12 June 2020

Funeral directors and crematoria services market investigation

Dignity submission on the CMA's quantitative analysis of entry in the crematoria market

1. Introduction

1.1 The CMA assessed the impact of entry by a crematorium on incumbent crematoria. It used a performance-concentration analysis based on a fixed effects econometric model. The results were presented in the '*Crematoria: evidence on competition between crematoria'* working paper and the accompanying Appendix.[1]

1.2 On 28 February 2020, Dignity was given access to some of the CMA's underlying data and quantitative analysis.[2] Dignity sought to replicate the CMA's analysis of the base model specifications and its extensions.

1.3 Dignity agrees with the CMA's findings that entry has a significant negative impact on the volumes at incumbent crematoria. However, Dignity finds that the CMA's analyses underestimate the effect of entry on incumbent volumes. In fact, entry has more significant and sustained effects than reported in the working paper. The competitive discipline posed by entry is, therefore, even stronger than reported in the working paper.

1.4 This is important because, if remedies in the crematoria market were necessary, remedies to facilitate entry should be preferred to those that might frustrate entry.

1.5 In analysing the CMA's modelling, Dignity's concerns include:

(A) 37% of the entries in the CMA's dataset took place in 2017 and 2018 and account for 45% of all entry events tested. All these cases of entry have limited post-entry data (i.e. at most one year in the dataset). It is unsurprising, therefore, that including them in the sample weakens the apparent effects of entry – in essence, there is too little post-entry data to see the full effect of these entries. Given they account for almost half of entries tested by the CMA, they materially soften the 'average' effects shown in the working paper.

(B) The CMA's results typically focus on the effects on the volumes of incumbent crematoria in the calendar year in which the entry took place. But the analysis does not control for the fact that many new entrants in the dataset started operating later in the calendar year of entry (say, in July, meaning that the incumbents already had over 6 months of volumes 'unaffected' by entry). This

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1 Paragraphs 89 – 92 and 99 – 101 of the '*Crematoria: evidence on competition between crematoria'* working paper.

2 The CMA also assessed the extent to which entry affected slot length. Dignity was not provided access to this data or analysis. However, many of the concerns identified about the robustness of the volumes dataset and modelling would apply also to the analysis of impact on slot lengths.

means that the entry effect is only experienced in a few months of the year but is measured against the whole year. This softens the apparent effects of entry.

(C) There are existing concerns with the accuracy and completeness of the Cremation Society's crematoria fee data which means that the pricing findings are not reliable.

1.6 Dignity also examined the CMA's analysis of the longer-term effects of entry on incumbents' volumes. The CMA's finding of the incumbent returning to growth 3 years after entry is fragile; in fact, the CMA's own results suggest this conclusion falls away at year 4 after entry. Further, when measuring the effect of entry against the average incumbent's volumes in the year pre-entry, the stark negative impact of entry is more visible. Even five years after entry the average incumbent has not recovered to its pre-entry volumes (in spite of the overall growth in cremations in the UK).

Structure of paper

1.7 This paper is structured as follows:

(A) Part 2 presents a descriptive analysis of the dataset used by the CMA.

(B) Part 3 shows the effects on the results from improving the sample and methodology.

(C) Part 4 focusses on the longer-term effects of entry on incumbents' volumes.

(D) Annex 4.1 details the timing of each entry together with information on cremation volume during the year of entry and the following year.

2. Descriptive analysis of the CMA's data

2.1 The CMA's performance-concentration analysis uses the performance measures: cremation volumes; published fee; and, slot length.

2.2 The CMA used volume and fee data collected by the Cremation Society for each crematorium operating in the UK from 2007 to 2018. The CMA also used information gathered by the Institute of Cemetery and Crematorium Management (ICCM) on the crematorium's year of entry, operator and postcode.

2.3 Dignity understands that the slot length data was gathered from the Cremation Society's annual surveys but due to the inconsistent way these surveys were collected in the earlier years, data on slot length was available only from 2012 onwards.[3]

Analysis of entry events

2.4 Over the 2008 to 2018 period, there were 46 cases of entry.

2.5 As noted by the CMA, a new entrant may enter multiple incumbents' markets: the entry of 46 crematoria resulted in 664 'entry events' experienced by incumbent crematoria located within a 60-minute drive time from the entrant. On average, an incumbent crematorium experienced 2.8 entry events over the 2008 to 2018 period.

2.6 Dignity analysed the distribution of entry cases and entry events by year and found that 37% of entries took place between 2017 and 2018 and that these accounted for 45% of all entry events in the CMA's sample (see Table 1 below, in particular the rows in orange).

2.7 Dignity considers that the results of the CMA's analyses risk being skewed by these late entries as they have limited post-entry data. Capturing the full effect of the entry on performance requires sufficient post-entry data. For 45% of the CMA's sample there is – at most – one year of data available to observe the effect.

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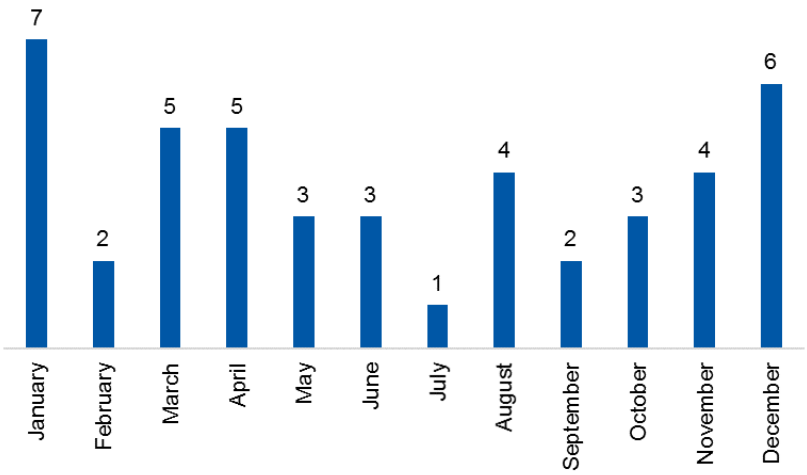
3 Paragraph 25 of *Appendix to Crematoria: evidence on competition between crematoria – Econometric entry analysis*.

Table 1: Number of entries and entry events by year, 2008 – 2018

	Entry		Entry event	
	No. of observations	Proportion	No. of observations	Proportion
2008	0	0%	0	0%
2009	3	7%	38	6%
2010	4	9%	29	4%
2011	5	11%	44	7%
2012	1	2%	28	4%
2013	4	9%	57	9%
2014	3	7%	65	10%
2015	5	11%	58	9%
2016	4	9%	48	7%
2017	10	22%	154	23%
2018	7	15%	143	22%
All years	***46***	***100%***	***664***	***100%***

2.8 Dignity then gathered information on the month of entry of the new entrants.[4] As shown in Figure 1 below, around 50% of entrants (by number) opened in the second half of a given year. Many entrants had only a few months of operation in their first calendar year.

Figure 1: Number of entries by month of entry, 2008 – 2018



Note: The figure is based on 45 crematoria. It excludes Beetham Hall crematorium for which a month of entry was not publicly available.

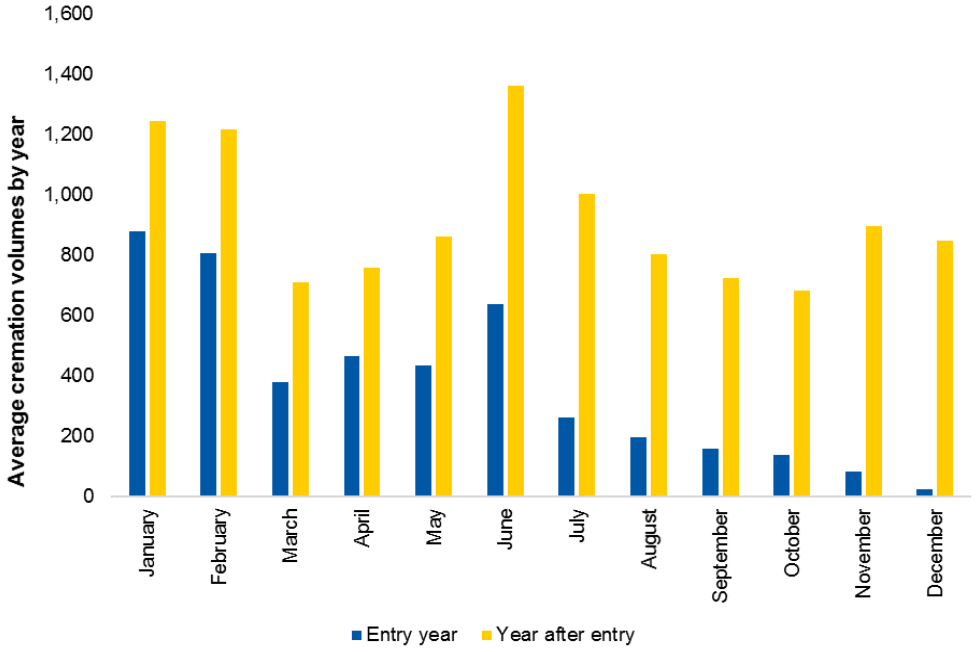
4 **Annex 4.1** contains more detailed information for each entrant on the entry date and cremation volumes in the first two years of operation.

2.9 As expected, when entry occurs late in the year, the entrant has less volumes in that first year. It would also have a more limited impact on the incumbents' volumes in that year of entry as the entrant would have been operating for a few months only. There is, therefore, a substantial risk that measuring an entrant's effect on incumbents 'in the year of entry' will underestimate the true effects.

2.10 Figure 2 shows the average annual volumes that new entrants, by month of entry, delivered in the year of entry and the following year. For example, on average, entrants opening in December delivered just 26 cremations in that year of entry, but almost 850 in the year post-entry. Measuring the impact of these December entrants in its first year of entry substantially underestimates their true effect.

2.11 More generally, new crematoria entering in the first quarter of the year delivered on average 52% more cremations once more established in the second year of entry (700 vs. 1063 cremations). But crematoria entering in the last quarter increased their volumes by 1130% (68 vs. 837 cremations) in the second year. This bias in the data needs to be accounted for in the econometric analysis, for example by measuring the effects on the incumbents in the year after entry when the entrant has a full year of activity.

Figure 2: Average annual cremation volumes of year of entry and year after entry by month of entry



Note: The chart is based on 37 crematoria for which both volumes in the year of entry and volumes in the year after entry are available. The chart excludes 7 crematoria that opened in 2018 (for which volumes of year after entry are not available), Houndwood (for which volumes of year of entry and year after entry are not available) and Beetham Hall crematorium (for which a month of entry was not publicly available). The chart is based on 6 crematoria in 'January', 2 crematoria in 'February', 4 crematoria in 'March', 5 crematoria in 'April', 2 crematoria in 'May', 1 crematorium in 'June', 1 crematorium in 'July', 3 crematoria in 'August', 2 crematoria in 'September', 2 crematoria in 'October', 4 crematoria in 'November' and 5 crematoria in 'December'.

2.12 In Table 2 of Part 3 below Dignity adjusts the modelling to put less weight on the entries in 2017 and 2018 (with limited post-entry data) and to capture the effects in the year after entry (rather than in the year of entry). In almost all cases the size of the estimated coefficients increases, and in several cases the statistical significance improves, suggesting that with these improvements, the measured effect of entry increases.

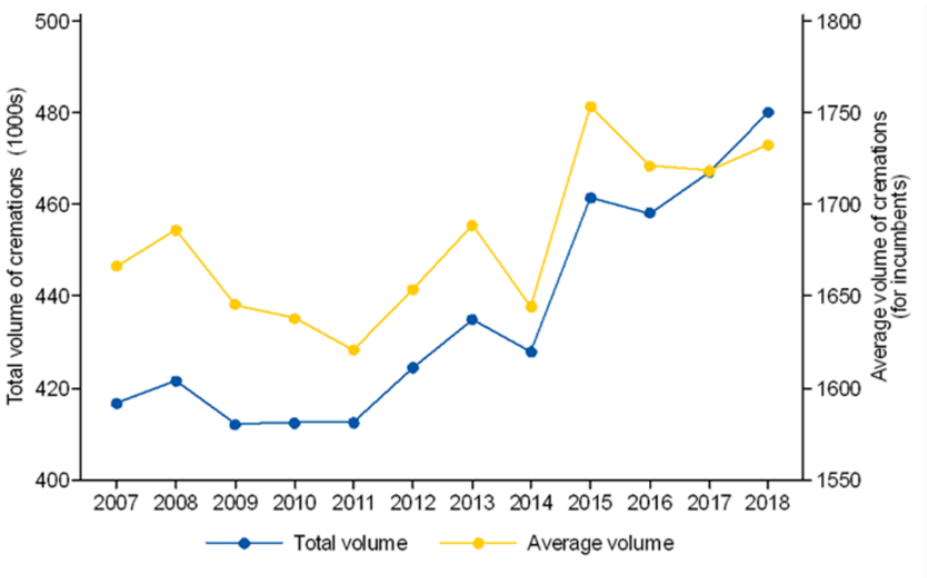
Analysis of volumes trends

2.13 The number of cremations in the UK increased over the period 2008 to 2018 – from c.420,000 a year in 2008 to c.480,000 in 2018.[5] This overall rise softens the apparent effects of entry on the incumbent. An incumbent's volumes may appear to fall less dramatically after entry because of the overall rising tide in volumes across the market.

2.14 The CMA recognises the risk of '**a positive bias**' in its results: "*A positive bias means that negative numbers should be more negative and positive numbers should be smaller (or non-significant) compared with the estimated effect. Therefore, although we can give more weight to statistically significant negative coefficients (ie once the bias is accounted for these coefficients would remain negative), we are more cautious in non-significant results or statistically significant positive results that are close to zero*." [6]

2.15 Figure 3 below shows the volumes of cremations in the UK and the volume of cremations for the incumbents in the CMA's sample. Overall, there is growth in volumes over the period (even for incumbents experiencing entry). There is also the sharp rise in 2015, which magnifies risks of positive bias in entries around this point in time.

Figure 3: Cremation volumes in the UK and in the sample of incumbents



Source: Cremation Society

5 Cremation Society.

6 Paragraph 16, *Appendix to Crematoria: evidence on competition between crematoria – Econometric entry analysis.*

2.16 Given the rising tide across the market, one must keep in mind that a finding of a negative and sustained impact of entry may, in fact, be even stronger.

Fee data

2.17 The CMA's performance-concentration analysis uses the fee data gathered from the Cremation Society.

2.18 As already explained in its response to Question 35 of the RFI dated 30 August 2019 and Annex 1 of Dignity's response to the CMA's working papers on cremation services of 30 January 2020, Dignity is concerned that the fee data gathered by the Cremation Society has inaccuracies. Dignity provided many examples where cremation fees appear to be misreported.[7, 8]

2.19 Dignity submits that if fee data is known to be inaccurate, the CMA should validate this data with each crematorium and re-produce its analyses based on validated data.[9]

2.20 Dignity considers that the mixed picture and lack of statistical significance on the fee analyses could be due to inaccurate price data.

Slot length data

2.21 Dignity was not given access to the performance-concentration analysis of slot length, and so cannot comment on this analysis in detail.

2.22 The CMA says the slot length data is available only from 2012. This shortens the analysis window, particularly when also noting the lack of post-entry data for the entries in 2017 and 2018, which would weaken the results.

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7 Dignity also notes inconsistencies in fees reported for the same crematorium across different annual surveys – i.e. in each of its annual surveys, the Cremation Society reports the annual basic cremation fee for both the current and the previous year. In particular, there are 15 cases where the basic cremation fees reported for the same crematorium and the same year differ between annual surveys. This suggests that the annual surveys contain some fees that have been updated in the subsequent year. For example, the 2014 survey reports a basic cremation fee for the City of London crematorium of £664 as of April 2014 whereas this is reported to be £332 for the same year in the 2015 survey. The CMA used the most recent fee information (i.e. £332 in the above example), but Dignity is concerned that the updated fee data may reflect misreporting issues. In this example, assuming that the most updated cremation fee is correct, the City of London cremation fees would have dropped from £615 in 2013 to £332 in 2014.

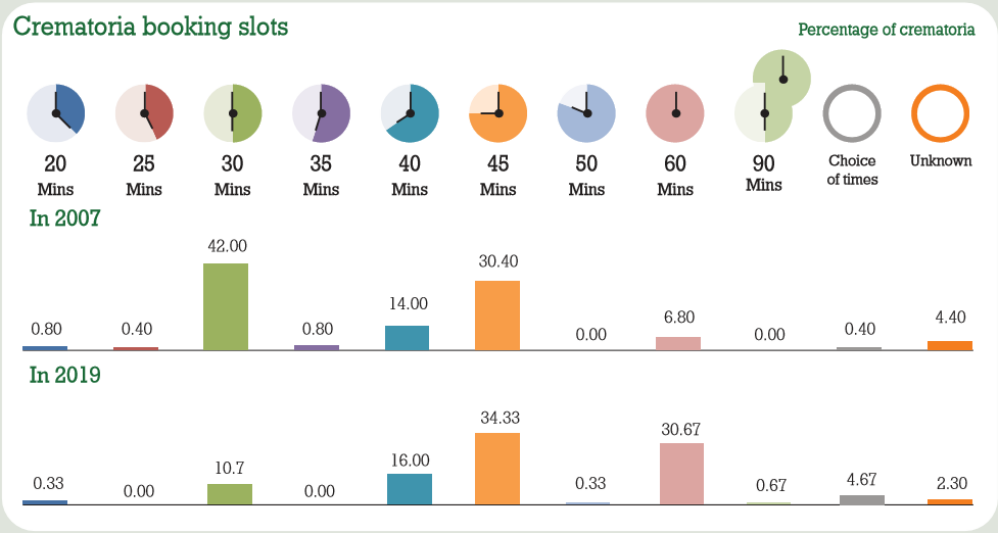
8 Dignity also noticed 25 cases in the Cremation Society survey data where the information on cremation fee is missing while the information on volumes is available.

9 At paragraph 3 of Annex 2 of Dignity's response to the CMA's working papers on cremation services of 30 January 2020, Dignity also noted that the CMA's model using fees as a performance measure will only capture the effect of entry on the standard fees but does not assess the effect on the other fees offered at each crematorium (i.e. reduced fees and direct cremation fees).

2.23 However, Dignity also notes that the model will likely fail to identify statistical significant results because: standard slot lengths do not vary often (variation is needed for econometric models to detect impacts); there may be a disconnect between entry and the slot length changing (there may be a lag or an incumbent may adjust slot length even before the new crematorium opens); and, the standard slot is not the only slot available at most crematoria, so a crematorium may change slot lengths at other points in the day.

2.24 Dignity notes that the UK Crematoria Survey data shows trends on slot length.[10] For instance, when comparing the distribution of crematoria by slot length in 2007 against the same distribution in 2019, a large proportion of crematoria have shifted from 30-minute to 60-minute slots (see Figure 4).[11] By 2019, more than 70% of crematoria offered slots of 45mins or more, up from under 40% in 2007. This is evidence of crematoria operators responding to growing competition, even if this trend is difficult to identify in the econometric model.

Figure 4: Distribution of crematoria by booking slot – 2007 vs. 2019



Source: *Cremation Society Survey of Crematoria in the British Islands 2019*, available at: https://www.cremation.org.uk/content/files/2019%20Survey%20of%20Crematoria%20in%20the%20British%20Islands.pdf.

2.25 Dignity, therefore, notes that slot lengths have increased generally and given the available data (in terms of time period and structure), it is not surprising that the CMA's results have not found statistically significant results. This does not, however, mean that crematoria are not competing on slot lengths, giving customers more choice and value for money.

10 Cremation Society statistics; link: https://www.cremation.org.uk/statistics.

11 For example, the CMA's model does not account for the fact that consumers have the possibility to buy extra time in the chapel, meaning that the headline slot length gathered by the Cremation Society will not reflect the actual slot length available to customers.

3. Comments on the CMA's approach to model the volume effect of entry

3.1 The CMA describes how it conducts the fixed-effects econometric model measuring the effect of the entry on incumbents.

3.2 Dignity agrees with the CMA that there are empirical challenges when carrying out a performance-concentration analysis; two of the more fundamental being:

(A) *Omitted variable bias*: it is possible that local factors that vary over time are correlated with both local competition and performance. Omitting these factors from the model would bias the results.[12] For example, the CMA acknowledges the potential positive bias in the estimated coefficients caused by the rising local demand. This would soften the apparent effect of entry on the incumbent. Entry itself may be strongly correlated with factors increasing volumes locally.

(B) *Low variability in entries*: the identification of the volume effect of entry relies on variation in the number of competing crematoria over time but, as the CMA notes, there may be a limited number of events to estimate the coefficients reliably in some drive time bands.[13]

3.3 Dignity has expanded upon the CMA's analysis, as detailed below.

Treatment of entry events

3.4 The CMA's performance-concentration analysis tests how crematoria volumes respond to entry of another crematorium within their local area.[14] In order to do so, the CMA calculated the number of alternative crematoria for each crematorium and year within four drive time bands – i.e. 0-10 minutes, 10-20 minutes, 20-30 minutes, and 30-60 minutes.[15]

3.5 The CMA measures the entry effect in the first calendar year of entry, but as shown in Part 2 this could underestimate the effect:

(A) Many entries occurred later in the year meaning that the entry effect was only for a few months in that first calendar year. This will soften the estimated effect of entry.

(B) 45% of all entry events in the dataset occurred between 2017 and 2018. Although they better reflect the current state of the market, these entries have limited post-entry data and this affects the reliability of the fixed effects model estimates for these entries. This will soften the estimated effect of entry.

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12 Paragraph 15, *Appendix to Crematoria: evidence on competition between crematoria – Econometric entry analysis.*

13 Paragraph 18, *Appendix to Crematoria: evidence on competition between crematoria – Econometric entry analysis.*

14 Paragraph 1, *Appendix to Crematoria: evidence on competition between crematoria – Econometric entry analysis.*

15 Paragraph 4, *Appendix to Crematoria: evidence on competition between crematoria – Econometric entry analysis.*

3.6 Table 2 below shows what happens to the CMA's results when two changes are made to the analysis. In almost all cases the size of the estimated coefficients improves (as indicated by the green shading), and in several cases the statistical significance also improves:

(A) Column (1) shows that CMA's original result.

(B) Column (2) shows the results when excluding the observations for the years 2017 and 2018. An additional entry now has a statistically significant negative effect on incumbents in all drive bands, including the 30-60 minutes band.

(C) Columns (3) and (4) present the results of the model in Column (1) and Column (2) when the explanatory variables are lagged by one year as set out in the reduced form regression below:

$$\log(volume_{it}) = \sum_d \beta_d N_{d,it-1} + \delta_t + \delta_i + \epsilon_{it}$$

3.7 This extension is a simple way to model the gradual effect of entry on the incumbent's volumes: it estimates how concentration at time $t-1$ affects incumbent volumes at time t. Compared to the corresponding results in Column (1) and Column (2), the estimated volume effects tend to be greater in the lagged specifications.[16]

Table 2: Correcting the entry events sample

	(1) CMA's results Full sample (Year of entry)	(2) Drop 2017-2018	(3) Full sample Year after entry (lag)	(4) Drop 2017-2018 Year after entry (lag)
Drive time band (min)	**Log (volume)**			
0-10	-0.3056***	-0.2992***	-0.3229***	
	(0.0003)	(0.0000)	(0.0000)	
10-20	-0.2031***	-0.2094***	-0.2131***	-0.2216***
	(0.0000)	(0.0000)	(0.0000)	(0.0010)
20-30	-0.0673**	-0.0724**	-0.0975***	-0.0979***
	(0.0351)	(0.0368)	(0.0000)	(0.0001)
30-60	-0.0082	-0.0190**	-0.0034	-0.0093
	(0.2935)	(0.0471)	(0.5886)	(0.1848)
Observations	3,209	2,624	2,914	2,346
R-squared	0.074	0.058	0.193	0.164

Note: All standard errors are clustered at the crematoria level. P-values are reported in parenthesis. Asterisks indicate that the result is significantly different from zero with the following confidence levels: *90% (i.e. p-value < 0.1), **95% (i.e. p-value < 0.05), ***99% (i.e. p-value < 0.01).

16 The coefficient for the 0 – 10 minutes band is missing as there are no entry events to create the lagged drive time band once observations for 2017 and 2018 are dropped.

3.8 Table 2 also reports the R-squared values of the CMA's baseline specification in Column (1) and the alternative specifications.[17] These suggest that the specifications allowing for a lagged effect of entry (i.e. Column (3) and Column (4)) improve the fit of the model.

Existing levels of competition faced by incumbents

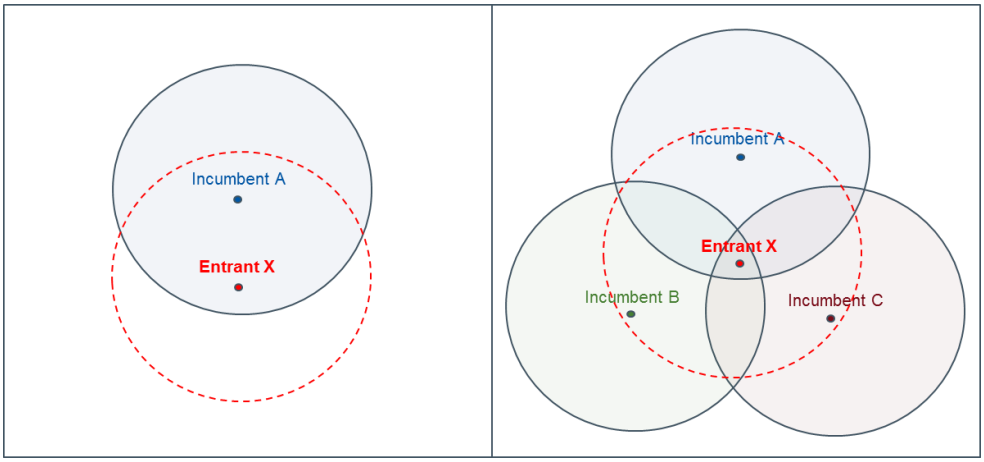
3.9 An entrant can affect many incumbent markets at the same time. Figure 5 illustrates two entry scenarios:

(A) On the left, Entrant X enters Incumbent A's local area (the blue circle) and attracts volumes from Incumbent A.

(B) On the right, Entrant X takes volumes from three incumbents – i.e. Incumbents A, B and C.

3.10 All else equal, one would expect the volume that Entrant X is able to divert away from Incumbent A to be higher under the first scenario than under the second scenario. In the second scenario, Entrant X may divert some volumes from each incumbent (and the total effect may be the same as the left panel), although 'the average' effect of the entry on three incumbents individually may be more muted.

Figure 5: Entry effects under two scenarios



3.11 The CMA's model treats these scenarios as follow:

(A) On the left, Entrant X will enter one incumbent market increasing the number of competitors of the relevant drive time band from 0 to 1 i.e. one entry event.

17 The R-squared is a statistical measure of fit which indicates the percentage of the variation in the dependent variable explained by the independent variable(s). The higher the R-squared, the better the specification explains the variation of the dependent variable around its mean.

(B) On the right, Entrant X will enter 3 incumbent markets increasing the number of competitors from 0 to 1 in each incumbent market i.e. 3 entry events.

3.12 Therefore, the same entry will be treated as either 1 or 3 entry events because of the number of incumbents in the local area. The Entrant X may also have a stronger effect on Incumbent A on the left than on the right. The number of incumbents is, therefore, an important determinant on the measured impact of the entry.

3.13 This has a few impacts on the CMA's measured results.

3.14 First, over time the number of crematoria in the UK has been increasing, meaning that – all else equal – each new entry is more likely to have a diluted effect. Given that the CMA's full sample of entry events is skewed towards the later years,[18] the CMA's model risks underestimating the average effect of entry on incumbent crematoria.

3.15 Second, the CMA's 30-60 minutes band is geographically broad, meaning there are many other incumbents (rivals) already present within this band for incumbents. The median number of crematoria faced by an incumbent in this band is around 12, even before entry. The entry effect risks being diluted in this band.

3.16 To illustrate, Table 3 shows how the estimated results change when adding a control for the number of existing crematoria in the local market.

3.17 Column (1) shows the CMA's original results.

3.18 Columns (2) and (3) add in controls for the number of existing crematoria in the incumbent's band. The median number of rivals in the band was used to inform the levels for most bands.[19] A dummy variable is defined based on the median number of initial competitors faced by the incumbents in the first year of observations. The median number of competitors is 0 for 0-10 minutes, 1 for 10-20 minutes, and 2 for the 20-30 minutes. For the 30-60 minutes band, the median of 12 is already high. Therefore, for this band, the split depends on whether more or fewer than 6 rivals were already present.

3.19 The results are consistent with entry having a greater impact on incumbents where these incumbents faced fewer rivals in the first place. Column (2) shows the effects using the CMA's sample, and Column (3) removes the entries with limited post-entry data and lags the effect of entry (as was done earlier in this paper). Statistically significant negative effects are found in each band.

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18 Almost half of the entry events in the sample took place between 2017 and 2018. On average, each new entrant faced 23% more incumbents within 30-minute drive in 2017 and 2018, compared to entries occurring in 2008-2016. Hence, a crematorium entering in 2017-2018 may appear to have a lower effect on an individual incumbent's volumes than a crematorium entering in earlier years.

19 The decision to use the median number of competitors reflects a trade-off between model complexity, statistical precision and ease of interpretation. By using few categories (i.e., dummy variables), the estimated effects are easier to interpret still ensuring enough variation to estimate the entry effect by initial degree of competition. However, this simple solution will not capture truly heterogenous market entry effects.

3.20 The CMA's conclusions on the 'average' impact of entry are, therefore, likely to be underestimated for those instances where the incumbent faced fewer competitors originally.

Table 3: Extensions of the estimated percentage volume effect on incumbent crematorium from entry

		(1) Full sample	(2) Full sample with control for level of competition on entry	(3) Controlling for level of competition Drop 2017-2018 Year after entry (lag)
Drive time band (min)		**Log (volume)**		
0-10		-0.3056***		
		(0.0003)		
10-20		-0.2031***		
		(0.0000)		
20-30		-0.0673**		
		(0.0351)		
30-60		-0.0082		
		(0.2935)		
0-10	No Rivals		-0.2964***	-
			(0.0023)	
	Rivals > 0		-	-
10-20	Rivals <= 1		-0.2353***	-0.2558***
			(0.0000)	(0.0022)
	Rivals > 1		-0.1095***	-0.1292**
			(0.0078)	(0.0494)
20-30	Rivals < = 2		-0.0871*	-0.1292***
			(0.0557)	(0.0001)
	Rivals > 2		-0.0290	-0.0323*
			(0.2306)	(0.0546)
30-60	Rivals <= 6		-0.0369**	-0.0322*
			(0.0321)	(0.0687)
	Rivals > 6		-0.0061	-0.0044
			(0.4419)	(0.5337)
Observations		3,209	3,209	2,346
R-squared		0.074	0.078	0.178

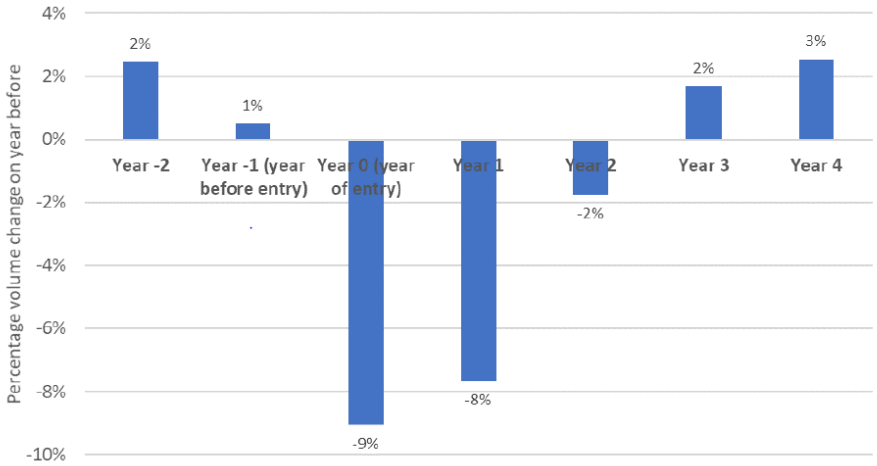
Note: All standard errors are clustered at the crematoria level. P-values are reported in parenthesis. Asterisks indicate that the result is significantly different from zero with the following confidence levels: *90% (i.e. p-value < 0.1), **95% (i.e. p-value < 0.05), ***99% (i.e. p-value <0.01).

4. Analysis of the long-term effects of entry

4.1 Figure 11 of the *Crematoria: evidence on competition between crematoria* working paper presents the results of the CMA's quantitative analysis of the longer-term effect of entry on incumbent volumes (see Figure 6 below).

4.2 The CMA found that, on average, incumbent crematoria lose volumes following entry and, three years after entry, volumes restart growing year-on-year at rates similar to those before entry.[20] The CMA concludes that "*the analysis appears consistent with customers close to new crematoria migrating to the new crematorium due to its proximity […], but limited ongoing competition beyond the point of entry*".[21]

Figure 6: Average changes in volumes on the previous year at incumbent crematoria experiencing entry (in Year 0)



Note: Analysis of incumbent crematoria that experienced entry within a 20-minute normal drive time (33 minutes at cortege speeds) between 2008 and 2018. The figure is based on 27 crematoria in Year -2, 28 crematoria in Year -1, 28 crematoria in Year 0, 24 crematoria in Year 1, 15 crematoria in Year 2, 9 crematoria in Year 3 and 8 crematoria in Year 4.

4.3 It is important to note that Figure 6 compares a year's volume against the volume in the year just before it e.g. 'Year 0' is 9% lower than 'Year -1', 'Year -2' is then a further 8% lower than 'Year -1'.

4.4 Dignity raised in response to *Crematoria: evidence on competition between crematoria* working paper some concerns around the CMA conclusion because:

(A) As the annual average volume changes are calculated on the basis of different sample sizes (27 crematoria in Year -2; 28 crematoria in Year -1; 28 crematoria in year 0; 24 crematoria in Year 1; 15 crematoria in Year 2; 9 crematoria in Year

20 Paragraph 97 of *Crematoria: evidence on competition between crematoria* working paper.

21 Paragraph 98 of *Crematoria: evidence on competition between crematoria* working paper.

3; and 8 crematoria in Year 4), there should be caution in comparing the average changes directly across years.

(B) The analysis does not account for (regional) movements in the death rates, and the overall upward trend in cremations, which could partially explain changes in volumes year-on-year before and after entry.

(C) The volume change at Year 0 might be underestimated by cases of entrants that started operating later through the year.

(D) The CMA's analysis also assumes that entrants within a 20-minute drive time will equally affect incumbents' volumes. However, the incumbent nearest to the new entrant might be more heavily affected by the entry. [22]

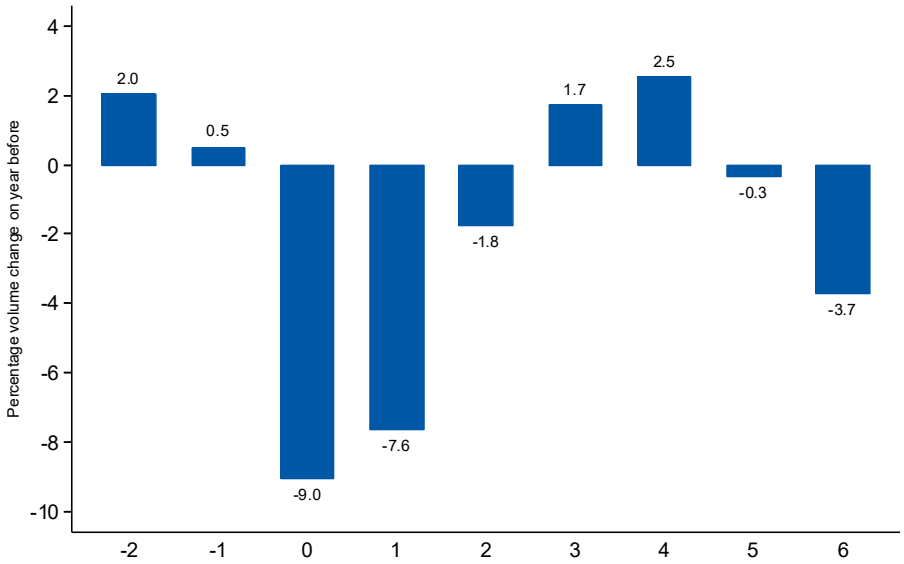
4.5 Dignity used the volume data provided by the CMA to examine the findings.[23]

4.6 First, the CMA's chart stops its analysis at Year 4. As shown in Figure 7 below, however, when one shows Year 5 or Year 6 of the same chart one does not see the CMA's claimed return to growth. Year 5 and Year 6 are both negative. There is greater measurement error risk from the smaller samples in these years; Year 5 = 7 and Year 6 = 5. However, the Year 3 and Year 4 samples are also relatively small (Year 3 = 9 and Year 4 = 8), suggesting the CMA's initial finding is fragile and unreliable.

22 Dignity refers to Annex 3 of Dignity's response to the CMA's working papers on cremation services of 30 January 2020.

23 Dignity obtained the same results for all years except for year "- 2" where the CMA's value for the average change in volumes from the previous year appears to be higher than 2% (according to Figure 5 above) while Dignity's value was 2%.

Figure 7: Average changes in volumes on the previous year at incumbent crematoria experiencing entry (in year 0)



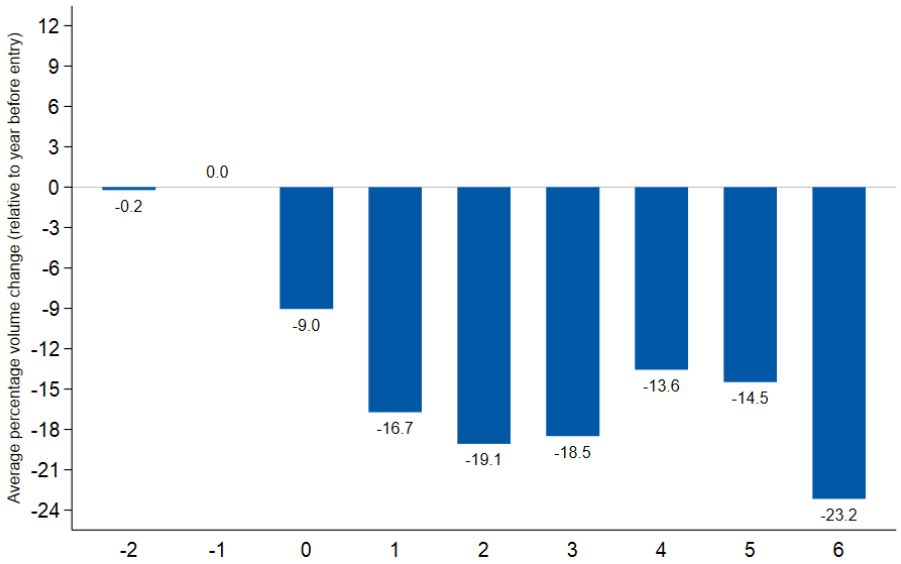
Note: Analysis of incumbent crematoria that experienced entry within a 20-minute normal drive time (33 minutes at cortege speeds) between 2008 and 2018. The figure is based on 27 crematoria in Year -2, 28 crematoria in Year -1, 28 crematoria in Year 0, 24 crematoria in Year 1, 15 crematoria in Year 2, 9 crematoria in Year 3, 8 crematoria in Year 4; 7 crematoria in Year 5 and 5 crematoria in Year 6.

4.7 Second, Dignity examined the CMA's data using a different 'base' year for the average incumbent's volumes.

4.8 Figure 8 shows the volume effect measured relative to the year before entry – i.e. 'Year -1'. For the incumbent, Year -1 is a full year of volumes before any entry.

4.9 Relative to this pre-entry year, the average incumbent has lower volumes in each post-entry year. Volumes do not return to its pre-entry levels, even considering the rising cremation volumes in the UK. This chart shows the sustained negative effects of entry on the incumbent.

Figure 8: Average changes in volumes at incumbent crematoria experiencing entry (relative to the year before entry)



Note: The figure is based on 28 crematoria in Years -2, -1 and 0; 24 crematoria in Year 1; 15 crematoria in Year 2; 9 crematoria in Year 3; 8 crematoria in Year 4; 7 crematoria in Year 5; and, 5 crematoria in Year 6.

Annex 4.1

4.10 Table 4 details the timing of each entry together with information on cremation volume during the year of entry and the following year.

4.11 For example, the Southampton (Wessex Vale) crematorium opened in December 2009 and delivered 19 cremations in that year. In 2010, the same crematorium delivered 1,075 cremations.

Table 4: Summary of crematoria entries during the period 2008-2018

	Crematorium name	Year of entry	Month of entry	Volumes in year of entry	Volumes in year following entry
1	Braintree	2009	April	353	685
2	Wear Valley	2009	April	271	357
3	Southampton (Wessex Vale)	2009	December	19	1075
4	West Lothian	2010	April	394	661
5	March (Fenland)	2010	August	201	616
6	Nacton (Seven Hills)	2010	November	132	1247
7	Camborne	2010	December	47	847
8	Mendip	2011	March	403	658
9	Whimple (East Devon)	2011	April	739	1259
10	Barry (Cardiff & Glamorgan)	2011	October	143	695
11	Melrose (Borders)	2011	December	29	572
12	Stourport (Wyre Forest)	2011	December	5	773
13	Brentwood	2012	August	82	484
14	Lichfield	2013	March	207	372
15	Sedgemoor	2013	October	135	674
16	South Lincolnshire	2013	November	61	657
17	Havant	2013	December	32	974
18	Kirkleatham	2014	January	803	1018
19	Rugby (Rainsbrook)	2014	April	576	828
20	Northwich	2014	July	264	1002
21	Abingdon (South Oxfordshire)	2015	January	801	1423
22	Alfreton (Amber Valley)	2015	January	868	1190
23	Countesthorpe (South Leicester)	2015	February	921	1462
24	Waveney	2015	November	75	772
25	Houndwood	2015	March		
26	Ormskirk	2016	February	695	973
27	Crathes	2016	May	254	548
28	St Asaph	2016	May	619	1178
29	Wellingborough (Nene Valley)	2016	September	181	695
30	Cromer	2017	January	747	859
31	Gedling	2017	January	998	1371
32	Gravesend	2017	January	1054	1615
33	Great Glen	2017	March	506	982
34	Hoddesdon (Woollensbrook)	2017	March	402	833
35	Hitchin	2017	June	637	1363
36	Romsey	2017	August	309	1316
37	Purbeck	2017	September	137	755
38	Newport	2017	November	70	917
39	Beetham Hall	2017		713	1011
40	Saffron Walden (Cam Valley)	2018	January	635	
41	Clyde Coast & Garnock Valley	2018	May	170	
42	Aston-on-Trent (Trent Valley)	2018	June	182	
43	Northop	2018	June	384	
44	Bassetlaw (Babworth)	2018	August	234	
45	Royal Wooton Bassett	2018	October	215	
46	Pershore (The Vale)	2018	December	43	

Note: Month of entry was gathered from the Directory of Crematoria or the crematorium's website.