

AGGREGATES, CEMENT AND READY-MIX CONCRETE MARKET INVESTIGATION

Analysis of cost structures and profit margins

PART I: Purpose, approach and methodology

1. This paper sets out the purpose, approach and methodology of our assessment of cost structures and profit margins for the relevant companies in the markets for aggregates, cement and ready-mix concrete (RMX) in Great Britain (GB). Our assessment is set out in two separate working papers entitled: 'Part II: Assessment covering the Majors' Relevant GB Operations' (Part II), and 'Part III: Assessment covering the medium-tier independents' Relevant GB Operations' (Part III). A 'Glossary' for terms used in all three parts has been provided separately.

2. This paper sets out:
 - (a) *The purpose of our assessment* where we set out the main areas of investigation for our cost structure and margin assessment.
 - (b) *Assessment framework* where we set out:
 - (i) the relevant companies included in our assessment;
 - (ii) the product scope of their relevant operations;
 - (iii) their relevant operating entities; and
 - (iv) the time period over which we conducted our assessment.
 - (c) *Definitions and data request* where we set out:
 - (i) our definitions of volumes, revenues and costs; and
 - (ii) details of our financial data request to the relevant companies.
 - (d) *Calculation methodology* where we set out our cost structure and margin calculation methodologies.

3. We first set out a brief summary of our methodology and approach, before setting out full details.

Summary

4. We set out below a summary of each section of this paper.

The purpose of our assessment

5. Our cost structure assessment primarily focused on determining whether there were any similarities in the cost structures of the companies covered by our assessment. Cost structure symmetry between rival firms can facilitate market coordination by making it easier for a firm to understand and predict how others will behave and react to any action taken in the market. Cost structure symmetry is an example of market symmetry which can assist firms in reaching a common understanding on the terms of any market coordination.
6. Our margin assessment focused on the following areas:
 - (a) how margins have performed historically against changes in market demand and cost conditions;
 - (b) whether the five largest vertically-integrated operators in the reference markets (the Majors) generated different margins on their external and internal sales, and if so, the materiality and impact of any differential on their underlying cost structures and margins; and
 - (c) a comparison of margins generated between large and smaller operators. In an assessment of market coordination, one of the relevant considerations is the extent to which non-coordinating firms might act as a competitive constraint on the coordinating firms.

7. The purpose of our margin assessment was not to determine whether margins could be deemed high or excessive. Such analysis forms parts of our profitability assessment, in which return on capital employed is compared against an appropriate competitive benchmark.

Assessment framework

The relevant companies, their operations and operating entities

8. Our cost structure and margin assessment covered the five Majors and six medium-tier independent operators (the medium-tier independents), and their production and/or sale activities in GB in relation to aggregates, cement or RMX (the relevant GB operations). The relevant companies included vertically integrated Majors and medium-tier independents, as well as stand-alone cement importers.
9. Where appropriate, our assessment of the relevant companies' cost structures and margins were made at an individual site (site), product divisional (division), and combined relevant GB operations (consolidated) level, where each site and division focused on one of the three reference products.

The relevant time period

10. Our assessment covered the last five years (the relevant period) from 2007 to 2011 for the Majors and medium-tier independents. During the early part of this period, the reference markets experienced a significant downturn in demand. Whilst we sought to extend the period over which we assessed the relevant companies' margin trends from five to seven years, given the widespread issues and concerns highlighted by the relevant companies in relation to the consistency and reliability of their financial data going back beyond five years, we focused our assessment on the relevant period.

Definitions and data requests

Revenue and cost definitions

11. For the purposes of our margin assessment, when examining the relationship between prices and costs, we determined whether gross revenue or net revenue per unit sold was an appropriate proxy for the average price. We considered that the net revenue per unit sold should be used as a proxy for the average ex-works price. Our reasons have been set out in the main body of this paper.

12. We categorized costs into: distribution costs, variable costs and fixed costs. We broadly defined variable costs as those costs that necessarily varied in line with small changes in production volumes (and to a lesser extent, sales volumes) during a normal production run at an active production site. Variable costs therefore generally comprised the relevant raw material input costs and the costs of the production process, eg gas and electricity. For cement importers, variable costs included their cost of purchasing imported cement.

13. Whilst we subdivided fixed costs into site fixed costs, divisional fixed costs, central costs and depreciation and amortization, we considered that there was limited meaning in comparing each of these cost subcategories between the relevant companies given that their composition and amount depended on individual company-specific factors, eg the extent to which certain business support services were centralized or recharged, or in relation to depreciation and amortization, the age profile of the relevant assets and the depreciation policy adopted by the company.

Financial data requests

14. We requested annual profit and loss account information (P&L data) covering the relevant period from each of the Majors and medium-tier independents. Whilst we requested the Majors to provide us with a further two years of historic P&L data, only

one of the Majors was able to provide us with historic P&L data which was prepared on a consistent and comparable basis as the P&L data for the relevant period. P&L data was requested at site, divisional and consolidated levels.

Calculation methodology

Cost structure assessment

15. We assessed cost structures using two methods: (a) on a cost per unit sold basis (per tonne for aggregates and cement, and per cubic metre for RMX); and (b) cost as a percentage of total costs (defined as the sum of distribution costs, variable costs and fixed costs).

Margin assessment

16. Our margin assessment focused on two measures of profit:
 - (a) variable profit (ie gross revenues less distribution costs and variable costs); and
 - (b) EBITDA or earnings before interest, tax, depreciation and amortization (or variable profit less fixed costs, but not depreciation and amortization). We excluded non-operating and non-recurring items from our profit calculations.
17. We calculated margins based on two methods: (a) on a unit margin basis, ie variable profit or EBITDA per unit sold; and (b) on a return on sales basis, ie variable profit or EBITDA as a percentage of net revenues.
18. We also calculated margins separately on external and internal sales for the upstream Aggregates and Cement Divisions. Our methodology is described below. Our methodology for calculating consolidated margins is set out in the main body of this paper.

Margins on external and internal sales

19. This analysis applied to our margin calculations for the upstream Aggregates or Cement Divisions where there was also a downstream RMX division. A split of revenues and sales volumes between external and internal sales was generally available from the financial information or transactions data provided by the relevant companies. We apportioned costs to external and internal sales based on the respective proportions of sales volumes accounted for by external and internal sales. We considered this to be a reasonable assumption for variable cost apportionment, where the costs of producing products for external sale should broadly be similar to the costs of producing products for internal sale, but noted that exceptions might apply for fixed cost apportionment, where certain costs might only relate to the generation of external sales, eg sales and marketing. The limitations of this methodology are also discussed in the main body of this paper.

Full details of our methodology and approach

20. The full details of our methodology and approach to our cost structure and margin assessment are set out below. For ease of reference, the definitions of terms mentioned in the 'Summary' above have been repeated below in our detailed assessment.

The purpose of our assessment

21. In this section, we set out the purpose of our cost structure and margin assessment, and the areas we investigated.

Cost structure assessment

22. Our draft market investigation guidelines (draft guidelines)¹ state that firms that are relatively 'symmetric', especially in terms of cost structures, market shares or capacity levels, could more easily respond to incentives to reach a common understanding with rivals than would otherwise be the case. The draft guidelines point out that this 'market symmetry' is one of the key structural aspects of a market that can often determine whether firms can reach a common understanding on the terms of coordination.²
23. Cost structure symmetry can facilitate coordination by increasing transparency of the incentives of firms in the market, enabling firms to understand and predict more accurately how rivals will behave and react to any action taken in the market.
24. We therefore focused our cost structure assessment on determining:
- (a) whether there were any similarities in the cost structures of the relevant companies; and
 - (b) how cost structures compared between the large and smaller operators, in particular whether smaller operators faced any cost disadvantage when compared with the larger operators.

Margin assessment

25. Our draft guidelines state that when competition is effective, prices are likely to be responsive to changes in market conditions, acting as market signals to both sellers and buyers.³ For example, sellers may seek to retain or win new customers by improving their prices in response to such changes. However, where a firm's prices appear not to respond to such changes, the draft guidelines state that this may not

¹ *Guidelines for Market Investigations: Their role, assessment, remedies and procedures, CC3 (Revised)*, June 2012, draft for public consultation.

² Paragraphs 236 and 241 of the *draft guidelines*.

³ Paragraph 110 of the *draft guidelines*.

always be due to an ineffective competitive process, and that margin analysis may help explain whether these situations could be explained by changes in a firm's costs over time or due to cost differentials between geographical areas.⁴

26. Margins analysis can also be used in the assessment of the external sustainability of any market coordination. The draft guidelines point out that, when determining the extent to which non-coordinating firms might act as a competitive constraint, the number of non-coordinating firms, their size, cost, margins, and scope to expand output levels are all relevant considerations.⁵
27. Our margin assessment focused on the following areas:
- (a) how margins have performed historically in response to changes in market demand and cost conditions, in particular since the end of 2008, when each of the reference markets experienced a sharp downturn in demand;
 - (b) whether there were there any differences in the margins generated by vertically integrated operators on their external and internal sales, and if so, the possible implications on their underlying cost structures and margins; and
 - (c) how margins compared between the large and smaller operators, eg differences in their respective underlying trends.
28. We would emphasize that the purpose of our margin assessment was not to determine whether margins could be deemed high or excessive, and that such an assessment forms part of our profitability assessment, in which profitability, as measured by return on capital employed, can be compared against a competitive benchmark, eg the weighted average cost of capital.

⁴ Paragraph 113 of the [draft guidelines](#).

⁵ Paragraph 247 of the [draft guidelines](#).

Assessment framework

29. In this section, we set out:
- (a) the relevant companies included in our assessment;
 - (b) the product scope of their relevant operations;
 - (c) their relevant operating entities; and
 - (d) the time period over which we conducted our assessment.

The relevant companies covered by our assessment

30. The relevant companies covered by our assessment comprised:
- (a) the five largest heavy building materials producers in GB (the Majors), namely:
Aggregate Industries UK Limited (Aggregate Industries), Cemex UK Operations Limited (Cemex), Hanson, Lafarge Aggregates Limited and Lafarge Cement UK Limited (together Lafarge) and Tarmac Group Limited (Tarmac); and
 - (b) a selection of six medium-tier independent operators (the medium-tier independents)⁶ in GB, namely: Breedon Aggregates Limited (Breedon Aggregates), Robert Brett & Sons Limited (Brett Group), Southern Cement Limited (Southern Cement) and Dragon Alfa Cement Limited (Dragon Alfa) (both part of the UK operations of Cementos Portland Valderrivas SA (CPV) and therefore counted as a single company),⁷ Marshalls plc (Marshalls), Thomas Armstrong (Holdings) Ltd (Thomas Armstrong) and Titan Cement UK Limited (Titan).

⁶ We broadly classified an independent operator as being 'medium tier' if one of its aggregates or RMX operations met one of our minimum annual production criteria of: (a) 1 Mt for aggregates; or (b) 100,000m³ for RMX. These thresholds were determined based on the top ten largest aggregates or RMX producers (excluding the five Majors) based on BDS 2009 data. In relation to cement importers, we approached all cement importers operating in Great Britain. The cement importers covered in this paper reflect those which have engaged with the CC through hearings and/or by providing responses to our information requests.

⁷ On 26 February 2013, CRH plc (CRH Group) announced that it had reached agreement, effective immediately, on an asset swap with CPV, as part of which, CRH Group will acquire CPV's Southern Cement business. For the purposes of our assessment, however, we have treated Southern Cement as being under CPV ownership given that this had been the case during the relevant period.

31. The company profiles of each Major and medium-tier independent, including details of their business activities, have been set out in our other published working papers on the CC website.⁸

The product scope of their relevant operations

32. For each relevant company, we defined its relevant operations as broadly comprising the production and/or sale of at least one of the following reference products: aggregates, cement and RMX in GB (the relevant GB operations). All other activities were excluded from our definition.
33. More specifically, these products can be further broken down as follows:
- (a) *Aggregates*: comprising primary aggregates (including both land-won and marine dredged aggregates), secondary aggregates and recycled aggregates.
 - (b) *Cement*: grey cement, including CEM I and blended grey cement, where cement can either be produced in GB or imported from abroad, and can be sold in bulk or bagged form.
 - (c) *RMX*: batched from fixed or site plants, or from volumetric trucks. All other concrete products, eg precast concrete and concrete blocks, were excluded.
34. The use, or sale, of cementitious products, eg ground granulated blast furnace slag (GGBS) or pulverized fuel ash (PFA), whether self-produced or procured from third-party suppliers, were treated for the purposes of our margin analysis as inputs into the production of blended cement or RMX, rather than as separate relevant operations.

⁸ For reference, the business activities of the five Majors and the six medium-tier independents are respectively set out in the following published working papers titled: *Market background: Company profiles of the five Majors: Aggregate Industries, Cemex, Hanson, Lafarge and Tarmac*; and *Market background: Company profiles of the medium-tier independents: Breedon Aggregates, Brett Group, CPV, Dudman Group, Leiths, Marshalls, Sherburn, Thomas Armstrong, Titan and Premier Cement*.

35. Table 1 sets out the relevant GB operations of each of the relevant companies included in our assessment.

TABLE 1 The relevant GB operations of the relevant companies

	<i>Aggregates production</i>	<i>Cement production</i>	<i>Cement imports</i>	<i>RMX production</i>
<i>Majors</i>				
Aggregate Industries*	x		x	x
Cemex†	x	x		x
Hanson†	x	x		x
Lafarge†	x	x		x
Tarmac	x	x		x
<i>Medium-tier independents</i>				
Breedon Aggregates	x			x
Brett Group†	x			x
Southern Cement and Dragon Alfa (CPV)			x	
Marshalls	x			x
Thomas Armstrong	x		x	
Titan			x	

Source: Majors and medium-tier independents

*Aggregate Industries imports cement predominantly for its own use in its downstream operations.

†Whilst Cemex, Hanson and Lafarge own facilities for importing cement, these have either not been used for importing clinker or cement during the relevant period, or the volumes imported accounted for a relatively small proportion of their total (ie both external and internal) cement sales. Brett Group owns an import terminal but it does not import CEM I cement but it does import GGBS. For the purposes of our assessment, we did not treat these companies as cement importers.

36. Based on Table 1 above:

- (a) all the Majors produce aggregates, cement and RMX, with the exception of Aggregate Industries which does not produce cement;
- (b) Southern Cement and Dragon Alfa (both part of CPV) and Titan are stand-alone cement importers;
- (c) Breedon Aggregates, Brett Group and Marshalls produce both aggregates and RMX;
- (d) Thomas Armstrong produces aggregates and imports cement; and
- (e) none of the relevant companies are stand-alone aggregates or RMX producers.

Their relevant operating entities

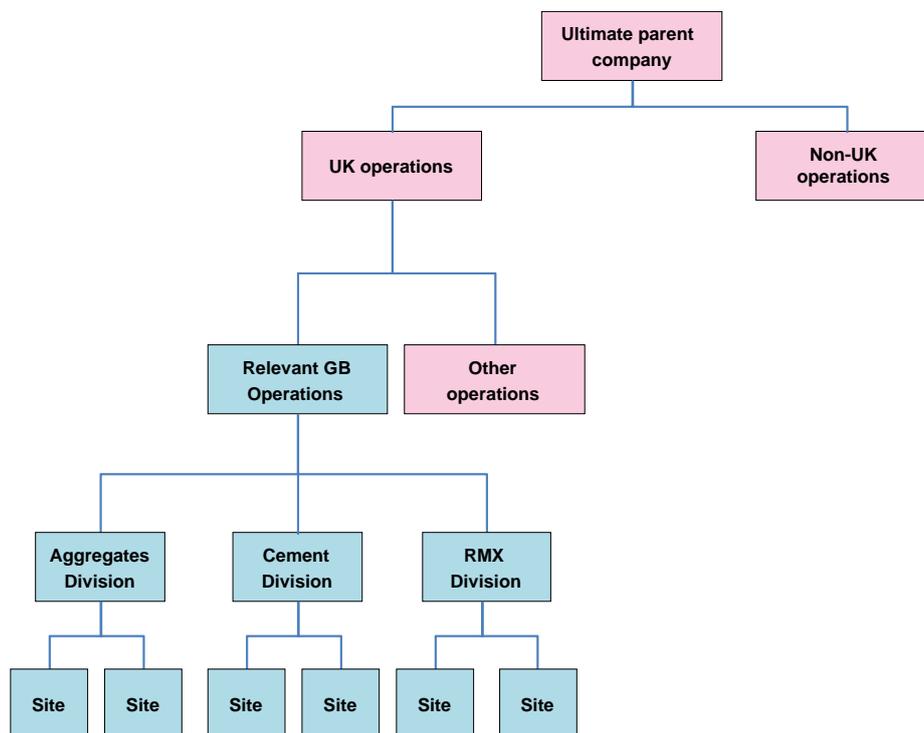
37. Given the differences in the nature, and the production process, of each of the reference products, we considered it appropriate to focus our assessment not only on the combined relevant GB operations, but also on each reference product separately.

38. We therefore defined the combined relevant GB operations as a relevant operating entity which comprised at least one of the following three product divisions (divisions): the Aggregates, Cement (or Cement Import) or RMX Division, where each division focused only on the production and/or sale of one of the three reference products. Each division was made up of individual sites, which we broadly defined as centres of production for the reference product, but could also mean storage, distribution and administrative centres and import facilities (sites). In this paper, we refer to margins for the relevant GB operations, divisions and sites as consolidated, divisional and site margins respectively.

39. Figure 1 illustrates how the relevant operating entities might fit within the overall structure of the relevant GB operations.

FIGURE 1

An illustrative structure of the relevant GB operations*



Source: CC.

*The relevant operating entities are highlighted in blue.

Note: This diagram is not intended to be an actual representation of a relevant company's legal, operational or financial reporting structure. This diagram serves to illustrate the financial consolidation structure of the different operating entities' financial information, as determined by the CC's financial data request to each relevant company.

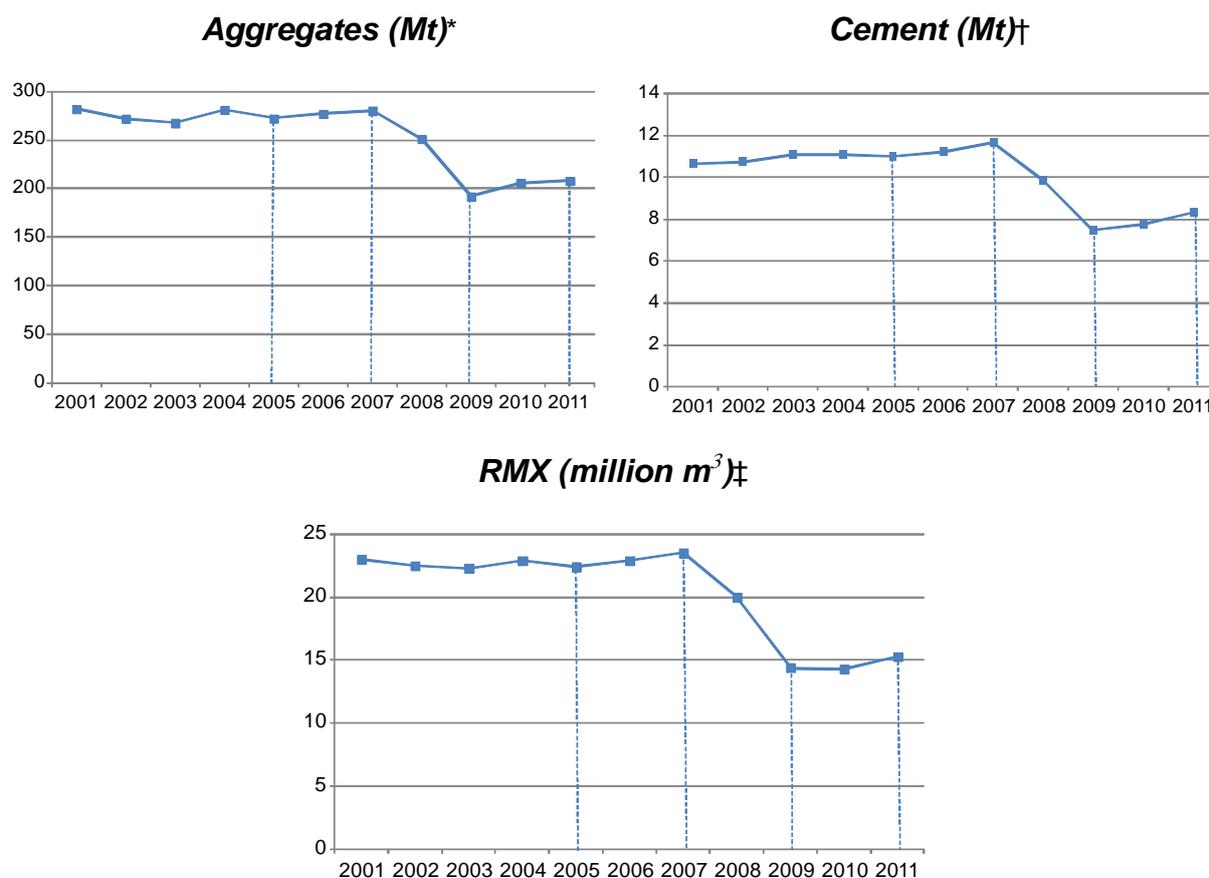
The time period over which we conducted our assessment

40. Whilst we would generally consider five years of historic annual financial information to be sufficiently long to determine any historic trend in margin performance, the reference markets had, from 2007 to 2011, experienced significant volatility in demand, with a major downturn in demand occurring in 2008 as a result of the general economic downturn and its effect on the construction and housebuilding sectors.
41. The national market demand from 2001 to 2011, as measured in terms of production or sales volumes, for each of the relevant markets is shown in Figure 2.⁹ The dotted vertical lines on each of the charts below mark the start and end of the different trends in volumes over the period from 2005 to 2011, as discussed in the next paragraph.

⁹ The charts show cement volumes for Great Britain, but aggregates and RMX volumes for the UK.

FIGURE 2

Historic market performance in the reference markets, 2001 to 2011



Source: Mineral Products Association.

*Based on UK production volumes of primary (ie crushed rock and sand and gravel) and non-primary aggregates.

†Based on sales of cement produced in GB.

‡Based on RMX production volumes in the UK.

42. Based on Figure 2 above, the period up to the end of 2007 reflected relatively high and stable levels of market demand for each of the reference products, representing a peak in the market over the period from 2001 to 2011. Lafarge told us that demand levels over the period from 2005 to 2007 were not high when compared with earlier years, in particular the period from 1988 to 1990, which it told us had a significant influence on the levels of capacity in aggregates and RMX. By the end of 2009, market volumes declined sharply for each of the reference markets with volumes declining on 2007 levels by –31 per cent for aggregates, –36 per cent for cement and –39 per cent for RMX. The declining trend in volumes ended in 2010, however, with a slight recovery in volumes by the end of 2011. Volumes, however, remained

significantly below 2007 levels: by –26 per cent for aggregates, –29 per cent for cement and –35 per cent for RMX.

43. As a result of the volatility in market volumes over the last five years, we sought to extend the time period over which we considered the Majors' margins from five to seven years, covering the period from 2005 to 2011. However, in light of the significant issues and concerns highlighted by all but one of the Majors in relation to the accuracy and reliability of financial data going back beyond five years,¹⁰ we focused our assessment on the last five years from 2007 to 2011 (the relevant period) for all of the relevant companies.

Definitions and data requests

44. In this section, we set out our definitions of the different measures of volume, revenue and cost, and provide details of our financial data request to the relevant companies.

Volume definitions

45. Volume data can broadly be categorized into production and sales volumes. The difference between the two relate to changes in inventory resulting from stock additions or deductions, and can arise from situations where:
- (a) sales volumes exceed or fall below production volumes;
 - (b) stock from one site is transferred in from, or transferred out to, another site (where both sites belong to the same division); or
 - (c) finished goods are purchased from third parties.

¹⁰ We also noted that there were a number of major acquisitions involving the Majors during the period from 2005 to 2007, eg in March 2005, Cemex Group acquired RMC Group plc, and Holcim Group acquired Aggregate Industries plc; in September 2006, Aggregate Industries acquired Foster Yeoman; and in August 2007, Heidelberg, which owned Castle Cement Ltd, acquired Hanson plc. Further details of each Major's major corporate activities can be found in Appendix B of the published working paper titled: [Market background: Company profiles of the five Majors: Aggregate Industries, Cemex, Hanson, Lafarge and Tarmac](#).

46. For any given financial year, revenues are driven by sales volumes, whilst production costs are largely driven by production volumes. The difference between sales and production volumes gives rise to a costing variation, which is resolved by an upward or downward adjustment to costs to match costs to the relevant sales volumes. These adjustments are sometimes referred to as 'stock movements' or 'changes in inventory', and are usually shown as a separate cost item.
47. For the purposes of our cost structure and margin assessment, we focused on cost data which included these 'stock movements' or 'changes in inventory' adjustments; and volume data based on sales volumes rather than production volumes.

Revenue definitions

48. In this section, we define the following revenue terms:
- (a) gross and net revenues;
 - (b) delivered and collected sales; and
 - (c) external and internal sales.

Gross and net revenues

49. Gross revenues measure sales based on sales volumes and delivered prices whilst net revenues measure sales based on sales volumes and ex-works prices. The difference between the delivered and ex-works price is the cost of distribution and haulage which is charged by the seller to the customer for delivery of the goods to the customer's jobsite.
50. Since we based our margin assessment on the relevant companies' annual financial data and not on their individual invoices or transactions (transactions data), we determined whether we could use their annual financial data to approximate average prices. We therefore assessed whether:

(a) gross revenue per unit sold was a reasonable proxy for the average delivered price; or

(b) net revenue per unit sold was a reasonable proxy for the average ex-works price.

51. Our assessment is set out under the subheading 'Delivered and collected sales' below.

Delivered and collected sales

52. The calculation of both gross and net revenues is based on the same total sales volume figure, with only the measure of price being different, ie the delivered and ex-works price respectively. The total sales volume figure, however, makes no distinction between 'delivered sales', ie where goods are delivered by the seller to the customer's jobsite, and 'collected sales', ie where goods are collected by the customer from the seller's works. It also follows that no distribution charges are levied by the seller on collected sales. Therefore, gross revenue per unit sold would be a weaker proxy for the average delivered price, the greater the proportion of total sales accounted for by collected sales.

53. Table 2 shows the proportion of the Majors' external sales volumes of aggregates and bulk cement accounted for by collected sales over the period from 2007 to 2011.

TABLE 2 Collected sales of aggregates and bulk cement as a percentage of total external sales volumes, 2007 to 2011

	per cent					
	2007	2008	2009	2010	2011	Total
<i>Aggregates*</i>						
Aggregate Industries†	[X]	[X]	[X]	[X]	[X]	[X]
Cemex‡	[X]	[X]	[X]	[X]	[X]	[X]
Hanson§	[X]	[X]	[X]	[X]	[X]	[X]
Lafarge	[X]	[X]	[X]	[X]	[X]	[X]
Tarmac¶	[X]	[X]	[X]	[X]	[X]	[X]
<i>Cement#</i>						
Aggregate Industries~	[X]	[X]	[X]	[X]	[X]	[X]
Cemex	[X]	[X]	[X]	[X]	[X]	[X]
Hanson	[X]	[X]	[X]	[X]	[X]	[X]
Lafarge	[X]	[X]	[X]	[X]	[X]	[X]
Tarmac	[X]	[X]	[X]	[X]	[X]	[X]

Source: Majors' transactions data.

*Figures for aggregates were based on each Major's transactions data covering all of its transactions for every aggregates type, ie primary construction, secondary, recycled and specialist aggregates. The proportion of collected sales was calculated for sales to external customers only (ie internal sales, transfers and sales to each Major's own joint ventures were not considered).

†[X]
‡[X]
§[X]
¶[X]

#Figures for cement were based on each Major's transactions data for its external sales of bulk cement only.

~Whilst Aggregate Industries does not produce cement in GB, it does purchase cement from the other Majors and imports cement from its sister company in Germany. The vast majority of its cement purchases are used internally by its downstream operations, with only a very small proportion sold externally, [X].

Note: N/A = not available.

54. Based on Table 2 above, collected sales volumes over the relevant period accounted for a relatively high proportion of external aggregates sales volumes, ranging from [X] per cent for [X] to [X] per cent for [X], with an average of [X] per cent over the relevant period. For the GB cement producers, the proportion of external bulk cement sales volumes accounted for by collected sales volumes varied across the Majors: from [X] to [X] per cent for [X]; [X] to [X] per cent for [X]; [X] to [X] per cent for [X]; and [X] to [X] per cent for [X]. The average across the GB cement producers was [X] per cent over the relevant period. Based on these figures, we considered that for the majority of the Majors, the proportion of their external aggregates and bulk cement sales volumes accounted for by collected sales was

sufficiently material, such that gross revenue per unit sold would not be an appropriate proxy for the average delivered price.¹¹

55. Since net revenues are, by definition, not affected by the proportion of collected sales, for the purposes of comparing prices, costs and margins between the relevant companies, we considered that there were stronger arguments in favour of adopting net revenue per unit sold as a proxy for the average ex-works price. We did, however, acknowledge the possible limitations of using net revenue per tonne sold as a proxy for the average ex-works price. For example, [REDACTED] told us that its delivered sales' customers were invoiced a delivered price only, and that the cost of haulage was 'not passed systematically through to customers', with the result that the 'presumed relationship between gross sales, haulage and ex-works prices' may not 'necessarily hold'. However, given that the P&L data calculated net revenues by deducting actual distribution costs from gross revenues, the net revenue per unit sold would still represent a reasonable approximation of the average ex-works price. Furthermore, as we explained above, given the relatively material proportion of external aggregates and bulk cement sales volumes accounted for by collected sales, gross revenue per unit sold would be a weaker proxy for the average delivered price.

External and internal sales

56. We defined external sales as those sales made by a relevant company to customers in which it holds no equity stake. Conversely, we defined internal sales as any sale made by a relevant company's upstream division to its downstream operations (where applicable), including but not limited to its RMX division. In relation to whether a Major treated a sale to its own joint venture as an external or internal sale, we found that this varied between the Majors. Given the relatively small proportion of

¹¹ [REDACTED]

total sales volumes accounted for by sales to joint ventures, we adopted each Major's own treatment of sales to its own joint ventures and made no adjustments to its P&L data in this regard.

57. We note that under UK tax law, internal or transfer pricing rules are governed by the 'arm's length principle', which states that 'transactions between connected parties should be treated for tax purposes by reference to the amount of profit that would have arisen if the same transactions had been executed by unconnected parties'.¹² A number of main parties¹³ commented that these transfer pricing rules only applied to internal sales made between separate legal entities, and not to internal sales made within the same legal entity, eg [REDACTED] told us that its internal sales of aggregates into RMX and asphalt took place within the same legal entity, ie [REDACTED], and therefore transfer prices only existed in its management accounts, and therefore tax considerations were not applicable. [REDACTED] also told us that its internal sales were made within the same legal entity, and therefore its transfer pricing policy was 'set internally by the company'.
58. For the purposes of our assessment, we were primarily concerned with whether the transfer price or the internal price was based on open market prices, or whether internal sales were priced higher or lower than external sales on like-for-like products. We therefore calculated margins on external and internal sales separately, and where these were different, we examined the reasons and implications of any differential on their underlying cost structures and margins.

¹² Small and medium-sized enterprises are generally exempt from UK transfer pricing rules, where a firm is considered 'medium sized' if it employs less than 250 staff and either generates less than €50 million (around £40 million) of annual turnover, or has a balance sheet total of less than €43 million (around £35 million). This exemption did not apply to any of the relevant GB operations of the relevant companies, either by virtue of their size exceeding the threshold, or because there were no downstream operations. Source: www.hmrc.gov.uk/international/transferpricing.htm.

¹³ Namely, [REDACTED], [REDACTED], [REDACTED] and [REDACTED].

Cost definitions

59. For the purposes of our assessment, we adopted the following three cost categories:
- (a) distribution costs;
 - (b) variable costs; and
 - (c) fixed costs.
60. We defined total costs as the sum of the above three cost categories. Our definitions for each cost category are set out below.

Definition of distribution costs

61. Distribution costs are the distribution and haulage charges paid by customers for delivery of the goods from the seller's sites to the customers' jobsites. As such, distribution costs do not include the costs of transporting goods or raw materials between a seller's sites, where these sites form part of the same division. Given that distribution charges relate to individual customer transactions, a split between distribution costs relating to external and internal sales was in most cases available.

Definition of variable costs

62. We defined variable costs as those costs that necessarily varied in line with small changes in production volumes (and to a lesser extent, sales volumes, eg the Aggregates Levy) during a normal production run at an active production site. For a cement importer, variable costs would mainly comprise its cost of purchasing imported cement. We did not consider staff costs to fall within our definition of variable costs on the basis that these costs did not necessarily change in line with changes in production volumes. Instead, we included these costs within fixed costs. Based on our definition of variable costs, we would expect variable cost movements to correlate very closely with changes in production volumes.

63. For the vast majority of relevant companies, which are engaged in the production of the goods they sell, the main components of variable costs relate to the costs of purchasing raw material inputs (materials costs) and the costs of the production process (variable production costs), eg gas and electricity.
64. A key assumption underpinning our definition of variable costs is that changes in production take place within existing production capacity limits, such that production could be increased without necessitating any further investment into plant or equipment, sometimes referred to as 'de-bottlenecking'. The effect of this assumption was to exclude from our definition of variable costs, large step-changes in fixed costs associated with increasing capacity or bringing mothballed capacity back on stream.¹⁴ We would note that given a sufficiently long time horizon, a firm will increasingly be able to vary the scale of its operations, such that some fixed costs may over time become variable. For the purposes of our assessment, in order to have a clear and meaningful distinction between variable and fixed costs, we have implicitly assumed a relatively short time horizon.
65. We also considered that any costs solely associated with resuming production at, or reinstating, a mothballed site should be deemed as one-off in nature, and were not included within variable costs. We considered that including these one-off costs within our definition of variable costs would reduce any meaningful distinction between variable and fixed costs. Therefore, in relation to our definition of variable costs:
- (a) the time horizon over which changes in production volumes take place should be relatively short since production capacity cannot be altered;
 - (b) changes in production volumes are relatively small incremental changes; and

¹⁴ We noted that bringing mothballed capacity back on stream could take place within a relatively short time frame. Cemex told us that a mothballed aggregates quarry or cement works [redacted]. In relation to reinstating its mothballed kiln at the South Ferriby cement works, Cemex estimated the cost of doing so at around £[redacted].

- (c) there is sufficient spare production capacity to accommodate the incremental change in production volumes.

Definition of fixed costs

66. We defined fixed costs as the converse of our definition of variable costs, ie costs that did not necessarily change in line with production or sales volumes. We subdivided fixed costs into the following subcategories:
- (a) site fixed costs;
 - (b) divisional fixed costs;
 - (c) central costs; and
 - (d) depreciation and amortization.
67. We noted that with the exception of depreciation and amortization, the exact composition and amount of each fixed cost subcategory depended highly on the management, operational and organizational structure of the individual relevant company, and the extent to which shared services were centralized within the business, or recharged to the relevant entities, eg for some relevant companies, certain business support services might be co-located at a site, in which case their associated costs would be included within site fixed costs. For others, the same services might be provided more centrally and form part of divisional fixed costs or central costs. In relation to depreciation and amortization, these may vary between the relevant companies due to differences in the age profile of their assets and their adopted depreciation policy. We define each of these fixed cost subcategories below.

Site fixed costs

68. Site fixed costs are those costs that are directly incurred at an individual site level, eg the costs of repairs and maintenance at a site and its on-site employees. As such,

site fixed costs are not centrally incurred and therefore should not take the form of a central recharge to the site.

Divisional fixed costs

69. Divisional fixed costs relate to the overheads incurred at a divisional level which are largely attributable to a specific reference product, eg divisional fixed costs would include the costs of a national or regional sales team focusing on the sale of aggregates.
70. A division might also be an integral part of a multi-product business division, eg if the Aggregates Division was a business unit within a business division that also produced and sold RMX and asphalt, then the aggregates business unit's divisional fixed costs would be based on its appropriate apportionment of the business division's total overheads.

Central costs

71. With reference to Figure 1 above, central costs relate to costs that are incurred at the relevant GB operations level and above, eg the ultimate parent company. Examples of central costs include UK head office costs and the costs of central services provided by the ultimate parent company. Again, the exact composition, and amount, of central costs would depend on the relevant company's management, operational or organizational structure.

Depreciation and amortization

72. Depreciation and amortization relate to the annual non-cash depreciation and amortization charges on a relevant company's tangible and intangible fixed assets respectively. Variations between the depreciation and amortization charges can arise for a number of reasons, including capital intensity, the age profile of the depreciating

assets, and the individual company's depreciation policy. For the Aggregates Division, we noted that the classification of mineral depletion charges varied between the relevant companies, eg whilst some treated these as a variable cost item, others included these within depreciation and amortization. We did not include annual mineral depletion charges in our definition of depreciation and amortization. Instead, given their direct relationship with changes in aggregates production volumes, mineral depletion charges have been treated as a (non-cash) variable cost item.

73. The relevant companies' depreciation and amortization figures are based on their reported figures and have not been adjusted for any revaluations of their fixed assets on a 'modern equivalent asset' (MEA) basis.¹⁵

Financial data requests

74. Based on the above framework, we requested each relevant company to provide annual (P&L data) for each of their relevant operating entities over the relevant period. We also requested that the Majors provide a further two years of historic financial information.
75. Based on our financial data request, the P&L data:
- (a) contained profit and loss account information at site, divisional and consolidated levels, starting from gross revenues down to operating profit, with non-operating and non-recurring items shown separately;
 - (b) contained (where available) the relevant production and sales volume figures, including the latter's split between external and internal sales;

¹⁵ The MEA-adjusted depreciation and amortization figures will only be used for the purposes of the CC's profitability assessment.

- (c) was prepared on a stand-alone basis for each of the relevant operating entities such that each of their P&L data reflected a total allocation of all relevant revenue and cost items, whether directly or indirectly attributable;
- (d) enabled the consolidation of all site-level P&L data to their respective divisional P&L data, and the consolidation of all divisional P&L data to the consolidated P&L data; and
- (e) was based on our financial data template, which set out our revenue and cost categories outlined above, for which the relevant companies were requested to provide details of their composition. The financial data template ensured that the relevant companies provided sufficient granularity to their financial information, as well as in a consistent format.

76. Based on the P&L data we received from each of the relevant companies, we made a number of reclassifications of their cost items to ensure their consistency with our cost category definitions. References to a relevant company's financial year end (regardless of the month in which the financial year end fell) have been denoted by FY followed by the relevant year, eg the financial years ended 30 September 2011 or 31 December 2011 will both be denoted by FY11.

Calculation methodology

77. In this section, we set out the calculation methodologies first for our assessment of cost structures and then for margins.

Cost structure assessment at divisional and site levels

78. We focused on cost structures at a divisional level, and in certain cases, also at a site level using two methods:

- (a) *Cost per unit sold*, where the unit of measure is a tonne for aggregates and cement, and a cubic metre for RMX. We referred to this cost ratio as a unit cost, eg unit variable cost or unit total cost.
- (b) *Cost as a percentage of total costs*, where, as mentioned above, total costs were defined as the sum of distribution costs, variable costs, fixed costs and depreciation and amortization.

Margin assessment

79. For the purposes of our margin assessment, we considered that there was limited value in considering profit measures that took into account each fixed cost sub-category separately. Instead, we focused on two measures of profit:
- (a) profit after variable costs (variable profit); and
 - (b) earnings before interest, tax, depreciation and amortization (EBITDA), which we calculated by deducting distribution costs, variable costs and fixed costs from gross revenues, but adding back depreciation and amortization. We focused on EBITDA in order to ensure greater comparability between the relevant companies' margins, noting that for the purposes of this assessment, we did not make any MEA adjustments to their depreciation and amortization figures.
80. We calculated margins using two approaches:
- (a) *return on sales*, where we calculated variable profit and EBITDA as a percentage of net revenues. Our reasons for adopting net revenues as the basis for our calculations were set out under the 'Revenue definition' subheading above; and
 - (b) *unit margins*, where we calculated variable profit and EBITDA per unit sold.
81. We calculated divisional and site margins based on both the return on sales and unit margin approaches, and consolidated margins (for the Majors only) based only on

the return on sales approach, given the differences in the units of measurement between aggregates and cement and RMX.

82. In order to assess the underlying trends in margins over the relevant period and between the relevant companies, we:
- (a) excluded non-operating and non-recurring items from our calculation of variable profit and EBITDA. Examples include the costs of any major business reorganizations or any gains or losses from asset disposals; and
 - (b) examined the impact of any difference in external and internal prices on underlying cost structures and margins. We therefore calculated margins separately on external and internal sales.
83. Below, we set out our methodology for calculating separate margins on external and internal sales before setting out how we calculated consolidated margins for the Majors' combined relevant GB operations.

Calculating margins on external and internal sales

84. In order to calculate margins separately on each upstream division's external and internal sales, we relied on the relevant company providing us with a split of its external and internal sales volumes and revenues. For the purposes of our assessment, we assumed that all RMX sales were external sales. Whilst the relevant companies generally maintained a relatively complete record of their external and internal transactions in terms of sales volumes and revenues, none of the relevant companies apportioned costs between its external and internal sales.
85. In order to allocate costs between external and internal sales, we apportioned costs to external and internal sales based on their respective proportions of external and internal sales volumes. However, we noted the limitations of this approach, which

were raised by [REDACTED] and [REDACTED]. [REDACTED] told us that a large proportion of its external sales related to granular fills and sub-bases which required less processing than graded or washed material which were more frequently sold internally to its RMX Division and asphalt operations. [REDACTED] told us that this methodology of cost apportionment between external and internal sales did not take into account the effects of product mix on costs, eg its internal sales of aggregates to its RMX Division were likely to have a higher proportion of sand and gravel than crushed rock, and therefore higher average production costs than on external sales. It added that whilst its internal sales, with the exception of some limited recycled materials, would attract the Aggregates Levy, a significant proportion of its external sales would be exempt from the Aggregates Levy given that these sales were for 'relieved' end-uses, eg chemical processes and agricultural lime customers. We test this in our assessment of cost structures for the Majors' relevant GB operations (see Part II), where we examine cost structures at a site level, eg between a crushed rock quarry and a sand and gravel pit, for each of the Majors' Aggregates Divisions. In relation to its external and internal cement sales, [REDACTED] added that nearly [REDACTED]. We took this into account in our interpretation of the Majors' external and internal margins on its cement sales in our assessment (see Part II).

86. In relation to applying this apportionment methodology (ie based on the proportion of external and internal sales volumes) to fixed costs, it could be argued that the sales and marketing functions of a relevant company only target external sales generation, and therefore such costs should only be allocated to external sales. However, given the limitations in the detail of some of the relevant companies' P&L data, we have not been able to identify the relevant sales and marketing costs for all of the relevant companies. It is worth noting that margins on internal sales would be higher if such adjustments were made than would otherwise be the case.

Calculating consolidated margins

87. The formula we used to calculate consolidated margins for the Majors' combined relevant GB operations was: consolidated profit divided by consolidated revenues. We set out below how we calculated each measure.
88. In order to calculate consolidated profit, we summed the profits (namely, variable profit and EBITDA) generated by each division on its total external and internal sales. We note that in relation to the RMX Division, we assumed that all of its sales were external.
89. We then calculated consolidated revenues by:
- (a) first summing each division's external net revenues; and
 - (b) then adding the internal net revenues for the upstream Aggregates and Cement Divisions that were generated from sales to their own downstream businesses other than the RMX Division, eg asphalt and concrete blocks. We did this on the basis that our definition of consolidated profit included upstream profits on all downstream sales, and therefore the corresponding revenues should also be included within consolidated revenues.
90. Based on the above, our calculation of consolidated revenues only excluded internal net revenues for the Aggregates and Cement Divisions which related to their downstream sales to the RMX Division. The rationale for this was based on our view that internal revenues generated from the sale of aggregates and cement to the RMX Division represented input costs for the RMX Division, which would ultimately be recovered from third-party customers, ie external sales.