticides and Cement sectors in Section 4 and 5, respectively. Finally, some policy suggestions are given in Section 6.

2 International Scenario

2.1 Structure of Pesticides Industry

2.1.1 Many countries have had their own local seed companies that have over the years developed seed for a specific geographical market and operated sales and distribution systems. The major biotechnology companies are increasingly purchasing these seed companies as a source of seed material in which to insert the genes for herbicide or insect resistance[1]. As an example, in 1997, Monsanto acquired a 30% share of the Brazilian corn seed market with the acquisition of Sementes Agroceres. With its 1998 purchase of Cargill's international seed division, Monsanto now controls over half the Argentine maize seed market. In 1998, Dow AgroSciences acquired Morgan Seeds, Argentina's second largest corn seed company, and Brazil's Dinamilho Carol Productos Agricolas, another key South American corn seed company. Phytogen (majority owned by Dow Agrosciences) acquired a major cottonseed breeding program in the Chaco province of Argentina. In 1998, Mexico-based Empresas La Moderna (ELM) bought two South Korean vegetable seed companies and Nath Sluis (agricultural biotech company) of India (Action Group on Erosion, Technology and Concentration [ETC], 2000).

Table 1: World Structure of Pesticides Industry: Sales Dominance

Company	1997 Pesticides	1997 Seed	1999 Seed	1998 Plant Biotech
(Millions $)				
DuPont (Pioneer) USA	2,518	1,800	1,850	—
Pharmacia (Monsanto) USA	3,126	1,800	1,700	88%
Syngenta (Novartis) Switzerland	4,199	928	947	4%
Groupe Limagrain (France)	—	686	700	—
Grupo Pulsar (Seminis) Mexico	—	375	531	—
Advanta (AstraZeneca and Cosun) UK and Netherlands	2,674	437	416	—
Sakata (Japan)	—	349	396	—
KWS AG (Germany)	—	329	355	—
Dow USA	2,200	—	350	—
Delta & Pine Land (USA)	—	—	301	—
Adventis Group (Hoechst/Rhone-Poulenc)	4,554	—	—	8%
Bayer	2,254	—	—	—
American Home Products	2,119	—	—	—
BASF	1,855	—	—	—
Sumitomo	717	—	—	—
Agribiotech	—	425	—	—
KWS	—	329	—	—
Takii	—	300	—	—
Total World Sales	30,900	23,000	24,700	—

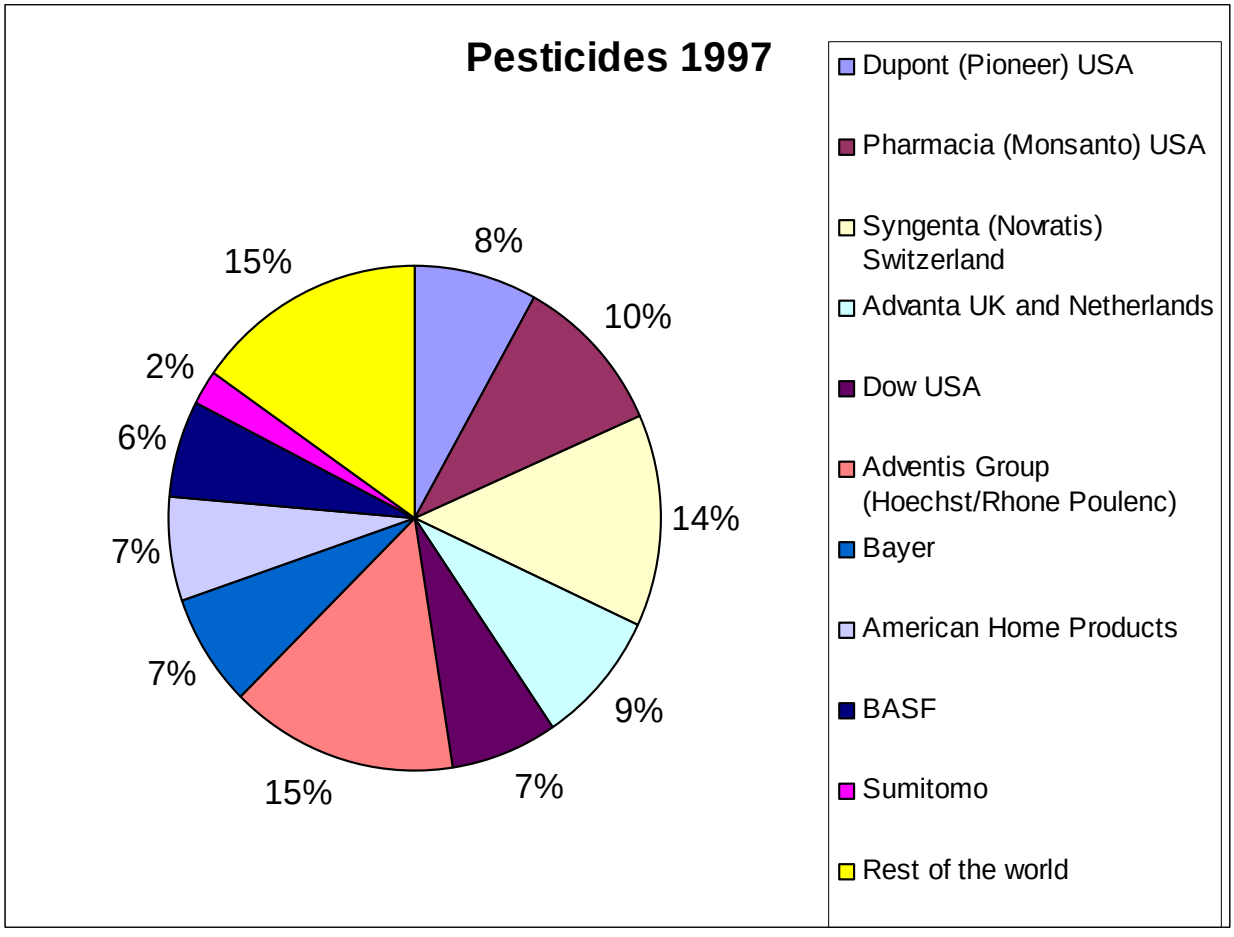
[1] Kalaitzandonakes, N. and Hayenga, M. (2000). Structural change in the biotechnology and seed industrial complex: Theory and evidence. In W.H. Lesser (Ed.), *Transitions in Agbiotech: Economics of Strategy and Policy*. Storrs, CT: Food Marketing Policy Center, University of Connecticut.

CR4	47%	23%	21%	100%
CR10	85%	32%	31%	100%

Note. From "Impact of Industry Concentration on Innovation in the US Plant Biotech Industry," by M.F. Brennan, C.E. Pray, and A. Courtmanche, 2000, In Transitions in Agbiotech: Economics of Strategy and Policy, W.H. Lesser (Ed.). Storrs, CT: University of Connecticut. Dashes indicate data not applicable.

2.1.2 Aggregate market figures mask the much higher concentration that exists in specific markets[2]. For example, in 1998, Monsanto and Pioneer-HiBred (now owned wholly by DuPont) controlled 15% and 39% of the US seed corn market, respectively. These two same companies controlled approximately 24% and 17%, respectively, of the purchased soybean seed market. For the US cotton market, two companies, Delta & Pine Land and Stoneville, had 71% and 16%, respectively, of the seed market[3].

Chart 1: World Structure of Pesticides Sales in 1997



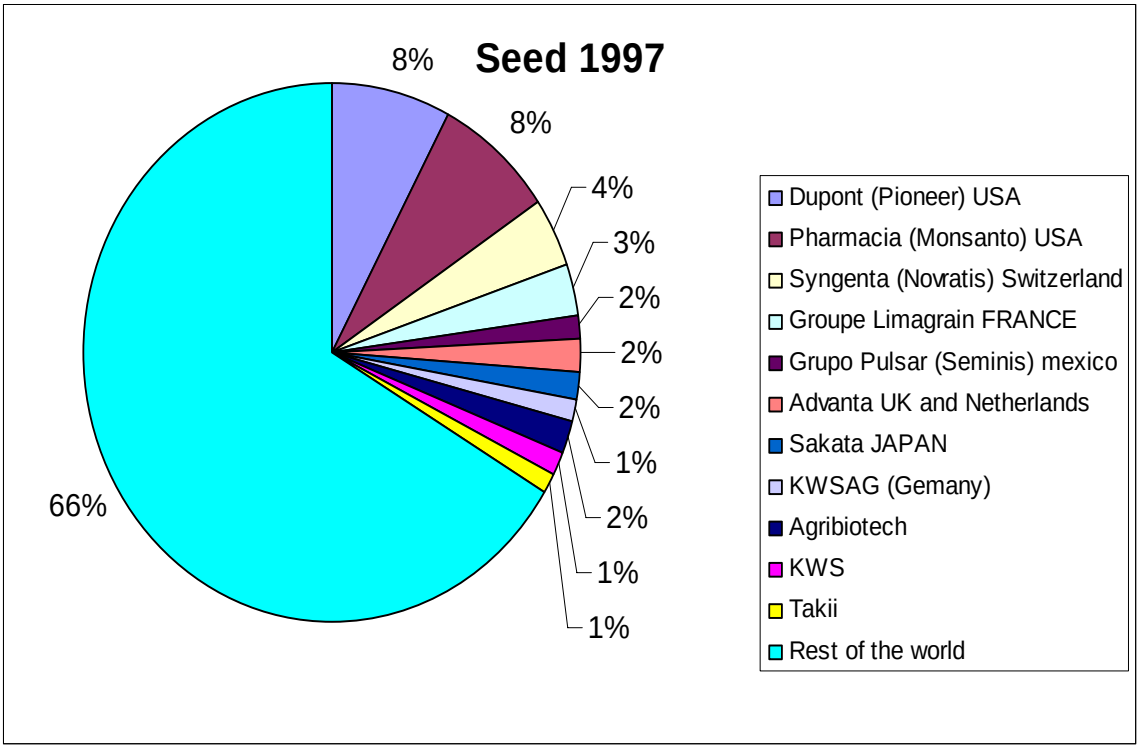
2.1.3 This chart follows from Table 1, wherein 15% of total share accrue to rest of the world and 85% accrue to few major countries (Companies), and CR4 and CR10

[2] Sexton, R. (2000). Industrialization and consolidation in the US food sector: Implications for competition and welfare. *American Journal of Agricultural Economics*, *82*(5), 1087-1104.

[3] ibid. pp 5.

are 47% and 85% respectively. Clearly, there is a scope for market dominance as the top 15 major companies share of sales in pesticides is more than that of the rest of the world.

Chart 2: World Structure of Seeds Sales in 1997



2.1.4 Chart 2 is derived from Table 1, wherein 66% of the total seeds sales accrue to rest of the world and only 34% accrue to few major countries (Companies), though CR4 and CR10 are 23% and 32% respectively. Market dominance is limited as rest of the world sales in seeds is more than the top 15 major companies.

2.1.5 Chart 3 follows from Table 1, wherein 71% of the total seeds sales accrue to rest of the world and only 29% accrue to few major countries (Companies), though CR4 and CR10 are 21% and 31% respectively. Here it is interesting to note that concentration (CR4 and CR10) in these industries has reduced from 23% and 32% to 21% and 31% respectively and total world sales share in seeds over 2 years has increased from 66% to 71%. Market dominance is limited as rest of the world share of sales in seeds is more than the top 15 major companies.

Chart 3: World Structure of Seeds Sales in 1999

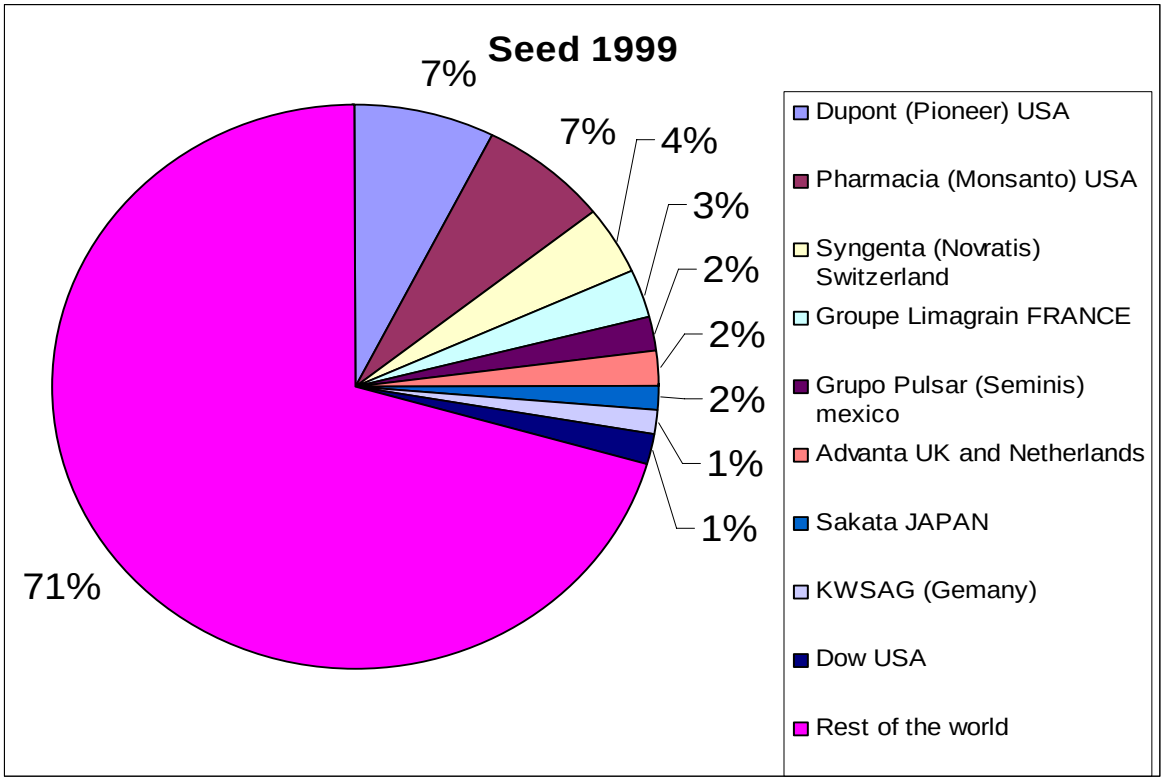


Table 2: Consolidation activity for the ten most active biotechnology firms, 1998

Company	Mergers	Acquisitions	Joint Ventures	Other	Total
Monsanto	1	15	4	17	37
AgriBiotech	1	30	0	5	36
Novartis	3	21	1	0	25
AgrEvo/Aventis	2	15	3	2	22
AstraZeneca	0	14	1	1	16
Limagrain	0	15	0	1	16
Empressa La Moderna	1	10	0	5	16
Rhone-Poulenc Agro	3	6	2	2	13
DuPont	0	3	2	8	13
DeKalb Genetics	0	11	0	0	11

Note. From "Impact of Industry Concentration on Innovation in the US Plant Biotech Industry," by M.F. Brennan, C.E. Pray, and A. Courtmanche, 2000, In Transitions in Agbiotech: Economics of Strategy and Policy, W.H. Lesser (Ed.). Storrs, CT: University of Connecticut.

2.1.6 Consolidation activities of firms generally take place through mergers, acquisitions, joint ventures, etc. From Table 2 it is clear that major consolidation activity of the ten most active biotechnology firms in the world is

acquisitions. Note that there exists a clear case of product diversification as Monsanto, AgriBiotech, Novartis, AstraZeneca, Limagrain, Dupont and Rhone-Poulenc Agro also figure in top world sales of firms in pesticides and seeds.

2.2 Structure of Cement Industry

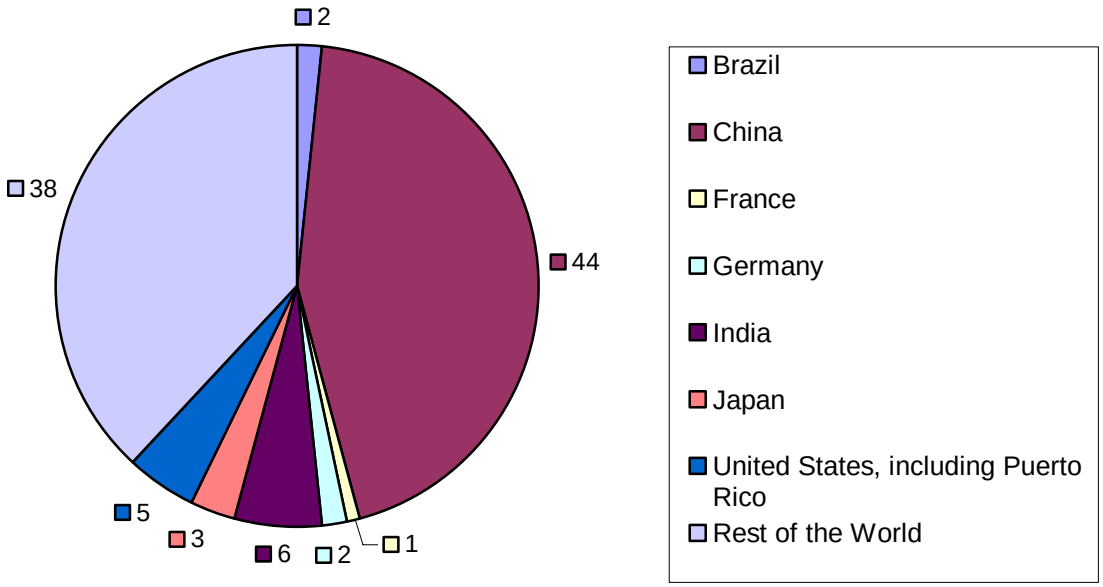
2.2.1 The cement industry operates in about 150 countries of the world. China is the largest cement producer with a share of 40% of the world production, second largest producer is India, third is USA, fourth is Japan, fifth is South Korea and Indonesia is at the 10^{th} place in world cement production. Italy, EU-25, China, Germany and Spain respectively are the top 5 exporters of cement and USA, EU-25, Germany, France and Japan respectively are the top 5 importers of cement in the world. Lafarge (France), Holcim (Switzerland), Cemex (Maxico), Heidelberg cement (Germany), Italecement Group (Italy), RMC (UK), The Siam Cement Group (Thiland), Tajbeno Cement (Japan) and Votorantim (Brazil) are the world top ten cement manufacturing companies.

2.2.2 Cement is the key constituent of concrete, in 2000, almost 1.6 billion tonnes of cement were consumed[4]. Market for cement can be divided into two types: one, bulk sales for infrastructure projects and two, bagged products sold to individuals for personal use in homes and local structure which accounts for an estimated 65% of the world production. Cement is essentially a local product and cement transportation via land is generally limited to 200-300 km of any plant site. The cement industry operates in about 150 countries of the world. The industry is consolidating globally, but the ten largest international firms only accounts for about one-third of the worldwide market. Thousands of smaller cement firms remain in the ownership of their founder families. Some national industries are primarily state-owned, such as China's. Other such as Egypt's were nationalized, but now are moving toward private ownership.

2.2.3 Chart 4 below clearly shows that China is the largest producer of cement with 44% of the world cement production. India contributes 6% to the world production stands at 2^{nd} largest producer of cement and Brazil stands at 3^{rd} position. There is clear case of market dominance by major producers constituting 62% of the world cement production whereas the rest of the world production of cement stands at 38%.

[4] World Business Council for Sustainable Development (Draft-2003), http://www.wbcsdcement.org

Chart 4: Share in the world total cement production for the selected countries
(Source: USGS 2004)



2.3 Countries chosen: Why?

2.3.1 **Brazil, China, France, Germany, India, Japan, Switzerland and USA** have been selected for the study. Bases for their selection are – they are world major countries (companies) in terms of sales and production. This is very much evident from table 1 and chart 1 – chart 4. They are major exporters and importers of pesticides and cement in the world. They are the representatives of developing and developed countries. All the chosen countries have well defined and diverse competition policy/law e.g. from the perspective of deterrence of hard-core anticompetitive conduct, the United States stressing punishment and deterrence and Japan focusing more on the elimination of the illegal conduct once it is uncovered, rather than on the elimination of the economic incentives for engaging in those activities. For a detailed study of pesticides we restrict ourselves to 6 major countries namely, **Brazil, France, Germany, India, Switzerland and USA** and 7 countries namely, **Brazil, China, France, Germany, India, Japan and USA** for the study of cement.

2.3.2 For further quantitative analysis we have obtained the detailed product level data on pesticides and cement industries on these countries from UNSD 4 – digit level and UNSD 5 – digit level data respectively. This gives us data on exports – imports transaction to derive prices. Data on consumption especially for pesticides has been collected from UNFAOSTAT and data on production is

duly derived. And some inferences on international scenario based on calculations on prices, trade, consumption and production have been made[5].

2.4 Consumption and Production of Major pesticide categories

2.4.1 FAOSTAT provides the data on consumption (Metric ton) of 46 items of pesticides from which we have chosen herbicides, insecticides, fungicides and bactericides, other fungicides, other insecticides, other herbicides. Accordingly we have pooled insecticides with other insecticides, herbicides with other herbicides and fungicides and bactericides with fungicides. Table 3 gives the details on major pesticide categories consumed by chosen countries for the years 1995 – 1997.

Table 3: Consumption of major pesticide categories – FAOSTAT

consumption of pesticides (1000 Metric Ton)				
		insecticide	fung&bact	herbicide
brazil	1995	14.54	4.719	25.017
	1996	15.45	5.039	26.469
	1997	18.97	6.366	31.847
france	1995	8.85	42.579	27.419
	1996	7.60	48.624	36.052
	1997	6.07	64.05	33.576
germany	1995	1.52	9.652	16.065
	1996	1.30	10.404	16.541
	1997	1.31	9.397	16.485
india	1995	40.05	9.635	6.12
	1996	35.49	9.227	7.258
	1997	31.08	8.641	6.992
swiss	1995	0.10	0.949	0.657
	1996	0.11	0.89	0.625
	1997	0.10	0.84	0.598
usa	1995	107.05	22.226	205.106
	1996	124.28	24.04	218.177
	1997	112.04	24.04	213.187

country's highest consumption of pesticide category *

* indicated category for which domestic consumption is the highest

2.4.2 From the table the major consumption for the various countries is as follow:
Brazil – Herbicides

[5] See Appendix A for details.

France – Fungicides & Bactericides
Germany – Herbicides
India – Insecticides
Switzerland – Fungicides & Bactericides
USA – Herbicides

2.4.3 Table 4 gives the derived[6] data on domestic production of major pesticide categories for the countries concerned. As an addition, imports as a share of domestic production are also calculated. Source of data on Consumption is from FAOSTAT and imports and exports are from UNSD.

Table 4: Production of Pesticide category

Production of pesticides (1000 Mt)					Ratios		
					insecticide	fung&bact	herbicide
		insecticide	fung&bact	Herbicide	M/P	M/P	M/P
brazil	1995	-8.62	-35.68	**26.35**	-3.15	-1.36	0.24
	1996	-17.37	9.99	**26.11**	-2.16	0.34	0.33
	1997	14.41	12.77	**29.97**	0.78	0.17	0.45
France	1995	11.38	**78.34**	5.01	3.09	0.57	14.00
	1996	15.10	**95.09**	14.36	2.19	0.45	5.57
	1997	19.72	**103.79**	20.80	1.48	0.43	3.50
Germany	1995	14.61	**62.21**	45.69	0.52	0.20	0.69
	1996	13.12	**61.29**	43.60	0.62	0.21	0.84
	1997	15.27	**60.67**	33.36	0.49	0.21	1.18
India	1995	**55.66**	10.12	6.97	0.08	0.01	0.03
	1996	**56.65**	9.84	7.73	0.07	0.04	0.04
	1997	**51.74**	10.04	7.43	0.05	0.03	0.05
Swiss	1995	9.79	**6.54**	16.25	0.16	0.80	0.21
	1996	9.03	**8.68**	14.75	0.15	0.60	0.28
	1997	7.70	**11.17**	16.48	0.19	0.47	0.24
US	1995	163.59	23.33	**301.61**	0.06	1.28	0.05
	1996	191.84	21.33	**333.97**	0.07	1.53	0.04
	1997	161.72	26.59	**339.16**	0.09	1.09	0.04

country's highest production of pesticide category

* indicated category for which production is the highest

[6] Domestic production (P) is derived as the following:
- Consumption = Net Supply
- Net supply = Domestic production + Imports – Exports
- Domestic production (P) = Net supply + Exports – Imports

2.4.4 From the table the production of major pesticides category for the various countries is as follow:
Brazil – Herbicides
France – Fungicides & Bactericides
Germany – Fungicides & Bactericides
India – Insecticides
Switzerland – Fungicides & Bactericides
USA – Herbicides

2.5 Production and import & export prices of Portland Cement

2.5.1 Following are data on production, imports, exports and calculated prices for major countries considered for Portland cement defined above as per the availability of data for further analysis and all the data collected are for the 3 successive years, namely, 1999, 2000, 2001 which would help understanding the trend and change in trend for selected variables. All the quantities are in 1000 Metric Ton, all the values are in Million US Dollars and prices are per unit.

Table 5: Cement Production

Quantity in thousand metric tonnes

Country	Year	Production (P)	% of World Production	Export (E)	Import (I)	E/P	I/P
Brazil	1999	40,270	3	227	235	0.006	0.006
	2000	39,208	2	222	166	0.006	0.004
	2001	38,927	2	158	260	0.004	0.007
China	1999	573,000	36	6,356	500	0.011	0.001
	2000	597,000	36	6,055	1,426	0.010	0.002
	2001	661,040	38	6,209	2,800	0.009	0.004
France	1999	20,219	1	1,364	2,852	0.067	0.141
	2000	20,137	1	1,178	3,075	0.058	0.153
	2001	19,839	1	1,299	2,950	0.065	0.149
Germany	1999	35,912	2	3,367	4,462	0.094	0.124
	2000	35,414	2	3,357	3,640	0.095	0.103
	2001	32,118	2	3,905	2,450	0.122	0.076
India	1999	90,000	6	2,178	10	0.024	0.000
	2000	95,000	6	3,417	14	0.036	0.000
	2001	105,000	6	3,267	30	0.031	0.000
Japan	1999	80,120	5	7,681	1,091	0.096	0.014
	2000	81,097	5	7,637	1,378	0.094	0.017
	2001	76,550	4	7,576	1,183	0.099	0.015
USA*	1999	87,777	5	726	29,351	0.008	0.334

	2000	89,510	5	770	28,684	0.009	0.320
	2001	90,450	5	781	25,861	0.009	0.286

*USA including Puerto Rico

Source: Caluclated from United State Geological Survey (P) and United Nation Statistics Division (E&I)

2.5.2 From Table 5 it is clear that China, by far is the largest cement producer in the world (661 Mt), followed by India (105 Mt), USA (90 Mt), and Japan (76 Mt) [year 1999]. Germany and Japan exports a major part of their annual production. In 1999, Germany exported 12% of its total production, Japan 9% of its total production and France also exported 6% of its total cement produce in 1999. In year 2004, the total world cement production was 2130 Mt, with 44% (933 Mt) share of China, and Brazil's production was 38 Mt, France 20 Mt, Germany 32 Mt, India 125 Mt, Japan 67 Mt, USA 99 Mt and rest of the world producing 814 Mt, which was only 38 % of the total production [Chart 4].

2.6 Regulatory Systems

2.6.1 For the main selected countries it is useful to look at their competition agencies and the principal legislative instruments. This is shown in Table 6 below.

Table 6: Regulatory Systems in various countries

Country	Competition Authorities	Competition Laws
Brazil	▪ Conselho Administrativo de Defesa Economica (CADE-**1962**) ▪ Secretaria de Direito Economico (SDE-**1990**) ▪ Secretaria de Acompanhamento Economico-**1994**	Lei de Defesa da Concorrencia
United States	• Department of Justice / Antitrust Division • Federal Trade Commission	• An Act to Protect Trade and Commerce against Unlawful Restraints and Monopolies (Sherman Act, **1890**) • Clayton Act, **1914** • Federal Trade Commission Act (September 26, 1914)
France	• Conseilde la Concurrence-**1986** • Direction Generale de la Concurrence, de la Consommation et de la Repression des Fraudes	Ordonnance No.86-1243 du ler december **1986** relative a la liberte des prix et de la concurrence

	(DGCCRF-**2001**)	
Germany	• Bundeskartellamt (Federal Cartel Office-**1997**) • Monopolkommission-**1998** • Bundesministeriumsfur Wirtschaftund Technologie	Act against Restraints of Competition
Switzerland	• Competition Commission • Appeals Commission for Competition Matters	Federal Act on Cartels and Other Restraints of Competition
India	Competition Commission	Competition Act, **2002** MRTP Act, **1969**
Japan	Fair Trade Commission of Japan	Antimonopoly Act (The Act Concerning Prohibition of Private Monopolization and the Maintenance of Fair Trade [Law No. 54 of 1947])
China	1. State Administration for Industry & Commerce of the People's Republic of China 2. The State Developing Planning Commission	The Law Countering Unfair Competition The Price Law

2.6.2 Bases under which competition laws are applicable:

- The competition rules apply to businesses if the agreements or abuses are implemented within the jurisdiction of the respective commission.
- The competition laws prohibit hardcore restrictions of competition involving price-fixing, market-sharing, limiting output and bid-rigging.
- The competition laws also apply to businesses that are dominant, that is businesses that have significant market power. It seeks to prevent the abuse of such power for anti-competitive ends. It prohibits the abuse of dominance either by the conduct of a single dominant business or by the uncoordinated action of one or more oligopolists.

2.7 Anti-competitive Cases

2.7.1 In this section we looked at some of the major anti-competitive cases and actions taken by regulatory authorities of various countries. In these cases we have tried to form the basis of anti-competitive actions.

2.7.2 Anti-competitive Cases: Pesticides

2.7.2.1 Box 1 is a case of managers' liability in cartel case of a Pesticide Distribution Company reported in Israel during 2003 – 2004.

Box 1

Managers' Liability in Cartel Case: Israel (January 2003 through April 2004)

- In January 2004, the Supreme Court denied an appeal of a director of a pesticides distribution company on the District Court's decision, which found him liable according to the "Managers Liability" provision of the Antitrust Law.
- The company was convicted for price fixing and market allocation under a plea bargain. The director refused to take part in the plea bargain and therefore decided to proceed with the court litigation.
- The District Court established that the accused did not prove any of the two elements of the defense available under the "Managers Liability" Provision: he did not prove that he had not known of the felonies nor did he prove that he had taken reasonable measures in order to ensure obedience to the Antitrust Law provisions. For the first time, the Court determined that in order to convict an official, under the said provision, there is no need for the prosecution to prove the existence of *mens rea*.
- The Supreme Court concluded that even though the appellant was new in his job, he was obliged to take measures to guarantee that the Antitrust Law was not violated by his employees, even if this required an adjustment of his managerial priorities.

Source: Annual Report on Competition Policy Developments in Israel (January 2003 through April 2004)

2.7.2.2 Box 2 is a case for anti-trust reported during 1998 – 2003 between Aventis Pharmaceuticals Inc., and Andrx Corporation in New Mexico.

Box 2

Aventis Pharmaceuticals Inc., and Andrx Corporation: Anti-Trust Case (1998 - 2003)

- Attorney General Madrid agreed to a settlement involving the popular heart medication Cardizem CD. The 50-state settlement resolves an antitrust lawsuit filed by New Mexico and other state attorneys general against Aventis Pharmaceuticals Inc., (Aventis), Andrx Corporation (Andrx) and affiliated entities, all of which agreed to the terms. The prescription drug companies agreed to pay $80 million to the 50 states in settlement.
- The New Mexico Attorney General's Office and others alleged that Aventis and Andrx illegally agreed that Andrx would not introduce to the market a less expensive generic version of the drug Cardizem CD in return for Aventis paying Andrx nearly $90 million. That allowed Aventis to be the sole source for the medication and to charge higher prices. This illegal activity resulted in higher

prices for consumers and governmental agencies.

- Under the settlement, Aventis and Andrx must pay $80 million into a fund that will compensate consumers, as well as state agencies and insurance companies, who overpaid the Cardizem CD and its generic equivalents between January 1, 1998, and January 31, 2003. The settlement is in addition to a $110 million settlement reached earlier between the companies and drug wholesalers involving the same alleged violations. In total, the drug companies will be required to pay over $190 million. The companies were thus found guilty of market allocations.

2.7.2.3 Box 3 is a case for merger of 1999. This merger forms part of an international merger that had been notified in several countries between Bayer AG and Aventis Agriculture SA (France), Hoechst AG (Germany) and SCIC Holdings LLC.

Box 3

Republic of South Africa: Bayer-Aventis merger (1999)

The Competition Commission has conditionally approved the merger between Bayer (Pty) Ltd, a local subsidiary of Bayer AG, Germany and Aventis CropScience (Pty) Ltd (a subsidiary of Aventis CropScience Holding SA, France), providing Bayer divests itself of several of its brands of agricultural insecticides and fungicides. Bayer is a broad-based and highly diversified chemical and pharmaceutical company and has four main business segments; namely healthcare, agriculture, polymers and chemicals. Aventis is a life sciences company born out of a merger in 1999 between the agriculture and pharmaceutical businesses of Hoechst and Rhone Poulenc. Aventis CropScience (ACS) is the crop protection division, which includes agrochemicals, seeds and products for non-agricultural use in public health and safety. The transaction relates only to crop protection chemicals. The crop protection products protect crops against all manners of damage that might be caused by weeds (herbicides), insects (insecticides) or fungi (fungicides). This merger forms part of an international merger that had been notified in several countries between Bayer AG and Aventis Agriculture SA (France), Hoechst AG (Germany) and SCIC Holdings LLC. In terms of this merger, Bayer will acquire the business of ACS. Pursuant to the international merger, Bayer AG will acquire the respective shareholdings of the latter corporations in Aventis CropScience Holding SA (France) which is the owner of the target firm. One of the competition concerns explored was that new entrants would likely face high barriers to entry. The Commission examined the following market areas under the proposed transaction for product overlaps: insecticides, herbicides, fungicides and seed treatment products. Competition concerns arose in the agricultural insecticide and fungicide markets, where the divestiture of products and production is to take place. The Competition Commission found that the proposed transaction is likely to prevent or substantially lessen competition in the cereal fungicides market, fungicides for foliar treatments market, agricultural fungicides market, soil insecticides market, nematicides market, pyrethroids market and foliar insecticides market and insecticides for the control of aphids in various crops and has consequently recommended a number of divestitures by the two companies. Further, the

Commission has requested the merged enterprise to discontinue third party distribution of certain products. The Competition Commission also found that the proposed transaction would create or strengthen a dominant position on the market for certain agricultural fungicides protecting cereal and fungicides for treating botrytis on grapes in South Africa.

Action taken

The importance of this case stems from the size of the two companies and their worldwide presence. Bayer ranks seventh of all agrochemical companies in terms of worldwide sales. ACS ranks fourth on the world-wide scale. Together they will become the second largest in the world with a market share of about 25%, according to the South African Competition Commission. Therefore, the effects of the proposed merger will probably be significant in other markets as well, apart from South Africa. Another interesting feature of this case is that in evaluating the effects of the proposed merger, the Commission took into account the broader objectives of competition policy for economic development and also examined public interest issues, including the impact on employment, black empowerment and international competitiveness. In this merger, the Commission notified the relevant trade union, the South African Chemical Union (SACWU), which did not file a notice of intention to participate. In its analysis, the parties notified the Commission that they expected 61 job losses to occur, but were offering skills training and placement services to ameliorate the negative effect on the economy.

2.7.2.4 In general there are very few cases in case of pesticides for which information was publicly available. However from the few cases we have seen, the main aim of the large firm has been price fixing via market allocation. In the case discussed in Box-3 about the action against the merger was mainly on the ground that it would create barrier to entry for smaller firms.

2.7.3 Anti-competitive Cases: Cement

2.7.3.1 Box 4 is a case of German cartel between six cement manufacturers in 2003.

Box 4

German Cartel Office imposed fines

The Cartel Office first imposed fines totaling approx. € 660 million in cartel proceedings against the six largest German manufacturers, including Alsen AG, Dyckerhoff AG, Heidelberg Cement AG, Lafarge Cement GmbH, Readymix AG, and Schwenk Zement KG. Further fines of € 41 million were imposed on six medium-sized cement manufacturers and dealers in year 2003.

- Evidence seized during a *nation-wide search of 30 cement companies* in July 2002, and during further searches of several small and medium-sized cement manufacturers in 2003.
- Evidence confirmed that the investigated cement producers had operated anti-competitive *market allocation and quota agreements* (ie. method of control), some of them since the 1970s, and continued to do so until 2002**.**

(Source: http://www.wbcsd.org/web/projects/cement/tf1/Climate-Change-Cement-and-the-EU-Contribution-to-CO2-reduction-CEMBUREAU-Brochure.pdf)

2.7.3.2 Box 5 is case wherein the European Commission imposed 478.32 million Euro fine on four companies involved in plasterboard cartel –27 November 2002.

Box 5

The European Commission imposed 478.32 million Euro fine on four companies involved in plasterboard cartel –27 November 2002

- The amount of fine has been determined on the bases of the market turnover.
- The decision has been taken after a detailed investigation during which it (ECC) carried out surprise inspections in 1998, the Commission concluded that, between 1992 and 1998, BPB PLC (United Kingdom), Gebrüder Knauf Westdeutsche Gipswerke KG (Germany) and Société Lafarge SA (France) participated in a plasterboard cartel.
- The cartel started in 1992 at a meeting in London in which it was decided to end the *price war* (in the previous years price of Plasterboard has fallen sharply due to fiercely competition) and after this meeting, a secret information-exchange system was set up to monitor market trends and avoid over-aggressive competition. Such conduct constitutes a very serious infringement of the competition rules laid down in Article 81 of the EC Treaty.

(Source: www.europa.com)

2.7.3.3 Box 6 is a case for cement cartel in Romania, and companies were fined a total of EUR 28,500,000 for their participation.

Box 6

Cement companies fined in Romanian

Three cement companies, all subsidiaries of large multinational companies, were fined a total of EUR 28,500,000 for their participation in a cement cartel. The fine represented about 6 per cent of the companies' annual turnover. There was no direct evidence of agreement rather the competition agency's decision was based on market data showing that cement prices had raised by as much as 38 per cent.

(Source: http://www.oecd.org/dataoecd/58/1/35863307.pdf)

2.7.3.4 Box 7 is a case for cement cartel in Taiwan. Taiwan's Fair Trade Commission fined 21 cement companies involved in the cartel.

Box 7

Taiwan's Federal Trade Commission V Cement Cartel - Taiwan's Fair Trade Commission fined 21 cement companies in cement cartel.

- A fine of 6.3 million US $ was imposed on the 21 cement companies involved in the cartel.

- The Taiwanese cement markets are very close-knit and hard to obtain evidence from. Thus after more than 1000 hours assembling evidence, Taiwan's Fair Trade Commission held formal hearings using a new article of law. It also

collaborated with other governments - whom it is now advising to tackle affiliated cartels operating across South East Asia - to assemble thousands of documents. Its analysis took account of events in the Philippines and Korea, observed that cement production did not follow market demand and exposed a 'sanctuary strategy' that allowed the cement conspirators to subsidies their products abroad.

(Source: *Global Competition Review*, vol. 9, Issue 1, Feb. 2006, pp. 19-20.)

2.7.3.5 In general there are many cases in case of cement for which information was publicly available. However we have considered four major cases of cartel. In the cases discussed in Boxes – 4, 5, 6 and 7 about the action against the cartel was mainly imposition of huge fines by the concerned authority on the ground that it would infringe competition.

2.7.3.6 In looking at the cases we have relied mainly on published documents relating to the two industries we are studying. We have also concentrated on these cases where we were able to identify the kind of competition abuse which is targeted and the basis for anti – competitive action.

2.7.3.7 However there are many more reported cases to be found in the Global Competition Review website which is an exclusive e-site for anti-competition cases. Information includes price fixation, cartel, dominance, mergers and acquisitions etc. The data and information on these studies are however only available to paying subscribers.
(Web site: www.globalcompetitionreview.com)

2.8 Broad Inferences

- Countries have distinct regulatory systems.
- Anti-competitive practices are very much prevalent and heavy fines were imposed following the detection but further information on actions taken is inaccessible.
- Prices of all the pesticides (category-wise) and cement are oscillating and are mainly due to product composition.
- Structure of the industry is monopolistic for pesticides: High CR4 and CR10.
- Observation: A country which produces more of a pesticide category, it consumes and exports the same category.
- Cement industry is highly regional in nature, with many firms operating in a region besides few big firms.
- While there are some monopolies in the pesticides industry, these are mainly in high tech seed areas. The cement industry on the other hand, is highly cartelized.

3 Assessing the State of Competition in India

3.1 Methodology and Data Bases.

3.1.1 We study both pesticides and cement cases under 3 benchmark years i.e., 1989, 1995 and 2004. We define 1995 as the break year and see pre and post 1995 scenarios. Here we will first try to suggest measures or indicators that can be used to identify non-competitive behavior and apply these to the two sectors using available data.

3.1.2 For assessing the state of competition in India, we rely on CMIE-PROWESS data base. As per CMIE-PROWESS Product classification – Economic Activity, the number of firms listed broadly for pesticides are 67 and for cement 84. Within pesticides we have 6 more sub-categories and they are – 1) Insecticide 2) Fungicide 3) Weedicide 4) Pesticide & pesticide Intermediary 5) Rodenticide & Fumigants and 6) Plant Growth Regulators & Antibiotics. PROWESS does not have any data on Fungicide, Weedicide, Rodenticide & Fumigants, Plant Growth Regulators and Antibiotics. However there are 20 firms listed for insecticides and 3 firms for Pesticide & pesticide Intermediary. Hence we restrict our study to these categories for which data is available.

3.1.3 To identify non-competitive behavior we look at the following factors.

- Entry – Exit Behavior
- Simple Analysis of Mergers and Acquisitions
- The Missing Middle Problem
- Concentration Indices
- Regression Study of Profitability
- Cost – Audit Data for Select Units

3.1.4 **Entry – Exit: Definition:** Under the Competition Act, Section 19 (3) (a), one of the factors which must be taken into account in determining adverse effects on competition is the ease of entry into the market. To analyze this we looked at entry – exit into markets using PROWESS data base. Three methods of inferring entry barriers have been used.

(a) The existence of regulatory barriers due to government policy regulations. These are considered entry preventing to the extent that they are non-transparent or discriminatory.

(b) Number of firms actually entering or exiting the market. Here we have defined Entry as the year of incorporation of a firm and the firm is considered to have exited if there is no production of the product for two consecutive years. The data is considered for the periods 1989-1995 and 1995-2005 for purposes of comparison.

(c) Evidence of production restrictions. We look at whether a significant set of firms in the industry do not increase/reduce production over a period of three years even though industry output has increased. A three year period is used as over a longer period

issues like GDP growth, industry restructuring etc. would complicate the issue. Hence we are arguing that larger firms may exert production restriction on smaller firms.

3.1.5 **Mergers and Acquisitions:** In the context of Competition Policy a study of M&As/combinations begs the question as to when an agreement (written or otherwise) constitutes an anti-competitive act. A specific function of the Indian Competition Act, 2002 is to control the abuse of dominance by cartels defined as combination of one or more enterprises (individual or group) as given in section 5 of Competition Act 2002. However, even if a M&A does not fall under the above section it could still be considered an anti-competitive action under Sections 3 and 4 of the Act. For example, under Section 4.(2)(e) if the agreement establishing the merged entity is such that a firm "uses its dominant position in one market to enter into, or protect, other relevant market" the M&A agreement can be termed anti-competitive. The term "dominance" is defined generally in terms of the ability of the firm to operate independently of the market or exclude competitors. However under Section 3 (3) (d) of the Act, any agreement entered into by way of joint ventures need not be considered as anti-competitive if such agreement increases **efficiency** in production, supply, distribution, storage, acquisition or control of goods or provision of services.

3.1.6 There is no work in the Indian context defining economic constructs used to construe the anti-competitive nature of any M&A. Much of the jurisprudence here seems to come from test of the application of anti-trust legislation in the USA[7]. Some authors note that while in the USA the cornerstone of antitrust laws is consumer welfare and efficiency, in developing countries like South Africa other issues like protecting small competitors and promoting affirmative action have also been taken into account in determining anti-competitive behaviour[8]. In the absence of any jurisprudence in India it is difficult to know how different issues would be balanced.

3.1.7 A perusal of the literature on the use of quantitative techniques to analyse anti-competitive behaviour indicates that three main quantitative indicators are used: market shares of the merged entity, degree of sales concentration after the merger and prices[9]. In particular the single best test of the anti-competitive nature of a merger seems to be the effect on prices: if the merger leads to an increase in product price it is anti-competitive. Where data on prices is not directly available the impact of the merger is often inferred by using estimated price elasticities of demand[10]. However, in the Indian context the lack of data precludes use of the price based measures. We have therefore looked at the other two measures in inferring anti-competitive behaviour.

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[7] See, for example, Scheffman and Coleman, 2003; Cooper, 2001, *Quantitative Analyses of Potential Competitive Effects form a Merger*', www.ftc.gov/be/quantmergeranalysis.pdf.

[8] See, Nicola Theron (2001), " *The economics of Competition Policy: Merger analysis in South Africa*",

[9] See Mark N. Cooper, (March 21, 2001), "Mergers Between Major Airlines: The Anti-Competitive and Anti-Consumer Effects of the Creation of a Private Cartel", Consumer Federation of America.

[10] See Pinkse J. & Slade M.E. (2004), "Mergers, brand competition, and the price of a pint", *European Economic Review* 48 (2004) 617-643.

3.1.8 We have relied on our PROWESS database to calculate our ratios. As per the definition of the Act, we check for pre and post M & A sales (Turnover) and value of assets. In addition to measures used by other authors we have also used some test of the efficiency properties of any M&A. The importance of this is noted in para 3.1.5.above. However, in the absence of detailed data, we have proxied efficiency by **Average Cost.** We check for pre and post M & A Average Costs of the merging entities to see whether pre – merger entities are similar in terms of their efficiency or not. Our presumption is that mergers between firms with similar average costs structure can be construed as anti-competitive.

3.1.9 **Missing Middle:** One of the interesting issues on the literature on competitive behavior of markets is that of the 'missing middle'. Here the main issue is the extent to which a market over time gets dominated by 'middle sized' firms defined as those with an average sales share. The presumption is that in non-competitive markets middle sized firms tend to disappear because of either takeover by larger firms or loss of market share. In any case, a missing middle indicates a segmented, possibly non-competitive market. To investigate this issue we look at the behavior of both pesticides and cement markets over the years 1989 – 1995 – 2004.

3.1.10 **Concentration Indices:** As per Section 19 (4) of the Act, dominant position of an enterprise can be assessed looking at market shares, size of firms etc. A standard measure of market concentration is the Herfindahl Herschman Index (HHI). We have also calculated CR4 (*four-firm concentration ratio)* which is defined as the market share of the four largest firms in the industry. While the former is a measure of the *distribution* of sales among firms the latter is an indicator of the *monopoly position* of dominant firms.

- To capture market size effects on competition we use Herfindahl Herschman Index (HHI) and Four-Firm Concentration Ratio (CR4) as standard measures.

- HHI: A commonly accepted measure of market concentration. It is calculated by squaring the market share, *S* of each firm *i* competing in a market, and then summing the resulting numbers.

$$HHI = \sum Si^2$$

- CR4: Consists of the market share, as a percentage, of the four largest firms in the industry.

$$CR4 = \sum_{i=1 \text{ to } 4} Si^2$$

3.1.11 **Regression Study of Profitability:** One possible indicator of competition is a reduction in profitability of an enterprise. What is more interesting is to find out which factors are important in reducing enterprise profitability. As per the

literature[11], we have identified the degree of openness, CR4, real wage, and foreign ownership as some factors that can impact profitability. To analyze the relationship we have employed regression analysis using panel data.

- The main objective in the regression study is to identify the factors commonly used in the literature as impacting some indicator of competitiveness. The most commonly used measure of competition is the profitability of an enterprise[12]. This is measured in our study as the ratio of profitability after tax (PAT) to total sales. We have followed other studies in identifying the main factors impacting profitability as the degree of openness (OPEN) measured as the ratio of total exports and imports to the sales of the firm, changing concentration of the industry over time (CON) measured as the Herschliefer coefficient of concentration, the ratio of real wages to sales (WAGES) and the presence of foreign equity (FOR). The latter is proxied by two dummy variables with DUM1 for firms with more than 10 percent foreign equity and DUM2 for more than 25 percent foreign equity. The estimating model is then defined as

$$PAT = a_1 + a_2 \underset{(-)}{OPEN} + a_3 \underset{(+)}{CON} + a_4 \underset{(-)}{WAGE} + \underset{(-)}{FOR} + u_i$$

- The signs in parenthesis above indicate the expected signs of the coefficients. In general we expect that the more open a firm the greater the degree of competition, the more concentrated is the industry over time (CON rises) the lower the degree of competition, the higher is wages cost the lower the PAT and the greater is foreign ownership the lower is PAT. The last sign is a measure of the degree of competition afforded by foreign controlled firms. Presumably, the world wide operations of foreign owned firms makes them more competitive and willing to work with lower margins thus driving down PAT in the industry as a whole. Since we are using dummy variables as a proxy for FOR we are actually checking to what extent the PAT relationship for foreign owned firms is statistically different from domestic firms.

- Our data is generated from the PROWESS data base. The lack of data for a large number of years indicated the use of panel data. We generated two balanced panels for the period 1995-2004 and 2000-2004.

3.1.12. **Cost – Audit Data for Select Units:** Finally, we were able to obtain from the Ministry of Company Affairs (MCA) cost audit data for firms in the Pesticide and Cement sectors. However, since we have committed to keeping the names of firms confidential, these names will not be revealed in our data. In this report we will only refer to firms by their serial number.

[11] Manoj Pant and Manoranjan Pattanayak, 'Does openness promote competition? A case study of Indian manufacturing', *Economic and Political Weekly*, Vol XL, No 39, September 24, 2005.

[12] Hall, Robert E (1988): 'The relation between price and marginal cost in US industry', Journal of Political Economy, 96(5), 921-47 and Levinsohn, J (1993): 'Testing the Imports-as-Market-Discipline Hypothesis', *Journal of International Economics*, North Holland.

3.1.13. The cost audit data, though incomplete, gives us plant level and firm level information on both rates per unit of production and the sales margin. This information helps us to compare prices in specific locations. This is important as the Competition Act; Section 2 (s) specifically talks about the condition of competition in 'relevant geographic market'. This geographic market is to be defined taking into account factors like local specificity, language, transport cost etc as per the Competition Act, Section 19 (6). In addition, it is hoped that MCA data would also allow us to define the 'relevant product market' as per Section 2 (t) of the Act which implies a market for products which are substitutes for consumer by reason of characteristics or prices. The data on pricing could indicate if some degree of price collusion is taking place.

3.1.14. The data is available for quantities produced, Q_i , the sales realisation (price), P_i, the margin of profit per unit, M_i and the cost of production, C_i, for each product, i . Obviously, $M_i = P_i - C_i$. However, the raw MCA data does not allow us to get a precise product definition particularly in the case of the Pesticides industry. What we have done in that case is to calculate the average profit per unit cost, $\Sigma Q_i M_i / \Sigma Q_i C_i$, for each plant and then compare these numbers between plants. Since the data defines plants according to location we can also compare our numbers for plants/firms in the same geographical area. This is particularly important for cement since the nature of the industry implies that markets are geographically segmented.

3.1.15. In the next two sections the methodology outline above is applied to the Pesticides and Cement sectors respectively. We may however note that the issues of defining the 'relevant product market' and 'relevant geographic area' are crucial in calculating variables like concentration. However, in the case of our main data base PROWESS it is not always easy to define these two issues as often location issues are not well known. In addition, calculation of price elasticities of demand is useful in defining the 'relevant product market'. In the absence of data this is not possible in this exploratory study.

4. Pesticides

4.1 Introduction

4.1.1 India is the biggest manufacturer of basic pesticide chemicals among the South Asian and African countries, next only to Japan. It is also the second largest producer of agrochemicals in Asia. Currently, 145 pesticides are registered in India, of which 85 technical grade pesticides are manufactured in India. Indian companies have developed process technologies for more than 30 pesticides, and pesticides export from India are steadily on rise. India exports pesticides worth approx. Rs. 2000 crores. Exports have increased by 15% in the last three years. Foreign direct investment into the industry in India has also been encouraging, with approvals touching Rs 12,852 crore and inflows reaching Rs 4,840 crore. World majors such as Unilever, ICI, Hoechst, DuPont, BASF, Bayer and Glaxo already have a presence in India. Indian Industry has built good reputation as a reliable supplier. The industry accounts for approximately $28 billion of revenues and constitutes 6.7 per cent of India's GDP and 10 per cent of the country's exports. Globally, it is insignificant, accounting for just 2 per cent of the industry worldwide.

4.1.2 Exports Regulatory norms are becoming stringent. The industry is constrained by regulatory norms. At present, there are high data generation costs for export registration. The systems and protocols needed for registration are extremely stringent. Export formalities for pesticides are particularly cumbersome and cause huge losses of order and of precious foreign exchange are some of the challenges faced by Pesticide Industry in India[13].

4.2 Entry – Exit Behavior

4.2.1. Table 8 shows the entry – exit situation for pesticides industry and the data shown in the table is for the years 1989 – 1995 – 2004.

Table 8: Entry-Exit of Pesticides Firms

Year	Entry	Cumulative Entry	Exit	Cumulative Exit	Firms Operating
till 1989	50	50	2	2	48
1989-95	16	66	1	3	63
1995-04	3	69	19	22	47

4.2.2. Table 8 shows that 19 firms altogether have exited pesticides industry out of 67 from 1995 to 2004. One of the possible reasons for some firms exiting could be the growth rates of sales. Table 9 shows comparable growth rates for 1989 – 1995 and 1996- 2005, 1995 being the break year in our analysis and for 1989 – 2005 together.

[13] U S Madan, '*Challenges and Problems Faced by Indian Pesticide Industry*', paper presented at Crop Care Federation of India, 12th January'2006

Table 9: Growth Rates*

Year	Pesticides (%)
1989-2005	15
1989-1995	17
1996-2005	8

* Growth rates are calculated from NSO data

4.2.3. Growth rate for industry as a whole for 1996 – 2005 has declined compared to growth rate for 1989 – 1995 for pesticide industries.

4.3 Entry Barriers

4.3.1 **Reduction in Entry Barriers: Reforms 1991 –** Exporters were given entitlements equal to 30 to 40 percent of their export earnings in the form of EXIM scripts against which even restricted items were allowed to be imported. The maximum rate of import duty which had been reduced from over 300 percent to 150 percent in 1991-92 was further lowered to 75 percent in the 1993-94 Budget while duties on pesticides intermediates was reduced to zero percent from around 65-110 percent. As on 2006-07, the duty on all 8 digit pesticide import has been fixed at 12.5%. The item-wise detail is given in Appendix C I.

4.3.2 **Administrative –** The Ministry of Agriculture (MOA) - 'Insecticides Act, 1968'/Insecticides (Amendment) Act, 2000: An Act to regulate the import, manufactures, sale, transport, distribution and use of insecticides. The Central Government has also constituted the Central Insecticides Board to advise the Central Government and State Governments on technical matters. Any person desiring to import or manufacture any insecticide may apply to the Registration Committee for the registration of such insecticide and there shall be separate application for each such insecticide. The Board can prohibit import, manufacture, sale, etc. of certain insecticides for reasons of public safety. Environmental Clearance is required from 'Ministry of Environment and Forest' under section Environment (Protection) Rules, 1986.

4.3.3 **Cost and Time Requirements for Registration:**

- The data on parameters of Chemistry, Toxicology, Metabolism, Persistence, Efficacy, Patents & Trade Marks and Residue & Packaging is required to be generated at a cost of Rs. 1.5 to Rs. 2.0 crores. And a time frame of 3 to 3.5 years.
- Subsequently CIBRC (**The Central Insecticides Board Registration Committee**) takes 1 to 1.5 years to evaluate the dossier and grant Registration.
- Of late fixation of MRL (**Maximum Residue Limit**) by **Ministry of Health** adds additional time of 6 months or more.

Entry barriers to imports exist because of registration requirements, which can delay entry into India.

4.3.4 **Marketing Barriers –** A major threat for pesticides exports is regulatory barriers. Access to foreign markets is restricted through registration procedures stipulated by different countries. A company desirous of marketing a generic product in a new market is required to obtain registration for that product in each target market. Registration involves significant initial investments (US $ 3 -10 million per registration in most markets), and long gestation periods of 4-5 years (for field trials, if required). Therefore, companies that have registrations are protected by strong entry barriers, once they establish a presence in the target market.

4.3.5 **Registration as a non-tariff barrier –** Registration can also be used as a non-tariff barrier. Thus, Indian exports to the European Union (EU) have stagnated over the last few years, because the EU decided to re-register all products. From July 2003, the re-registration process is expected to increasingly affect the market for older products. Whilst there are obvious alternatives for a number of these molecules, opportunities exist for replacement of others in the market place. Many countries supplement their pesticide registration programmes with re-registration programmes to bring the test data on older pesticides up to modern standards.

4.3.6 We can conclude from the above that the regulatory procedure to be followed by the prospective new entrant is very cumbersome and time consuming but does not seem to be discriminatory as between firms. The regulatory authority after receiving the application for registering any generic product may, if it is unable within the said period to arrive at a decision on the basis of the materials placed before it, extend the period by a further period not exceeding six months. In addition to the time required, the entrants have to get the clearance from other agencies like 'Ministry of Environment and Forest' and 'Ministry of Health'. Cost of setup is very high as it is a high-tech industry, large expenditure on R&D is required and patents have to be obtained. Marketing and tariff/non-tariff barriers are also very much prevalent in the pesticide industry although tariff rates have been reduced in India.

4.3.7 In general, while there are administrative barriers to entry they do not seem to be discriminatory. The most important barrier seems to be the high technical costs of entry.

4.4 Mergers and Acquisitions

4.4.1 Here we check for pre and post M & A sales (Turnover) and value of assets as per the Competition Act definition, and we also check for pre and post M & A average costs, profitability and market share of the merged entity. As already discussed earlier, we are using average cost as a proxy for efficiency. Here Average Costs are defined as the ratio of 'Total Input Costs' to 'Sales' while Profitability is defined as the ratio of 'PAT' (profit after tax) to 'Sales'. The results of our calculation are given in Tables 10.

Table 10: M & A – Pesticides (Rs. Crores)

Company Name	Year of Merger	Sale		Total Asset		Average cost		Profitability ratio (PAT/Sale)		Market Share (%)	
		Before merger	After merger	Before merger	After merger	Before merger	After merger	Before merger	After merger	Before merger	After merger
Alchemie Organics Ltd. [Merged]	February, 2002	37.25 (Mar 01)	(Mar 03)	37.16		**1.03**		**-2.95**		**0.62**	
Aarti Industries Ltd.		284.9	473.37	267.86	372.49	**0.94**	**0.94**	**5.56**	**6.11**	**na**	
Aryan Pesticides Ltd. [Merged]	June, 2004	54.86 (Mar 03)	(Mar 05)	53.06		**1.04**		**-3.65**		**0.88**	
Deepak Nitrite Ltd.		279.88	367.12	236.09	300.67	**0.97**	**0.98**	**3.92**	**2.54**	**na**	
Aventis Cropscience Ltd. [Amalgamated]	January, 2001	24.09 (Mar 91)		10.97 (Mar 91)		0.95 (Mar 91)					
Bayer Cropscience India Ltd.		257.1 (Mar 00)	467.72 (Mar 02)	198.23 (Mar 00)	305.08 (Mar 02)	0.94 (Mar 00)	0.97 (Mar 02)	**0.7**	**1.78**	**4.06**	**7.21**
Bayer Cropscience India Ltd. [Merged]	April, 2003	467.72 (Mar 02)	(Mar 04)	305.08		**0.97**		**3.32**		**7.21**	
Bayer Cropscience Ltd.		707.84	976.84	382.07	719.32	**0.99**	**0.96**	**1.78**	**4.9**	**10.91**	**13.39**
Cyanamid Agro Ltd. [Merged]	July, 2001	98.15 (Mar 00)	(Mar 02)	146.94		**1.05**		**-4.22**		**1.55**	
B A S F India Ltd.		380.19	584.86	353.67	437.99	**0.96**	**0.96**	**5.41**	**4.78**	**na**	
Paushak Ltd. [Merged]	September, 2005	16.31 (Mar 04)	N.A.	17.96		**0.98**		**4.54**		**0.22**	
Paushak Ltd. (Darshak Ltd)		6.14		22.4		**1.28**		**-5.7**		**na**	
Raychem Ltd. [Merged]	April, 2002	182.85 (Mar 01)	(Mar 03)	153.54		**1.01**		**-0.74**	**-24.52**	**3.04**	
Rallis India Ltd.		1105.3	1006.9	804.1	845.39	**1.03**	**1.18**	**-2.5**	**-8.43**	**18.38**	**16.11**

Rallis Industrial Chemicals Ltd. [Merged]		19.74 (Mar 99)	(Mar 01)	20.64		**0.96**		**4.15**		**0.37**	
Rallis India Ltd.		1266.2	1105.3	742.07	804.1	**0.99**	**1.03**	**2.21**	**-2.5**	**23.63**	**18.38**
Saris India Ltd. [Merged]	April, 2002	31.98 (Mar 01)	(Mar 03)	34.06		**1.23**		**-21.98**	**-973.1**	**0.53**	
Rallis India Ltd.		1105.3	910	804.1	764.14	**1.03**	**1.1**	**-2.5**	**-8.43**	**18.38**	**16.11**

4.4.2 Though there are nine cases of merger in the pesticides category, none of the mergers come under the purview of the Competition Act 2002 Definition 5 (a) (i) A – wherein the merged entity is defined to possess Assets Value of more than Rs.1000 crore or Turnover of more than Rs.3000/ crore.

4.4.3 However, a comparison of pre and post merger average costs shows that except for Paushak Ltd and Rallis India Ltd, there is very little difference in the pre – merger AC ratios of the various companies. This could lead to some presumption of non–competitive behavior. However in most cases the firm amalgamated also showed negative profitability so that the merger could have elements of efficiency enhancement.

4.4.4 A look at markers shares after merger gives a mixed picture. While Bayer Cropscience Ltd. has raised its market share from about 4 percent to 13 percent via two mergers this is not the case for Rallis India Ltd. In any case, the resulting market shares via merger do not seem larger enough in either case to be considered non-competitive. The two mergers are also in distinct product segments. The data does not allow us to look separately at market shares in the two segments.

4.4.5 It seemed worth while to look at the shares of the top three firms as they evolved over time. The detailed data is given in table 9 in Appendix C III. Inspection of the table clearly indicates that the top three firms (Rallis India Ltd., Bayer Cropscience Ltd. & Excel Industries Ltd. in 1989) have seen their market shares steadily decreasing over time as per the CMIE data available with us. It is interesting to note that United Phasphorus Ltd. & Monsanto India Ltd. have suddenly emerged as important players after the year 2000. In fact United Phosphorus Ltd. has the highest market share in 2005, although it was a marginal firm earlier. The available data does not allow us to infer more details of anticompetitive behaviour. Further work at the firm level seems warranted.

4.5. The Missing Middle Problem

4.5.1 Here we look at the trend in share of sales data for the two industries for the years 1989, 1995 and 2004 taking 1995 as break point.

4.5.2 In the Chart 7 below we have plotted firms on the horizontal axis and share of sales on the vertical axis to see the missing middle trend for pesticides.

Chart 7: Missing Middle
(Insert Chart 7)

4.5.3 From the chart 7 it is clear that over a period of time firms share is distributed more evenly in the pesticides industry with decline in sales of larger firms. Over all an observation of an increase in the degree of competition in the pesticides industry over 1989 – 2004 seems justified.

4.5.4 However, some comments on the behaviour of peaks in Chart 7 seem to be in order. The two peaks observed in Chart 7 relate to the two firms Rallis India Ltd. and Bayer Cropscience Ltd. As we saw in the previous section these are the two important mergers in this industry. Both firms have seen a decline in share overtime despite the mergers.

4.6. Concentration Indices

4.6.1 In Table 11 we have calculated HHI and CR4 for pesticides industries.

Table 11: HHI & CR4

	Pesticides	
	HHI	**CR4**
1989	0.18	0.18
1995	0.13	0.12
2004	0.07	0.05

4.6.2. HHI: Limit 1/n to 1, where n is number of firms. In our case the Limit is 0.015 to 1, n being 67. Both indexes show decrease in the concentration and an increase in competition over the period 1989 to 2004.

4.6.3. Pesticides industry clearly shows an increase in competition in terms of decreasing concentration ratio.

4.7. Regression Study of Profitability

4.7.1. In the panel regression the usual statistics were computed to confirm that there is no problem of autocorrelation etc. We also ran the regression for two sets of years, 1995-2004 and 2000-2004. Since results are computed for balanced panels (including firms for which data is available for all the years) this yields a larger set of firms for shorter data periods. Thus we ran our regression for 15 firms for the longer period and 28 firms for the shorter period. This is shown in table 12 below.

4.7.2 The results of our estimation for random effect panel regression are given below in Table 12.

Table 12: Pesticides - Dependant Variable – PAT

	Data for 15 firms		**Data for 28 firms**	
	1	2	3	4
OPEN	-0.76*	-0.41**	-0.23	0.96*
WAGE	-2.3*	-2.52*	0.69	-0.91
CON	-1.12	-2.8*	-2.4	-3.34
DUM 1	0.79*		0.38	
DUM 2		1.04*		0.32
Wald	36	45.2	3.6	10.6
R^2 (Between)	0.99	1.00	0.05	0.99
R^2 (Within)	0.13	0.38	0.22	0.002
Overall R^2	0.58	0.73	0.0002	0.49
N	150	150	140	140
Type	re	re	re	re
* 1% level				
** 5% level				

4.7.3 An inspection of table 12 indicates that in the Pesticides industry there seems to be some evidence that greater openness tends to make firms more competitive but, surprisingly, concentration seems to have little statistically significant impact on the profitability ratios. The negative impact of concentration on PAT shown in the table is in fact contrary to what one would expect. In the literature[14] it has been argued that greater concentration is a consequence of greater efficiency so that it may not be plausible to consider the degree of concentration an exogenous variable as implied in our modeling. Finally, there is no strong statistical evidence to suggest that the factors affecting behaviour of foreign owned firms are structurally dissimilar from those affecting domestic firms especially in the larger sample of 28 firms.

4.8. Cost – Audit Data for Select Units

4.8.1. For this section we calculated the average profit margin per unit cost for different plants. These are presented by regions as this comes closest to the definition in the Competition Act, 2002 of the 'relevant geographic area'. However, unlike the Cement industry, it is very difficult to define the 'relevant product' for pesticides as the disaggregation given in the MCA data is not easy to classify. In the case of some of the plants the product description does not even allow any comparison between different companies. We therefore present in Table 13 below the average profit margin per unit cost only for those plants where the data was available in a similar format. Hence, the data represents average margin per unit cost at the plant level rather than at a specific product level.

[14] see Pant, 2005,op.cit.

Table 13: Pesticides—Average Margin per Unit Cost

Company Code	State (Plant Location)	2004-05	2003-04	2002-03
1	Gujarat	0.11	0.12	0.12
2	Gujarat	0.01	-0.01	0.03
3	Gujarat	0.00	0.42	0.09
4	Gujarat	0.18	0.08	0.14
5	Gujarat	-0.04	-0.03	-0.02
6	Maharashtra	0.22	0.13	0.18
7	Maharashtra	0.02	-0.04	-0.02
8	Maharashtra	0.04	-0.07	0.03
9	Maharashtra	0.01	-0.01	-0.02
10	Maharashtra	0.18	0.11	0.07
11	Punjab	0.07	0.12	0.10
12	Tamil Nadu	0.22	0.31	-0.23

Source: Calculated from MCA data

4.8.2. Inspection of table 13 indicates the wide variation in the margin per unit cost across regions and also across firms in a particular region. Contrary to what economic theory would lead us to believe, there seems to be no convergence of these margins over time even for firms belonging to the same region. In addition, there seems to be no common trend of these margins increasing or decreasing over time for firms in a particular region.

4.8.3. While the wide variation in margins might indicate non-competitive behaviour, it must be noted that the data is also suspect. In table 13 for firm 3 (company code 3) the margin has declined from 42 percent in 2003-04 to zero by 2004-05 while at the same time for the firm 4 (company code 4) the figures go up from 8 percent to 18 percent. Similar inconsistencies are seen in the other regions also. This might be due to the difference in product composition but at the level of data available we cannot confirm this.

5. Cement

5.1 Introduction

5.1.1 Today India is the second largest producer of cement in the world, next only to China, having around 55 cement companies with 128 large cement plants situated across the country. The top 15 companies accounts for almost 84% of the total cement sale, with top 3 companies having a share of more than 44 % of the total sale. In India cement industry is regional by its very nature in terms of bulky nature of the raw material and high freight costs involved in the transportation. Table 14 below shows the overview of the all India demand and supply scenario for cement industry.

Table 14: Overview of Demand & Supply (in Million metric tonnes)

	2002-03	2003-04	2004-05P	2005-06P
Net Functional Cement Capacity	132	137	141	148
All India Consumption	108	113	122	132
Exports	3	3	4	4
All India Production	111	117	126	137
Capacity Utilisation	84.4	85.7	89.7	92.1
All India Consumption Growth (%)	9	5.2	7.2	8

Source: Consumer Unity and Trust Society (2004) Functional Competition Policy for India

5.1.2 Actual cement production in 2003-04 was 126 Mt, an increase of approximately 6% on 2002-03 production of 117 Mt. Cement production during the year 2004-05 (April-January) was 137 Mt (provisional), registering a growth of approximately 7%. There is huge difference between capacity[15] installation and capacity utilization with the capacity utilization much below than installed capacity.

5.1.3 Table 15 and Chart 6 show the major cement manufacturing companies for the year 2004. Though we have 84 companies listed in the companies by economic activity category from PROWESS database of CMIE, we have considered only 17 major companies which are major in terms of percentage sales.

Table 15: Major cement manufacturing companies with sales (Mar 2004 figures)

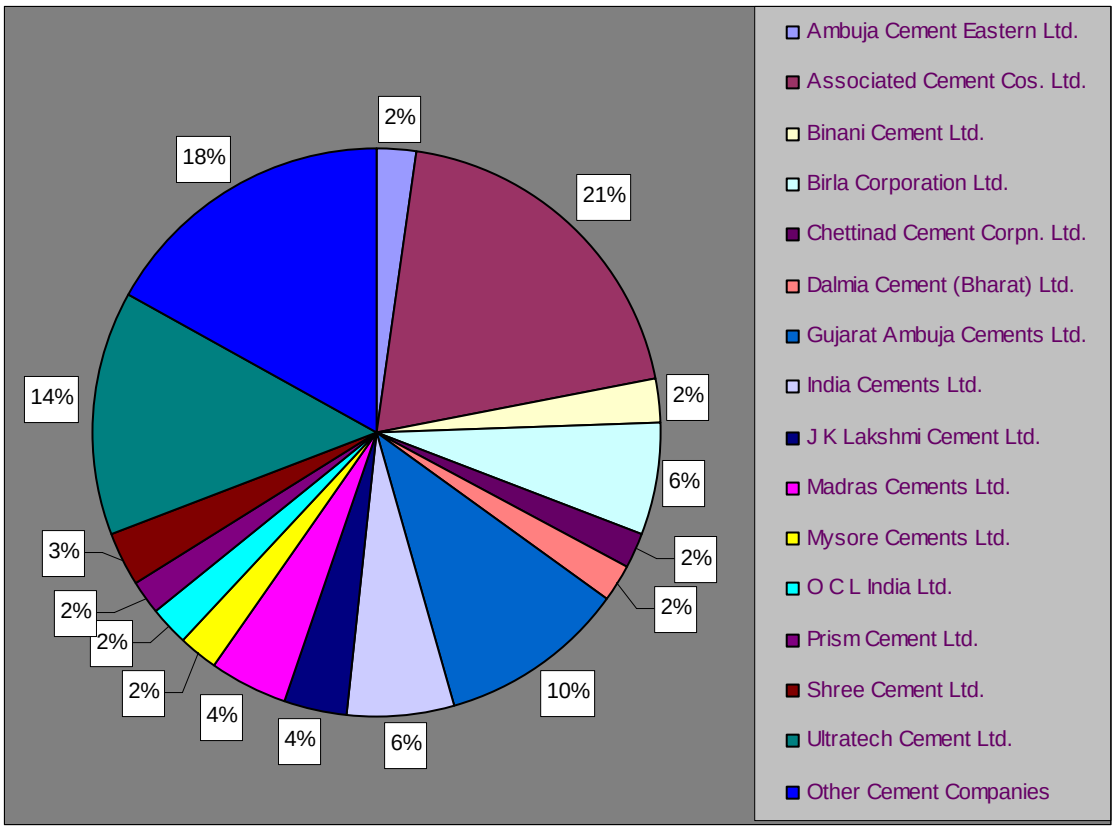
S No.	Company Name	Sales Rs. Crore	% of Total Cement Sale
1	**Ambuja Cement Eastern Ltd.**	**423.61**	**2.16**
2	**Associated Cement Cos. Ltd.**	**3901.61**	**19.90**

[15] http://dipp.nic.in/industry/cement.htm
** Mt pa- Million tonnes per annum

3	Binani Cement Ltd.	463.69	2.36
4	Birla Corporation Ltd.	1245.7	6.35
5	Chettinad Cement Corpn. Ltd.	413.26	2.11
6	Dalmia Cement (Bharat) Ltd.	436.25	2.22
7	Gujarat Ambuja Cements Ltd.	2033.19	10.37
8	India Cements Ltd.	1234.46	6.30
9	J K Lakshmi Cement Ltd.	698.65	3.56
10	Madras Cements Ltd.	845.23	4.31
11	Mysore Cements Ltd.	429.74	2.19
12	O C L India Ltd.	454.73	2.32
13	Prism Cement Ltd.	397.11	2.03
14	Shree Cement Ltd.	606.93	3.10
15	Ultratech Cement Ltd.	2697.78	13.76
16	Other Cement Companies	3327.61	16.97
17	Total	19609.55	100.00

Source: PROWESS Database of CMIE (Companies by Economic Activities)

Chart 6: Share in the India's total cement sale for the major companies



5.1.4 From Chart 6 it is clear that Associated Cement Co. Ltd, Gujarat Ambuja Cements Ltd and Ultratech Cement Ltd are the major companies which account for approximately 44% of the total sales.

5.1.5 Table 16 helps to understand the regional distribution of cement capacity, production and consumption.

Table 16: State wise cement capacity, production & consumption

State	Capacity	Production	Consumption
Punjab	3.13 (2.14)	3.33 (2.83)	5.4
Delhi	0.50 (0.34)		3.39
Rajasthan	18.52 (12.65)	17.78 (15.13)	6.61
Himachal Pradesh	4.06 (2.77)	3.99 (3.40)	1.38
Haryana	0.17 (0.12)	Nil	3.72
Jammu & Kashmir	0.20 (0.14)	0.12 (0.10)	0.81
Uttaranchal	No Cement Plant exists		1.36
Uttar Pradesh	5.66 (3.87)	3.46 (2.94)	13.4
Madhya Pradesh	16.19 (11.06)	15.02 (12.78)	5.57
Tamil Nadu	14.56 (9.95)	12.29 (10.46)	9.1
Andhra Pradesh	21.13 (14.44)	14.04 (11.95)	8.01
Karnataka	10.09 (6.86)	9.28 (7.89)	8.23
Kerala	0.62 (0.42)	0.53 (0.45)	5.89
Pondichery	No Cement Plant exists		0.24
Andaman & Nicobar	No Cement Plant exists		0.07
Goa, Daman & Diu	No Cement Plant exists		0.49
Maharashtra	11.70 (7.99)	10.63 (9.05)	14.68
Gujarat	17.58 (12.01)	10.37 (8.83)	7.84
Bihar	1.00 (0.68)	0.34 (0.29)	3.13
Orissa	3.04 (2.08)	2.48 (2.11)	3.38
West Bengal	3.13 (2.14)	2.74 (2.34)	5.78
North - Eastern States	0.20 (0.14)	0.10 (0.08)	0.72
Jharkhand	4.57 (3.12)	3.59 (3.05)	2.03
Chattisgarh	10.22 (6.98)	7.30 (6.21)	0.24

Source: Cement Manufacturers Association of India (CMA) http://www.cmaindia.org
Note: Figures in the brackets shows percent of All India Capacity and Production

5.1.6 From the Table 16 it is clear that Andhra Pradesh, Madhya Pradesh, Gujarat and Rajasthan, which are rich in limestone reserves, are the largest contributors to the total installed capacity of the country.

5.2 Entry – Exit Behavior

5.2.1 Here entry of a firm (company) is the year of incorporation itself. In many a case sales figures are not reported for many successive years starting from the incorporation year. This period is however to be presumed as the 'period of gestation'.

5.2.2 Table 17 shows the entry – exit situation for cement industry and the data shown in the table is for the years 1989 – 1995 – 2004.

Table 17: Entry-Exit of cement Firms

Year	Entry	Cumulative Entry	Exit	Cumulative Exit	Firms Operating
till 1989	62	62	0	0	62
1989-95	16	78	0	0	78
1995-04	6	84	29	29	55

5.2.2 Table 17 shows that 29 firms altogether have exited cement industry out of 84 from 1995 – 2004. One of the possible reasons for some firms exiting could be the growth rates. Table 18 shows comparable growth rates for 1989 – 1995 and 1996- 2005, 1995 being the break year in our analysis and for 1989 – 2005 together.

Table 18: Growth Rates*

Year	Cement (%)
1989-2005	10
1989-1995	16
1996-2005	07

* Growth rates are calculated from NSO data

5.2.3 Growth rate for industry as a whole for 1996 – 2005 has declined compared to growth rate for 1989 – 1995 for cement industry. This could well explain the exit in Table 17 above.

5.3 Entry Barriers

5.3.1 **Administrative –** The Mines and Minerals (Development and Regulation) Act, 1957, (MMDR) and the Mines Act, 1952, together with the rules and regulations under them constitute the basic laws governing the mining sector (revised in 1994 and Amendment in 1999). Approval from Government of India is required before sanctioning leases for cement grade limestone (in specific cases) and more power has been delegated to State Government by the amendment of MMDR Act in 1999.

5.3.2 **Cost of Setting Up –** Cement plants are capital intensive and require a capital investment of over Rs. 3,500 per tonne of cement, which translates into an investment of Rs. 3,500 million for a 1 MT pa plant. Cement Industry has been a heavily taxed industry.

Table 19: Taxes and Duty per tonne of cement

Item	**Duty Amount**
Excise	Rs. 408 per tonne
Royalty on Limestone	Rs. 45-55 per tonne

Royalty on Lignite	Rs. 50 per tonne
Royalty on Non Coking Coal	Rs. 65-165 (for Coal India Ltd. 'CIL' depending on grade), Rs. 90 per tonne for Singareni
Royalty on Gypsum	Twenty per cent of sale price on ad valorem basis.
Sales Tax Rates	0-28%

5.3.3 The major taxes/levies comprise central excise duty; sale tax levied by the respective state governments; royalty and cess on limestone and coal; and duties on power tariff. These duties account for around 30% of the sale price of cement or around 70% of the ex-factory price. Inspection of Appendix A indicates that import of cement product is generally very small part of total domestic consumption. However, as in the case of pesticide, import duties on all cement products have been brought down to 12.5% in 2006-07, as shown in Appendix C II. Recently, the import duty has been reduced to zero percent (as part of anti-inflationary measures). [Source: Ministry of Mines (http://mines.nic.in/welcome.html) & 'The Indian Cement Industry', ICRA, July 2006]

5.3.4 **Quality Control –** Though No pricing/quantity control has been exercised, quality controls are exercised timely. Cement Control Order, 1967 (As amended up to 1st March, 1989) or Cement Control (Amendment) Order, 1989: - Whereas the Central Government has decided for the removal of price and distribution control of Cement with effect from the first day of March, 1989. [But it does not include oil-well cement and "white cement and colored cement made from white cement (other than grey portland cement).] There is no control for the quantity produced by the cement manufacturer but quality is controlled by Cement (Quality Control) Order, 2003 and production with only 'Standard Mark' as assigned by the Bureau of Indian Standard Act, 1986 (63 of 1986) is allowed. [Source: Ministry of Commerce & Industry: http://siadipp.nic.in/publicat/cement/cemact01.htm]

5.3.5 It can be inferred from the above that there is very limited entry barrier as far as the regulatory framework is concerned for a new entrant in the cement industry. Although it is a capital intensive industry, getting finance from Commercial banks is no longer difficult. The possible barriers to new entrants are the raw material (limestone reserves, gypsum etc. for lease), availability of coal, which accounts for 15-20% of cost.

5.4 Mergers and Acquisitions

5.4.1 Here we check for pre and post M & A sales (Turnover) and value of assets as per the Competition Act definition, and we also check for pre and post M & A average costs and profitability. The latter is used as a proxy for efficiency defined by the Act. Further **Average Costs** are defined as the ratio of 'Total Input Costs' to 'Sales' while **Profitability** is defined as the ratio of 'PAT' (profit after tax) to 'Sales'. Tables 20 show the details of pre and post M & A entities, details of pre and post M & A sales and value of assets and details of pre and post M & A average costs and profitability ratio for cement.

Table 20: M & A –Cement (Rs. crores)

Company Name	Year of Merger	Sale		Total Asset		Average total cost		Profitability ratio (PAT/Sale)		Market Share (%)	
		Before merger	After merger	Before merger	After merger	Before merger	After merger	Before merger	After merger	Before merger	After merger
Ambuja Cement Rajasthan Ltd. [Merged]	June, 2004	284.67 (Mar 03)	(Mar 05)	320.64		**1.13**		**-11.62**		**1.90**	
Gujarat Ambuja Cements Ltd.		1584.05	2306.7	1486.62	4057.2	**0.94**	**0.91**	**11.68**	**12.37**	**10.55**	**10.06**
Damodhar Cement & Slag Ltd. [Merged]	April, 2005	125.46 (Mar 04)	(Mar 06)	51.28		**0.97**		**4.03**		**0.63**	
A C C Ltd.		3901.61	3723.2	3917.92	4933.9	**0.98**	**0.94**	**4.91**	**7.09**	**19.51**	**15.26**
Dharani Cements Ltd. [Merged]	Novemb er, 2000	16.64 (Mar 99)	(Mar 01)	33.63		**1.14**		-14		**0.14**	
Grasim Industries Ltd.		4346.47	5203.88	5711.6	5912.1	**0.98**	**0.94**	3.4	7.02	**na**	

5.4.2 There are 3 cases of merger in the Cement category and all of them come under the purview of the Competition Act 2002, definition 5 (a) (i) A either in terms of Assets Value and/or Turnover.

In terms of Average Cost and profitability –

5.4.3 Both Ambuja Cement Rajasthan Ltd and Gujarat Ambuja cements Ltd are similar firms in terms of Average Costs and hence merger could be anti-competitive. However, since Profitability was negative for Ambuja Cement Rajasthan Ltd there could be an efficiency enhancing objective.

5.4.4 Both Damodhar Cement & Slag Ltd and A C C Ltd are similar firms in terms of Average Costs and hence merger could be anti-competitive. Here the profitability ratios were also somewhat similar before the merger. The substantially higher profitability ratio after the merger could be due to greater monopolistic position in the market.

5.4.5 Both Dharani Cements Ltd and Grasim Industries Ltd are similar firms in terms of Average Costs and hence merger could be anti-competitive. But Profitability Ratio being negative for Dharani Cements Ltd may imply efficiency of merger in the industry.

5.4.6 Looking at the market shares after the mergers, there does not seem to be any indication that the M&A has led to increased market share and, a priori, one cannot infer any anti-competitive behavior on this ground.

5.5 The Missing Middle Problem

5.5.1 Here we look at the trend in share of sales data for the two industries for the years 1989, 1995 and 2004 taking 1995 as break point.

5.5.2 In the Chart 8 below we have plotted firms on the horizontal axis and share of sales on the vertical axis to see the missing middle trend for cement.

Chart 8: Missing Middle
(Insert Chart 8)

5.5.3 In the case of cement (Chart 8), the picture is not clear. What seems to have happened is that from 1989 to 2004 there is an emergence of outlier firm with large market share while rest of the industry seems to be clustered at the lower end. While there is some evidence of 'missing middle' in 2004, there is no evidence that concentration has changed radically over this period. It would seem necessary to look in more detail at those firms which have emerged as clear outliers with more than 10% of industry sales to look at the factors that have determined their increasing market share.

5.5.4 In Chart 8 the peaks in 1989 are for ACC and Gujarat Ambuja Cement Ltd. Both these companies market share increased in the period 1989 to 1995. For ACC from 17 percent to 23 percent and for Gujarat Ambuja from 3 percent to 10 percent. However, after 1995 shares of both these companies declined.

5.5.5 Post 2000 some interesting mergers have occurred which could have anti-competitive features. In 2004, the second highest peak indicates the share of UltraTech company. This was however taken over by the Grasim group which has a 51 percent holding in UltraTech. This gives the Grasim group a 21 percent market share. However, Grasim does not figure in our PROWESS data base of cement companies as it does not earn 50 percent or more of its revenues from the Cement industry. Note that since UltraTech is a major player in the West and the South its shares of the regional markets would be substantially higher. The Grasim takeover of UltraTech could have substantial anti-competitive implications. This needs further investigation.

5.6. Concentration Indices

5.6.1 In Table 21 we have calculated HHI and CR4 for cement industry.

Table 21: HHI & CR4

	Cement	
	HHI	**CR4**
1989	0.07	0.05
1995	0.08	0.07
2004	0.09	0.07

5.6.2. HHI: Limit 1/n to 1, where n is number of firms. In our case the limit is 0.012 to 1, n being 84. Both indexes show increase in the concentration and a decrease in competition over the period 1989 to 1995 but from 1995 to 2004 only HHI show an increase. However, the HHI does not seem exceptionally high by international comparisons.

5.7 Regression Study of Profitability

5.7.1 In the panel regression the usual statistics were computed to confirm that there is no problem of autocorrelation etc. Balanced panels for the years 1995-2004 and 2000-2004 gave samples of 21 and 36 firms respectively.

5.7.2 The results for the Cement industry are shown in Table 22 below.

Table 22: Cement - Dependant Variable – PAT

	Data for 21 firms		**Data for 36 firms**	
	1	2	3	4
OPEN	4.15*	0.72	4.07*	-0.14
WAGE	11.7*	-25.8*	-10.8	-35.9**
CON	-5.5	-11.5	-15.7	3.21
DUM 1	-0.06		1.92	
DUM 2		2.9**		1.31
Wald	25	30.8	12.6	10.4
R^2 (Between)	0.31	1.00	0.34	1.00
R^2 (Within)	0.37	0.18	0.38	0.09
Overall R^2	0.23	0.66	0.31	0.63
n	210	210	180	180
Type	re	Re	re	re
* 1% level				
** 5% level				

5.7.3 As in the case of the Pesticides industry our preliminary investigations do not reveal any clear trends. Thus, if anything, PAT goes up with greater openness which is contrary to our a priori expectations. This could be because the greater openness is indicating greater efficiency which may in fact allow higher profitability. Similarly, the impact of concentration (HHI) is statistically insignificant and seems to be opposite to what is expected. The limited impact of openness is probably explained by the nature of the industry: cement can generally be classified as a non-traded commodity not subject to the discipline of the world market. The fact that market concentration has no impact on profitability may be explained by our sample size which is limited to the larger companies. The limited impact of market concentration on profitability may also indicate that some kind of collusive behaviour is taking place. However, this would require more detailed company level investigation.

5.8 Cost – Audit Data for Select Units

5.8.1. For Cement we were able to calculate the profit margins separately for regions and three classes of products: PPC, OPC, and white cement. We also present the price (sales realization) for each company/plant for the latest year available. The calculations are shown below in Table 23. In the case of Cement (unlike the Pesticides industry) firms have plants operating in more than one region and sometimes more than one plant in any region. This is due to the regional nature of the market for cement. However, for some companies/plants the data was incomplete and has been left out.

Table 23: Cement —Average Margin per Unit Cost

Company Code	State (Plant Location)	Sales Realisation	Average Margin per unit cost		
		2005-06	2005-06	2004-05	2003-04
Ordinary Portland Cement					
6	Andhra Pradesh	1589	-0.02	-0.03	-0.05
7	Andhra Pradesh	1827	-0.09	-0.14	-0.20
11	Andhra Pradesh	1625	-0.01	-0.06	-0.17
13	Andhra Pradesh	1793	0.04	-0.05	
14	Andhra Pradesh	1916	0.05	-0.08	-0.10
3	Chattisgarh	2199	0.14	0.20	0.09
6	Karnataka	2060	0.14	0.14	0.08
9	Karnataka	2185		-0.30	
7	Karnataka	2073	-0.21	-0.37	-0.38
3	Madhya Pradesh	2073	0.13	0.06	0.01
2	Madhya Pradesh			0.00	-0.16
2	Madhya Pradesh			-0.17	-0.19
9	Madhya Pradesh	1790	-0.12		
3	Maharashtra	2126	0.10	-0.07	0.02
2	Maharashtra	1698	-0.01	-0.10	-0.13
11	Maharashtra	2193	0.18	0.11	-0.01
10	Orissa	2026	0.12	0.11	0.17
3	Punjab	2646	0.36	0.27	0.24
1	Rajasthan	2077	0.24	0.17	0.19
3	Rajasthan	1882	0.31	0.12	0.11
4	Rajasthan	2567	0.08	0.03	
8	Rajasthan	2144	-0.01	-0.05	-0.03
12	Rajasthan	2713	-0.01		
3	Tamil Nadu	2324	0.36	-0.01	0.14
3	Tamil Nadu	1801	0.31	0.04	0.22
7	Tamil Nadu	1911	0.10	0.02	0.10
7	Tamil Nadu	2208	0.14	0.08	-0.06
9	Uttar Pradesh			-0.24	
White Cement					
5	Rajasthan	5431	0.37		
3	Rajasthan	4521	-0.14	-0.22	-0.22
Pozzalona Portland Cement					
6	Andhra Pradesh	1643	0.11	0.05	0.02
7	Andhra Pradesh	1827	0.04	0.01	-0.07

13	Andhra Pradesh	1836	0.17	0.04	
14	Andhra Pradesh	1939	0.15	-0.05	-0.07
6	Karnataka	2046	0.18	0.14	0.07
7	Karnataka	2185	-0.14	-0.29	-0.31
2	Madhya Pradesh	2248	0.00	-0.01	-0.10
2	Madhya Pradesh	1811	0.02	0.03	-0.14
9	Madhya Pradesh	1661	1.01	-0.07	
3	Maharashtra	2065	0.19	-0.18	0.04
2	Maharashtra	1792	0.07	-0.02	-0.06
1	Rajasthan	2098	0.24	0.15	0.17
8	Rajasthan	2228	0.13	0.04	0.04
12	Rajasthan	2578	0.0002		
3	Tamil Nadu	2276	0.36	0.24	0.26
7	Tamil Nadu	1912	0.22	0.14	
7	Tamil Nadu	2208	0.29	0.26	-0.05
9	Uttar Pradesh	1923	0.01	-0.03	

Source: Calculated from MCA data

5.8.2. From table 23 it is clear that for OPC grade cement, for the firms operating in the North (Punjab, Rajasthan) the profit margins have been high and rising over the period under consideration. The profit rates are particularly high as compared to any other region which may indicate collusive pricing behaviour. It is only firm 3 which operate in the North which earns comparable profit margins in Tamil Nadu. The wide variations in profit rates cannot be explained by input costs alone.

5.8.3. Again for OPC grade, data may be suspect. For example, in Karnataka firm number 7 is consistently losing money yet another firm earns reasonable profits. This is not consistent market behaviour.

5.8.4. For PPC grade cement the divergence in margins are as high as in the case of OPC variety. However, as in the case of PPC some of the trends in margins indicate possibly suspect data.

5.8.5. Some indication of non-competitive behaviour could also be obtained by comparing the average ex-factory product price given in table 23 (column 3) with the margins. Despite wide variations in margins, prices tend to lie between Rs. 1800-2200 per ton. In other words firms with 0 to 10 percent margins charge the same price as those with margins above 30 percent. A similar story is observed in the case of PPC grade cement. Such price fixation (if done by covert or overt agreement) would be construed as anti-competitive under Section 3(3)(a) of the Competition Act.

5.8.6. Crucial to any study of anti-competitive behaviour is the retail pricing of cement. The MCA data indicates that the ex-factory price is roughly around Rs/ 2200 per tonne. Rough approximation of the retail data around the Delhi region gives the price at around Rs. 4200 per tonne. This implies that the transport cost plus sales tax should account for about Rs. 2000 per tonne. This is too high and reflects either the monopoly of the transport sector or price fixation by Cement companies. Further investigation seems necessary.

5.8.7. There is also some indication of market division among firms. If one divides the markets into North, South, East, West and Central one sees clear signs of market division. Thus in the case of OPC grade, only firm 3 operates in all the regions while two firms (numbers 9 and 11) operate in more than one zone. Firm 3 is a major player which has also through M&A activity become a market leader as shown in Section 5.6 above. Similar market division is seen in the case of PPC grade where only one firm (number 9) operates in more than one zone. However, we need more evidence to show if this market sharing arrangement is reached by any tacit agreement among the firms. In the latter case such market segmentation would be construed as anti-competitive under Section 3(3)(c) of the Competition Act.

6 Conclusion

6.1 This report has two parts. In part one we have looked at the structure of the Pesticides and Cement industry at the international level. Our analysis indicates that while the Pesticides sector is characterized by what may be called monopolistic competition, the Cement industry is dominated by a few big companies and is patently cartelised. Analysis of a few case studies for these industries internationally indicates that the main emphasis seems to be the cartel like behaviour of Cement majors with the principal objective of market sharing and price fixation. In the case of Pesticides there is some monopoly behaviour particularly in the case of high tech seed industry. In particular, there is evidence of enterprises in one industry entering the Pesticides industry using its monopoly to create entry barriers in Pesticides sector. However, anti-competitive cartelisation is more clearly established in the Cement industry.

6.2 Our analysis also indicates that India is both a dominant producer and consumer in the Insectides segment of the Pesticides industry. However, further firm level analysis indicates that none of the M&A cases qualify for action under the Competition Act, 2002. More detailed analysis indicates that the degree of competition in the Pesticides industry has been increasing in that the concentration levels in terms of sales has been decreasing over the nineties. A regression analysis also indicates that one possible measure of competitive behaviour, profitability, is affected negatively by the degree of openness which is a possible indicator of external competition. Surprisingly, however, decreasing concentration has no statistically significant impact on profitability indicating that there could be other barriers to competition.

6.3 The study of the Cement sector shows some differences from the Pesticides sector. For one, there is clear evidence of dominance by a few large producers in that the “middle level” firms (in terms of sales) seem to have disappeared over the ’nineties. Our analysis of the M&A activity in Cement industry clearly shows that these mergers fall under the ambit of the Competition Act provisions on combinations. There also seems to be some presumption that these M&As are non-competitive in that the merging firms have a very similar average cost structure so that they could not have been guided only by efficiency consideration. It is likely that market dominance seems to have been the objective. However, the preliminary regression analysis does not give any clear indication as to what economic factors influence our measure of competition, namely, profitability. Presumably, specific firm level analysis would give a clearer picture.

6.4 However, for the purposes of the Competition Act, 2002, it is necessary to define the ‘relevant geographic market’ and the ‘relevant product market’ before commenting on non-competitive behaviour. Existing studies of concentration which use firm level data probably understate the level of concentration as the data is normally at the country level. Nor is the issue of ‘relevant geographic market’ addressable in firm level data studies. We have attempted to get round this problem by using cost audit data for firms in the two industries. In the case of the Pesticides industry the data seems to be incomplete and possibly faulty. It is also not possible to sue the data in the current form to

get product wised information. However, a look at the data on the profit margins per unit cost indicates that the variation in any region and between regions is far too large and does not indicate a market functioning in a competitive way. However, the level of aggregation does not allow any firm conclusion.

6.5 Finally, the MCA data for the Cement industry does allow disaggregation to both region and product level. Here, one finds some evidence of both price fixation and market sharing activities which can be construed to be anti-competitive as per the Competition Act. Further investigation seems warranted.

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APPENDIX A

1 Description of the Data

To get more detailed product level data on pesticides and cement industries we have looked at UNSD 4 – digit level and UNSD 5 – digit level data respectively. This gives us data on exports – imports transaction to derive prices. Data on consumption especially for pesticides has been collected from UNFAOSTAT and data on production is duly derived. And some inferences on international scenario based on calculations on prices, trade, consumption and production have been made.

International trends in Prices, Consumption and Production of Pesticides

For a more detailed study of major pesticide category at disaggregated level, we rely on UNSD (SITC Rev. 3) for imports and exports and prices are duly calculated. For consumption data we have relied on UNFAOSTAT and data on production are derived suitably. The description of the 4 – digit level data is the following;

- **Name**: Insecticides (5911)

Description: Insecticides put up in forms or packing for retail sale or as preparations or articles.

- **Name**: Fungicides (5912)

Description: Fungicides put up in forms or packing for retail sale or as preparations or articles.

- **Name**: Herbicides (5913)

Description: Weed-killers (herbicides), anti-sprouting products and plant-growth regulators, put up in forms or packing for retail sale or as preparations or articles.

Imports, Exports and Prices of the major pesticide category

Following are data on imports, exports and calculated prices for major countries considered for major pesticide categories defined above as per the availability of data for further analysis and all the data collected are for the 3 successive years, namely, 1995, 1996, 1997 which would help understanding the trend and change in trend for selected variables. All the quantities are in 1000 Metric Ton, all the values are in Million US Dollars and prices are per unit.

Table 1: Insecticides (5911)

		value = $ Mil		Qtty = 1000 M Ton			
		Insecticide – 5911					
		X		M		X	M
Country		Value	Qtty	Value	Qtty	price	price
brazil	1995	26.02	4.00	33.41	27.16	6.51	1.23
	1996	34.94	4.74	33.66	37.56	7.38	0.90
	1997	47.00	6.66	72.73	11.22	7.06	6.48

France	1995	351.09	37.72	263.61	35.19	9.31	7.49
	1996	363.68	40.62	286.33	33.13	8.95	8.64
	1997	378.90	42.91	216.27	29.26	8.83	7.39
Germany	1995	371.59	20.64	69.63	7.55	18.00	9.22
	1996	378.46	19.98	75.10	8.16	18.94	9.21
	1997	368.40	21.40	59.77	7.44	17.22	8.04
India	1995	142.14	19.86	33.32	4.24	7.16	7.85
	1996	185.51	25.10	33.70	3.94	7.39	8.55
	1997	168.27	23.20	29.10	2.55	7.25	11.43
Swiss	1995	157.71	11.24	16.99	1.55	14.03	10.95
	1996	138.55	10.29	14.05	1.37	13.46	10.24
	1997	112.76	9.03	14.00	1.43	12.49	9.80
US	1995	351.47	65.57	61.98	9.02	5.36	6.87
	1996	370.45	80.16	91.08	12.60	4.62	7.23
	1997	411.35	63.83	124.13	14.14	6.44	8.78

Table 2: Fungicides (5912)

		value = $ Mil		Qtty = 1000 M Ton			
		Fungicide – 5912					
		X		M		X	M
Country		Value	Qtty	Value	Qtty	price	price
brazil	1995	29.03	8.30	6.05	48.69	3.50	0.12
	1996	31.25	8.38	9.34	3.42	3.73	2.73
	1997	33.70	8.51	15.74	2.11	3.96	7.46
France	1995	445.34	80.47	422.45	44.71	5.53	9.45
	1996	468.17	89.16	395.82	42.70	5.25	9.27
	1997	423.66	84.26	383.54	44.52	5.03	8.61
Germany	1995	619.35	64.92	127.55	12.36	9.54	10.32
	1996	548.40	63.45	133.83	12.57	8.64	10.65
	1997	551.30	63.85	132.83	12.58	8.63	10.56
India	1995	4.40	0.60	0.71	0.11	7.35	6.37
	1996	5.03	1.00	2.31	0.39	5.02	5.96
	1997	5.57	1.70	1.88	0.30	3.28	6.37
Swiss	1995	256.34	10.80	32.61	5.20	23.74	6.27
	1996	293.96	13.02	43.36	5.23	22.57	8.29
	1997	283.32	15.62	44.79	5.29	18.14	8.47
US	1995	160.43	30.87	77.32	29.77	5.20	2.60
	1996	173.80	30.02	92.60	32.73	5.79	2.83
	1997	192.61	31.55	100.26	29.00	6.11	3.46

Table 3: Herbicides (5913)

		value = $ Mil		Qtty = 1000 M Ton			
	Herbicide – 5913						
		X		M		X	M
Country		Value	Qtty	Value	Qtty	price	price
brazil	1995	66.87	7.76	52.97	6.43	8.62	8.24
	1996	71.17	8.27	61.09	8.62	8.61	7.08
	1997	100.95	11.58	107.13	13.45	8.72	7.96
France	1995	675.29	47.74	705.06	70.15	14.15	10.05
	1996	789.52	58.30	693.75	79.98	13.54	8.67
	1997	826.48	60.04	554.45	72.82	13.77	7.61
Germany	1995	633.77	61.35	373.16	31.72	10.33	11.76
	1996	648.46	63.48	380.15	36.43	10.22	10.44
	1997	525.28	56.30	342.59	39.43	9.33	8.69
India	1995	5.68	1.07	1.97	0.22	5.30	8.93
	1996	3.85	0.79	2.33	0.31	4.88	7.40
	1997	2.66	0.77	2.87	0.34	3.45	8.50
Swiss	1995	261.36	19.06	37.77	3.46	13.71	10.90
	1996	265.93	18.30	42.28	4.17	14.54	10.15
	1997	251.07	19.77	62.15	3.88	12.70	16.01
US	1995	693.92	112.12	174.06	15.62	6.19	11.14
	1996	713.74	130.31	208.13	14.52	5.48	14.34
	1997	842.83	139.01	221.17	13.03	6.06	16.97

Least import price has been observed for insecticides in the year 1996 in Brazil i.e., 0.90 per unit against maximum import price faced by India in the year 1997 i.e., 11.43 per unit Table 1. Similarly least export price has been observed for the same category in the year 1997 in USA i.e., 6.44 per unit against maximum export price of Germany in the year 1996 i.e., 18.94 per unit. From Table 2 we have observed the least import price for fungicides in the year 1995 in Brazil i.e., 0.12 per unit against maximum import price faced by Germany in the year 1997 i.e., 10.56 per unit. Similarly least export price has been observed for the same category in the year 1997 in India i.e., 3.28 per unit against maximum export price of Switzerland in the year 1995 i.e., 23.74 per unit. Similarly for herbicides from Table 3 we observe the least import price in the year 1996 in Brazil i.e., 7.08 per unit against maximum import price faced by USA in the year 1997 i.e., 16.97 per unit. Similarly least export price has been observed for the same category in the year 1997 in India i.e., 3.45 per unit against maximum export price of Switzerland in the year 1996 i.e., 14.54 per unit.

Huge differences of import as well as export prices between the years, between pesticide categories and between countries are due to differences in commodity composition within and among pesticide categories traded and their respective prices.

Non-availability of even more disaggregated level data on all those pesticide categories for all those countries considered restrict our analysis only to 4 – digit level data of UNSD.

Table 4 shows the disaggregated data on export prices for India for insecticides category.

Table 4: Industry-wise export prices of technical pesticides for India

Prices*: Insecticides					
	1994-95	1995-96	1996-97	1997-98	1998-99
B.H.C.	0.30	0.17			
D.D.T.	0.25	0.24	0.25	0.52	0.34
Parathion (Methyl)	1.28	1.50	1.59	1.63	1.37
Dimethoate	1.07	1.10	1.21	1.58	1.44
Quinalphos	2.52	2.65	2.44	2.14	2.33
Endosulphan	1.84	2.00	2.38	2.23	2.27
Cypermethrin	6.17	7.40	7.35	5.70	4.72
Malathion	0.69	0.77	0.83	0.85	0.94
Fenthion	2.11	3.43	3.07	2.67	5.88
Lindane	1.89	2.04	2.22	3.06	2.94
D. D. V. P.	1.22	1.53	1.69	1.36	1.41

Source: Indian Chemical Statistics 2000-01, Department of Chemicals & petro chemicals, Ministry of chemicals and fertilizers, GOI (* prices are calculated)

Among all the insecticides Cypermethrin is the costliest i.e. Rs. 6.17 per unit and B.H.C. is least priced at Rs. 0.30 per unit in the year 1994-95. It is this difference in inter-category prices within insecticides which makes huge differences of import as well as export prices between the years, between pesticide categories.

We have then derived the trade pattern of various countries. This is shown in Table 8 below:
Table 5 gives the details on physical trade of major pesticide categories for the countries concerned. It is important to note that imports are from and exports are to the rest of the world of concerned countries and not just trade among themselves.

Table 5: Exports and Imports of Pesticide Category

M and X of I, f, h (1000 Metric Ton)							
		insecticides		fungicides		herbicide	
		X	M	X	M	X	M
brazil	1995	4.00	27.16	8.30	48.69	7.76	6.43
	1996	4.74	37.56	8.38	3.42	8.27	8.62
	1997	6.66	11.22	8.51	2.11	11.58	13.45
france	1995	37.72	35.19	80.47	44.71	47.74	70.15
	1996	40.62	33.13	89.16	42.70	58.30	79.98
	1997	42.91	29.26	84.26	44.52	60.04	72.82
germany	1995	20.64	7.55	64.92	12.36	61.35	31.72
	1996	19.98	8.16	63.45	12.57	63.48	36.43
	1997	21.40	7.44	63.85	12.58	56.30	39.43

india	**1995**	19.86	4.24	0.60	0.11	1.07	0.22
	1996	25.10	3.94	1.00	0.39	0.79	0.31
	1997	23.20	2.55	1.70	0.30	0.77	0.34
swiss	**1995**	11.24	1.55	10.80	5.20	19.06	3.46
	1996	10.29	1.37	13.02	5.23	18.30	4.17
	1997	9.03	1.43	15.62	5.29	19.77	3.88
usa	**1995**	65.57	9.02	30.87	29.77	112.12	15.62
	1996	80.16	12.60	30.02	32.73	130.31	14.52
	1997	63.83	14.14	31.55	29.00	139.01	13.03

country's highest export of pesticide category *

country's highest import of pesticide category #

* indicated category for which exports are the highest
# indicated category for which imports are the highest

From the table the major trade pattern for the various countries is as follow:

Brazil – Exports more of Herbicides and imports more of Insecticides
France – Exports more of Fungicides and imports more of Herbicides
Germany – Exports more of Fungicides and imports more of Herbicides
India – Exports more of Insecticides and imports more of Insecticides
Switzerland – Exports more of Herbicides and imports more of Fungicides
USA – Exports more of Herbicides and imports more of Fungicides

International trend in Production and import & export prices of Portland Cement

For a more detailed study of major cement category at disaggregated level, we rely on UNSD (SITC Rev. 3) for imports and exports and prices are duly calculated. Data on production are calculated from United State Geological Survey and UNSD. The description of the 5 – digit level data is the following;

Name: **Portland cement (6612)**

Description: Portland cement, aluminous cement, slag cement, supersulphate cement and similar hydraulic cement, whether or not coloured or in the form of clinkers.

- **Name**: Cement Clinkers (66121)
  Description: Cement clinkers
- **Name**: Portland Cement (66122)
  Description: Portland cement
- **Name**: Aluminous Cement (66123)
  Description: Aluminous cement
- **Name**: Other Hydraulic Cements (66129)
  Description: Other hydraulic cements

Table 6: Export-Import with Prices

		Export			Import		
Country	**Year**	**Value** (Million US $)	**Quantity** (1000 Metric Ton)	**Price** (US $ per ton)	**Value** (Million US $)	**Quantity** (1000 Metric Ton)	**Price** (US $ per ton)
Brazil	1999	10.3	227	45.3	16.9	235	71.9
	2000	10.1	222	45.6	15.3	166	92.3
	2001	6.5	158	41.5	16.8	260	64.5
China	1999	200.9	6,356	31.6	14.8	500	29.6
	2000	189.9	6,055	31.4	34.8	1,426	24.4
	2001	195.6	6,209	31.5	64.7	2,800	23.1
France	1999	93.8	1,364	68.8	181.3	2,852	63.6
	2000	83.7	1,178	71.1	176.3	3,075	57.4
	2001	82.9	1,299	63.8	172.4	2,950	58.4
Germany	1999	216.9	3,367	64.4	268.8	4,462	60.2
	2000	196.1	3,357	58.4	204.9	3,640	56.3
	2001	211	3,905	54.0	179	2,450	73.1
India	1999	50.3	2,178	23.1	1	10	99.6
	2000	112.1	3,417	32.8	1.4	14	95.2
	2001	88	3,267	26.9	2	30	64.0
Japan	1999	157.8	7,681	20.5	49.3	1,091	45.2
	2000	155.1	7,637	20.3	62	1,378	45.0
	2001	141.2	7,576	18.6	50.8	1,183	42.7
USA	1999	57.3	726	79.0	1449.8	29,351	49.4
	2000	67	770	87.0	1397.6	28,684	48.7
	2001	59.3	781	76.0	1266.3	25,861	49.0

Source: Calculated from United Nation Statistical Division

As cement is regional by its very nature, the quantity of cement traded in the international market is very small. The quantity of cement exported (6 Mt) by China in 1999 was only 0.37% of total world production (1600 Mt), with export price of 31.5 US $ per ton and imported 0.5 Mt at average price of 29.6 US $ per ton. USA is the largest importer of cement in the world, importing around 25% of its total consumption. In 1999 USA imported (26 Mt) of cement at import price of 49 US $ per ton, which is 1.5% of total world production (1750 Mt). The overall per ton export prices of cement is highest for USA, followed by France and Germany and the overall import prices are highest for India (although negligible import), followed by Brazil, France and Germany.

APPENDIX B

MCA Cost Audit Report

The data received form MCA contains 'cost audit reports' for 14 cement companies consisting 30 plants and 20 pesticide companies. The data pertains for three years 2005-06, 2004-05 and 2003-04 for cement and 2004-05, 2003-04 and 2003-02 for pesticide companies. The cost audit report data is divided in 28 paras. Para 1 to 3 provides general information about the company, the cost accounting system adopted and the process of manufacture. Para 4 gives the quantitative details, like installed capacity, total production quantity and capacity utilization percentage etc. Para 5 and 6 gives details about input materials consumed, imported etc. Para 7 gives details about power, fuel and utilities expanses and para 8 about salaries and wages, para 9 gives details of repairs and maintenance, para 10 and 11 for fixed assets register and depreciation and Para 12 gives details about overhead expenses. Para 13 to 17 shows research and development expenses, royalty and technical know-how charges, quality control expenses, pollution control expenses and abnormal non-recurring costs respectively and para 18 and 19 provides details about the stocks and inventory. Para 20 is about sale of the product, giving details about the quantity sold, rate and amount for different categories of product sold. Para 21 gives details about margin per unit of output sold. Para 22 gives the details about the products competitive margin against imports and para 23 about the value addition and distribution of earning for the product under reference. Para 24 gives details about financial position like capital employed, net sales etc. and ratio analysis for the product under reference and also for the factory/company as a whole. Para 25 is the detail of capitalization of revenue expenditure and 26 is about related party transaction. Para 27 gives details about the central excise reconciliation for the product under reference and para 28 gives profit and loss reconciliation account.

APPENDIX C I

Table 7: Item wise detail of Customs Tariff on Pesticide (2006-07)			
Tariff Item	**Description of Goods**	**Unit**	**Rate of Duty**
3808	**INSECTICIDES, RODENTICIDES, FUNGICIDES, HERBICIDES, ANTI-SPROUTING PRODUCTS AND PLANT-GROWTH REGULATORS, DISINFECTANTS AND SIMILAR PRODUCTS, PUT UP IN FORMS OR PACKINGS FOR RETAIL SALE OR AS PREPARATIONS OR ARTICLES (FOR EXAMPLE, URTREATED BANDS, WICKS AND CANDLES, AND FLY-PAPERS)**		
3808 10	*Insecticides:*		
	Aldrin, aluminium phosphite, calcium cyanide, chlordane, chloro benzilate, DDVP, DDT:		
3808 10 11	Aldrin	kg.	12.5%
3808 10 12	Aluminium phosphite (for example phostoxin)	kg.	12.5%
3808 10 13	Calcium cyanide	kg.	12.5%
3808 10 14	Chlordane	kg.	12.5%
3808 10 15	Chloro benzilate	kg.	12.5%
3808 10 16	D.D.V.P. (Dimethyl-dichloro-vinylphosphate)	kg.	12.5%
3808 10 17	D.D.T. (excluding D.D.T. of heading 2903 62)	kg.	12.5%
	Diaginal, heptachlor, lindane, methyl bromide, parathion methyl, dimethoate technical, malathion:		
3808 10 21	Diaginal	kg.	12.5%
3808 10 22	Heptachlor	kg.	12.5%
3808 10 23	Lindane	kg.	12.5%
3808 10 24	Methyl bromide	kg.	12.5%
3808 10 25	Parathion, methyl	kg.	12.5%
3808 10 26	Dimethoate, technical grade	kg.	12.5%
3808 10 27	Malathion	kg.	12.5%
	Endosulphan technical, quinal phos, isoproturon, fenthion, cipermethrin technical, allethrin, synthetic pyrethrum:		
3808 10 31	Endosulphan, technical grade	kg.	12.5%
3808 10 32	Quinal phos	kg.	12.5%
3808 10 33	Isoproturon	kg.	12.5%
3808 10 34	Fenthion	kg.	12.5%
3808 10 35	Cipermethrin, technical grade	kg.	12.5%
3808 10 36	Allethrin	kg.	12.5%
3808 10 37	Synthetic pyrethrum	kg.	12.5%
	Other:		
3808 10 91	Repellants for insects such as flies, mosquito	kg.	12.5%
3808 10 92	Paper impregnated or coated with insecticide such D.D.T. coated paper	kg.	12.5%
3808 10 99	Other	kg.	12.5%
3808 20	*Fungicides:*		
3808 20 10	Maneb	kg.	12.5%
3808 20 20	Sodium penta chlorophenate (santobrite)	kg.	12.5%
3808 20 30	Thiram (tetramethyl thiuram disulphide)	kg.	12.5%
3808 20 40	Zineb	kg.	12.5%

3808 20 50	Copper oxychloride	kg.	12.5%
3808 20 90	Other	kg.	12.5%
3808 30	*Herbicides, anti-sprouting products and plant-growth regulators:*		
3808 30 10	Chloromethyl phenozy acetic acid (M.C.P.A.)	kg.	12.5%
3808 30 20	2:4 Dichlorophenozy acetic acid and its esters	kg.	12.5%
3808 30 30	Gibberellic acid	kg.	12.5%
3808 30 40	Plant-growth regulators	kg.	12.5%
3808 30 50	Weedicides and weed killings agents	kg.	12.5%
3808 30 90	Other	kg.	12.5%
3808 40 00	Disinfectants	kg.	12.5%
3808 90	*Others:*		
3808 90 10	Pesticides, not elsewhere specified or included	kg.	12.5%
3808 90 90	Others	kg.	12.5%

Source: Central Board of Excise & Custom, Department of Revenue, Ministry of Finance, Government of India. http://www.cbec.gov.in /cae/customs/cst_0607/chap-38.pdf

APPENDIX C II

Table 8: Item wise detail of Customs Tariff on Cement (2006-07)				
Tariff Item	**Description of goods**	**Unit**	**Rate of duty**	
			Standard	**Preferential Areas**
2521	**LIMESTONE FLUX; LIMESTONE AND OTHER CALCAREOUS STONES, OF A KIND USED FOR THE MANUFACTURE OF LIME OR CEMENT**			
2521 00	*Limestone flux; limestone and other calcareous stones, of a kind used for the manufacture of lime or cement:*			
2521 00 10	Limestone flux (L.D., below 1% SiO2)	kg.	12.50%	
2521 00 90	Others	kg.	12.50%	
2522	**QUICKLIME, SLAKED LIME AND HYDRAULIC LIME, OTHER THAN CALCIUM OXIDE AND HYDROXIDE OF HEADING 2825**			
2522 10 00	Quicklime	kg.	12.50%	
2522 20 00	Slaked lime	kg.	12.50%	
2522 30 00	Hydraulic lime	kg.	12.50%	
2523	**PORTLAND CEMENT, ALUMINOUS CEMENT , SLAG CEMENT, SUPERSULPHATE CEMENT AND SIMILAR HYDRAULIC CEMENTS, WHETHER OR NOT COLOURED OR IN THE FORM OF CLINKERS**			
2523 10 00	Cement clinkers	kg.	12.50%	
	Portland cements			
2523 21 00	White cement, whether or not artificially coloured	kg.	12.50%	
2523 29	***Other:***			
2523 29 10	Ordinary portland cement, dry	kg.	12.50%	

2523 29 20	Ordinary portland cement, coloured	kg.	12.50%	
2523 29 30	Portland pozzolana Cement	kg.	12.50%	
2523 29 40	Portland slag cement	kg.	12.50%	
2523 29 90	Others	kg.	12.50%	
2523 30 00	Aluminous cement	kg.	12.50%	
2523 90	*Other hydraulic cements:*			
2523 90 10	Sagol: ashmoh	kg.	12.50%	
2523 90 20	High alumina refractory cement	kg.	12.50%	
2523 90 90	Other	kg.	12.50%	

Source: Central Board of Excise & Custom, Department of Revenue, Ministry of Finance, Government of India. http://www.cbec.gov.in /cae/customs/cst_0607/chap-25.pdf

***** In January 2007 the Indian Government reduced the customs tariff on item 2523 29 from 12.5% to zero percent zero with a view to check rising inflation.

SUPPLEMENTARY NOTE: In heading 2523, “sagol” means cement obtained by heating limestone and burnt coal in a kiln; and “ashmoh” means cement obtained by fine grinding of paddy husk, ash and hydrated lime with an additive.

APPENDIX C III

Table 9: Market Share of Top Pesticide Companies in India

Company Name	Bayer Cropscience India Ltd. [Merged]	**Bayer Cropscience Ltd.**	Carol Info Services Ltd.	**Excel Industries Ltd.**	Godrej Sara Lee Ltd.	**Rallis India Ltd.**	Syngenta India Ltd.	**United Phosphorus Ltd.**	Monsanto India Ltd.
1989	0.0	**19.0**	0.0	**12.8**	0.0	**34.7**	0.0	**4.0**	0.7
1990	0.0	**16.2**	0.0	**11.4**	0.0	**39.3**	0.0	**0.0**	0.6
1991	0.0	**15.8**	4.7	**11.2**	0.0	**37.6**	0.0	**0.0**	0.6
1992	0.0	**18.3**	5.3	**14.7**	3.1	**29.2**	0.0	**0.0**	1.2
1993	0.0	**15.9**	5.7	**12.7**	3.0	**24.3**	0.0	**0.0**	1.2
1994	0.0	**15.3**	7.4	**12.5**	3.7	**28.3**	0.0	**0.0**	1.4
1995	5.7	**13.8**	6.9	**10.9**	3.6	**29.2**	0.0	**0.0**	2.0
1996	6.1	**9.6**	5.7	**9.8**	4.3	**31.3**	0.0	**0.1**	1.8
1997	5.8	**12.0**	6.7	**9.4**	5.4	**30.8**	0.0	**2.5**	1.9
1998	5.6	**11.1**	7.4	**8.4**	0.0	**27.8**	0.0	**2.4**	2.0
1999	5.2	**9.8**	7.7	**7.4**	0.0	**23.6**	0.0	**2.5**	2.3
2000	4.1	**9.4**	13.5	**7.2**	4.4	**23.0**	0.0	**0.0**	1.8
2001	4.0	**10.4**	3.6	**7.0**	6.2	**18.4**	6.8	**6.2**	4.5
2002	7.2	**10.9**	3.1	**7.4**	6.5	**16.3**	6.6	**3.9**	5.1
2003	5.3	**10.0**	2.4	**3.4**	6.0	**14.5**	6.2	**1.6**	5.1
2004	0.0	**13.4**	0.5	**2.8**	6.1	**7.7**	6.3	**12.5**	4.8
2005	0.0	**11.6**	0.6	**3.7**	7.1	**9.3**	9.3	**16.7**	5.9

Source: PROWESS Database of CMIE

Chart 7: Missing Middle Pesticide

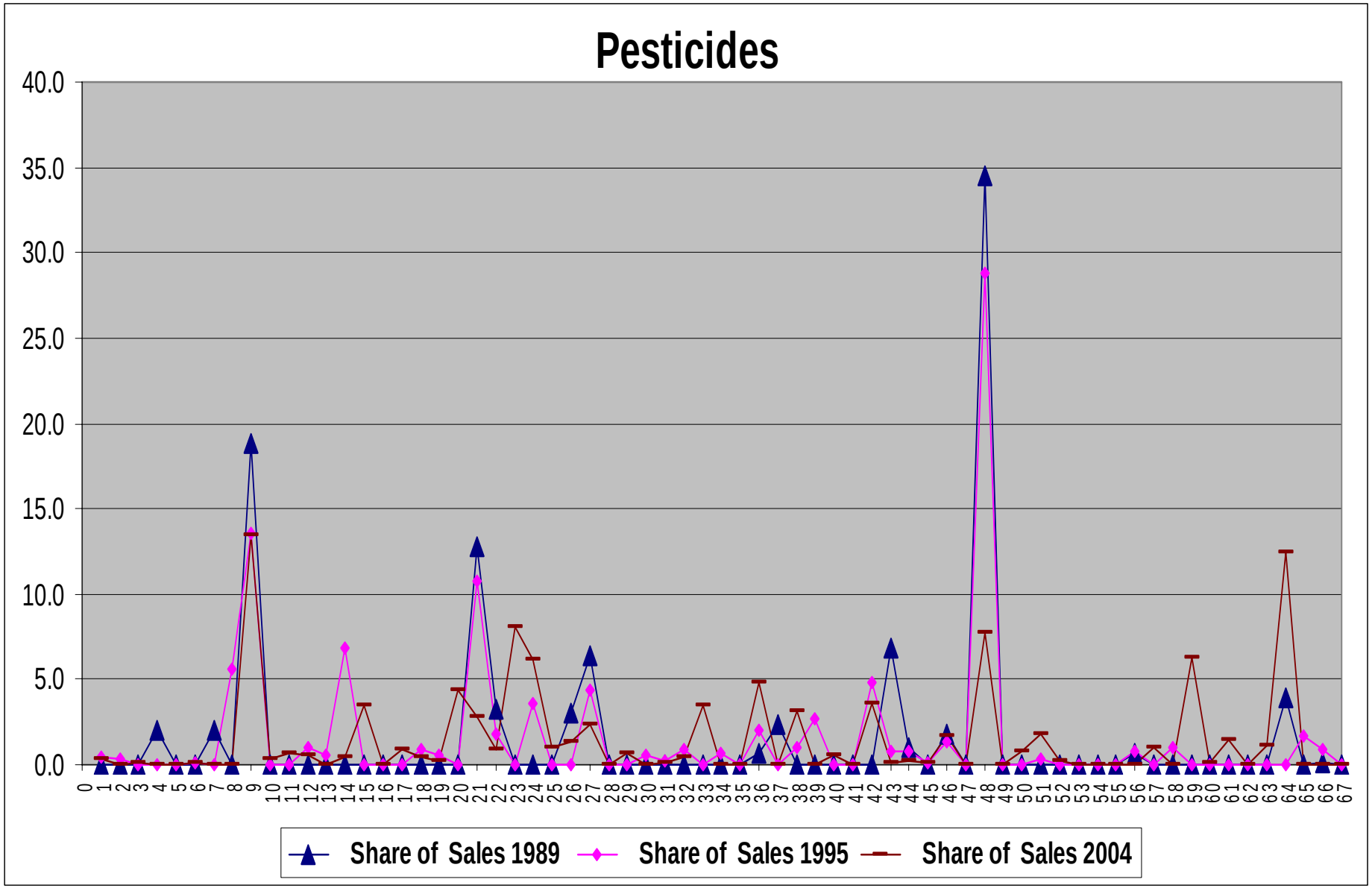

Chart 8: Missing Middle Cement