The Cost of Food Crime Phase 2 - Sensitivity of model estimates

The CoFC model by nature of construction is sensitive to variations in estimated total number of food crimes and the assumed proportion of major cases. This section demonstrates the CoFC model results when alternative assumptions are applied in order to provide a range of results that can be used in the absence of statistical upper and lower bounds. From the application of alternative scenarios, results show that the total annual cost of food crime to the UK is at lowest £33 million and at highest £1.96 billion per year.

4.1 Estimated total number of food crimes

The dataset of 16 food fraud cases for 2021 is used to derive cost estimates with the knowledge that the count of cases understates the number of cases that take place. To estimate the number of cases, this research assumes the 610 food crime intelligence reports processed by the FSA in 2021 as the total number of food crime in the UK each year. However, from the Food Business Organisation Tracking Survey conducted in 2021, it is inferred that five crimes were experienced for every one reported. If this is true, then there could be 3,050 food crime cases per year. Table 12 shows the CoFC model results vary between £33 million and £1.96 billion per year with changes in the estimated total number of food crimes. As such, the headline estimated total cost, based on the 610 suspected food crime incidents, is a conservative estimate.

Table 12 Sensitivity of estimates by varying estimate number of cases

Estimated total food crimes per year	Total annual cost
3,050 (reported x experience ratio)	£1,961,177,398
610 (reported)	£408,965,136
16 (prosecuted)	£32,858,905

Source: Authors' calculations, Cost of Food Crime model 2022

4.2 Major cases

In small datasets, outlying observations can distort analysis based on simplistic representations of a distribution, such as the mean or median values. By constructing a Weibull curve, it is observed that within this food crime dataset, a minority of cases appear far larger in cost values. Such cases have been labelled as major cases and are defined as at least one of the following:

- the value of confiscated fraudulent goods is over £100k in market value
- there was at least one fatality
- prosecution secured collective (of all accused) jail sentences of over 2 years
- prosecution secured a fine paid of over £100k

Across the dataset, 17% of cases are defined as major. The frequency of major cases does not fall evenly each year, there were 13% major cases between 2017 and 2021 and 8% between 2020 and 2021. Adjusting the assumed proportion of major cases projected from multiplying real number of cases provides the range of estimates shown in Table 13. Results vary between £283 million and £514 million in total cost when adjusting the assumed proportion of major cases. As such, the headline estimate takes the assumed proportion as 13% major cases per year, reflecting the activity of food crime cases over the last five years.

Table 13 Sensitivity of estimates by varying expected proportion of major cases

Proportion of major cases	Total annual cost
17% (all data)	£514,279,930
13% (2017-2021)	£408,965,136
8% (2020-2021)	£282,587,383

Source: Authors' calculations, Cost of Food Crime model 2022