Declining survey response rates and changes in UK food purchases and consumption

Stephen Walsh, July 2025

Family Finance Surveys User Conference 2025

Is meat consumption declining in the UK?

"Meat consumption in the UK fell to its lowest level on record last year" (*The Guardian,* 24/10/23)

"In recent years, meat purchases have fallen more steeply, with a 10% fall in overall meat consumption between 2020 and 2022." (The Seventh Carbon Budget, February 2025)

"Significant Decline: Multiple sources indicate a notable drop in per capita meat consumption in the UK. For instance, government figures (DEFRA) showed a 14% decrease between 2012 and 2022, with total meat consumption reaching its lowest level since records began in the 1970s." (Google Gemini answer, June 2025)

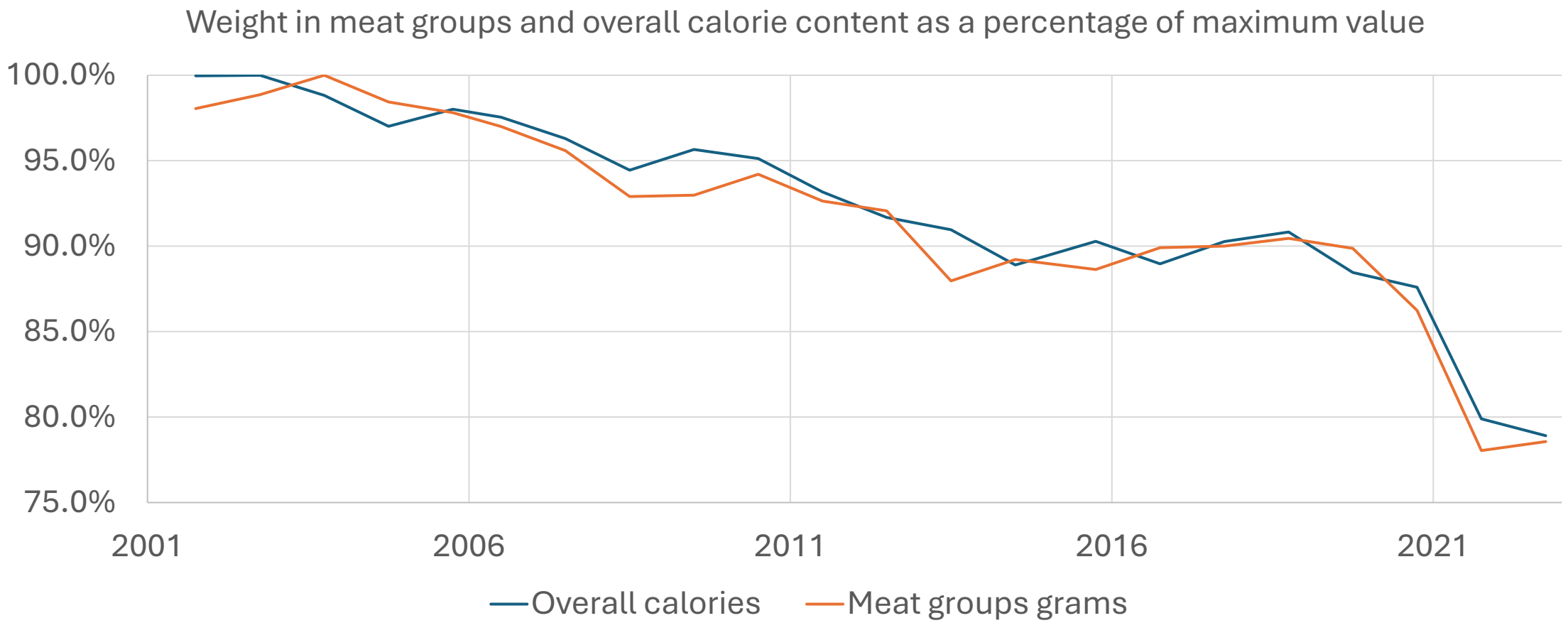
NB All the above comments are based on the Family Food module of the Living Costs and Food Survey – LCFS(FF)

Is calorie consumption declining in the UK?

"… we propose that the apparent fall in consumption can be explained by an increase in underreporting of calorie intake in official statistics. In other words, calorie intake may not actually have declined." (Behavioural Insights Team, 8/8/2016)

"… it is not accurate to state that overall calorie consumption is definitively and consistently decreasing in the UK" (Google Gemini answer, June 2025)

Trends from Family Food module of Living Costs and Food Survey



Overall calorie content of purchases and weight of purchases in the meat groups are very strongly correlated (r=0.98)

Why is the perception of calorie and meat trends so different, when the LCFS(FF) results for each are so similar?

Energy Intake estimates have a very direct cross-check by measuring Energy Expenditure using Doubly Labelled Water (DLW). DLW studies in Europe and North America indicate negligible change in overall energy expenditure, with modest declines *at a given body composition* (about 7% since 1990) offset by increased body weight. The National Diet and Nutrition Survey shows stable total energy expenditure in the UK between 2008 and 2022. Estimated energy intakes in NDNS, are about a third below estimated energy expenditure.

The energy content of purchases in LCFS(FF) has not been reported in the survey's public results since 2018. Calorie content of purchases after 2018 therefore need to be reconstructed from the UK data archive in order to make it apparent that changes in particular groups, such as meat, are closely mirrored in overall calorie content.

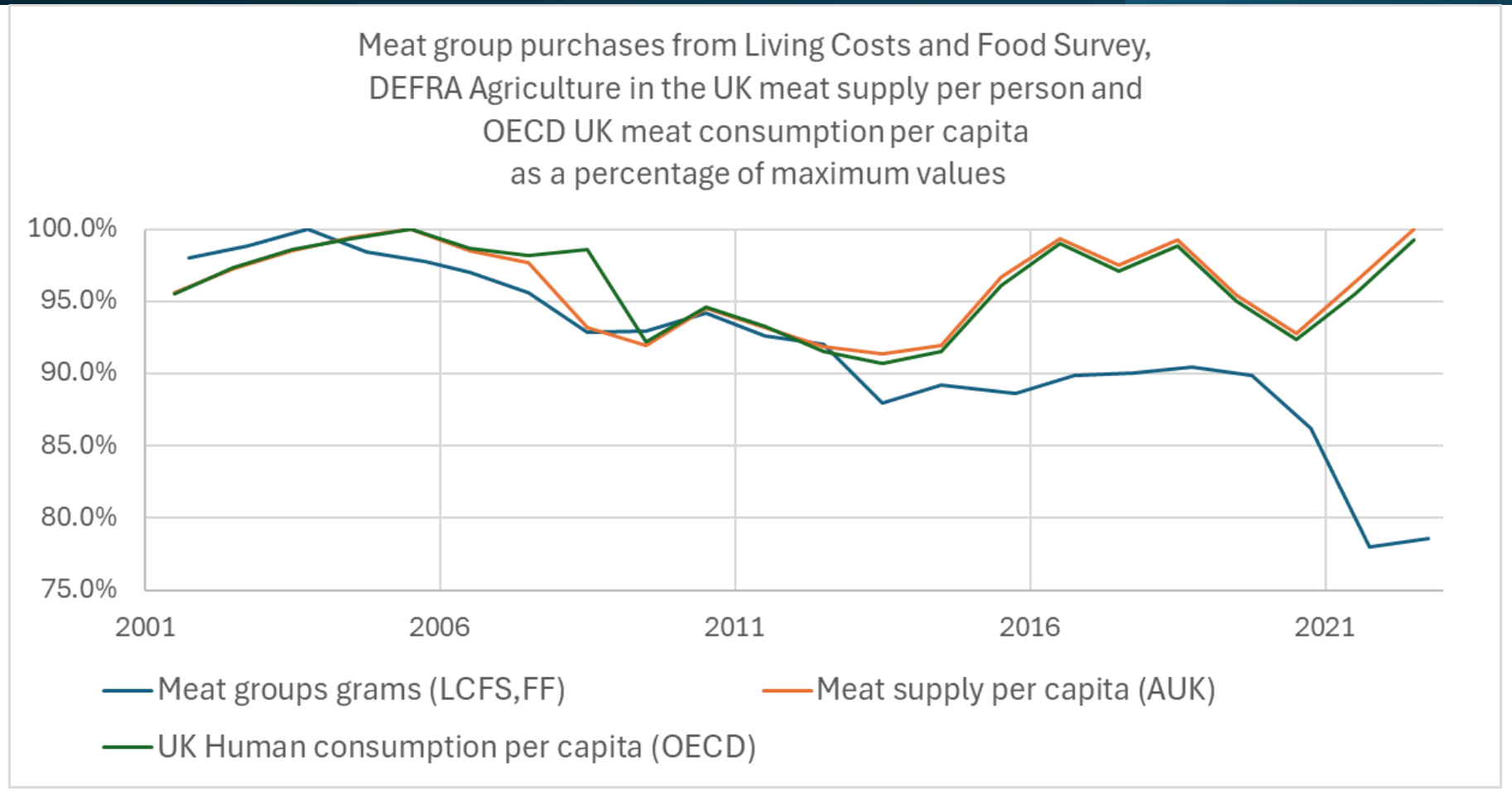
Other evidence on UK meat and calorie consumption since 2001 (especially pre- vs post- pandemic)

Measured BMI in the UK was unchanged between 2019 and 2022, whereas a drop in calorie supply of the magnitude suggested by LCFS(FF) would have resulted in a clear drop.

Institute for Fiscal Studies estimates of calorie content of purchases from January 2019 to April 2022 (using a longitudinal sample from Kantar) show a sharp increase in March 2020 with a second surge in January 2021, with intakes from April 2021 to March 2022 largely back to normal. Any study showing a significant *drop* in calorie content of food intake or purchases across this period is highly suspect.

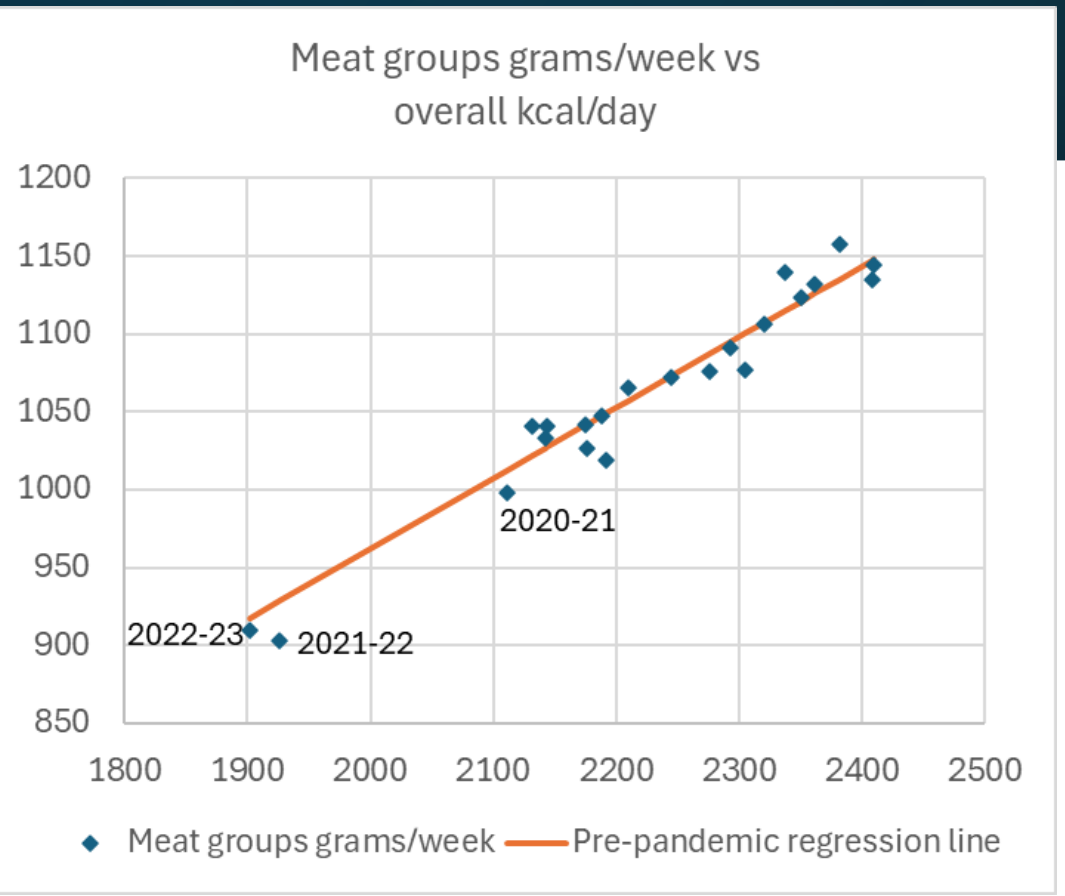
OECD estimates of UK meat consumption and DEFRA estimates of meat supply show a very different pattern of variation over time to the LCFS(FF) results.

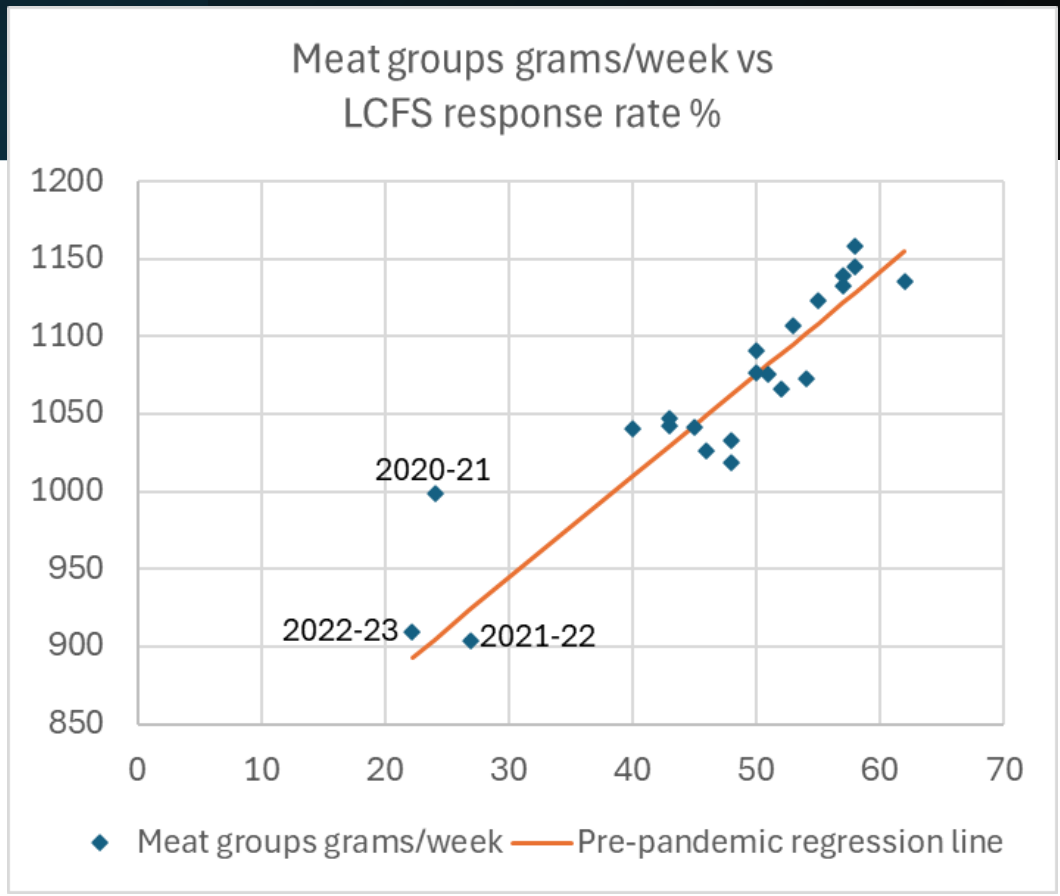
LCFS(FF) vs supply chain data on meat trends over time



Interestingly, the LCFS(FF) and Agriculture in the UK reports are both managed by DEFRA

Smoking guns for the apparent meat reduction over time in LCFS(FF)





Changes in meat group purchases are well predicted either by changes in overall calorie content of purchases (a proxy for changes in under-reporting) or by changes in survey response rate (a plausible driver of changes in under-reporting). In both cases a regression model based on pre-pandemic data provides good predictions post-pandemic. Meat per calorie shows no trend ($P>0.9$).

How do survey response rate and time compare as predictors for meat group consumption in LCFS(FF)?

Up to March 2020, response rate (75% variance explained) and time (83% variance explained) are each very good predictors of meat group consumption, but if both are used as predictors then time dominates and response rate is not significant.

Over the full data set to March 2023, each is statistically significant ($p<0.05$) in a joint model.

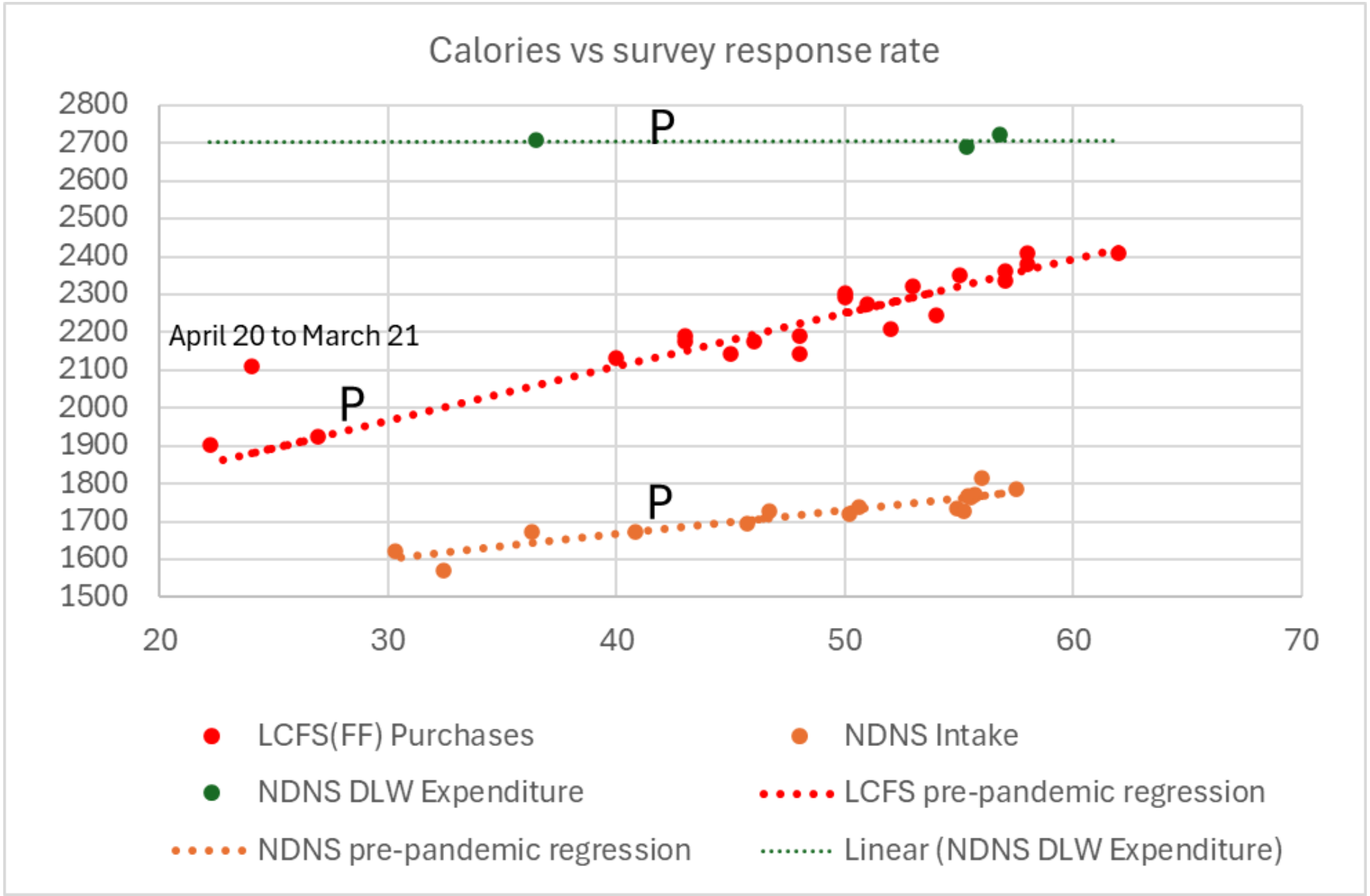
If we exclude the pandemic year (April 2020-March 2021) as an outlier, response rate dominates and time is not statistically significant. The excluded period includes three national lockdowns leading to surges in purchases from supermarkets and similar stores, including for stock-building.

National Diet and Nutrition Survey 2008-23

Other observations on meat consumption come from the National Diet and Nutrition Survey (NDNS). NDNS data from 2008 to 2023 show a 10% drop in calorie consumption and an 18% drop in meat consumption.

Response rate, year, meat intake and calorie intake show mutual correlation coefficients between 0.84 and 0.93. For calorie intake, response rate dominates year of survey as a predictor. For meat intake, year of survey dominates each of response rate and calorie intake, with year just about retaining statistical significance in joint models.

As with LCFS(FF), there is clear evidence of increased calorie underreporting as response rates decline, but unlike LCFS(FF) this does not seem to account entirely for the apparent decline in meat intakes. Meat per calorie declines by about 9% ($p=0.005$).


Calories vs survey response rate
2800
2700
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
1600
1500
20
30
40
50
60
70
April 20 to March 21
P
P
P
LCFS(FF) Purchases
NDNS Intake
NDNS DLW Expenditure
LCFS pre-pandemic regression
NDNS pre-pandemic regression
Linear (NDNS DLW Expenditure)

Conclusions and recommendations

The apparent reduction in calorie and meat content of purchases in the Living Costs and Food Survey (Family Food) results over time is an illusion reflecting increased underreporting, probably as a consequence of declining survey response rate. This survey is therefore unreliable as a measure of trends in expenditure on food.

Calorie content of food intake and purchases should always be reported as an internal quality control measure in surveys seeking to measure overall use of food, as it is a key indicator of underreporting. If calorie content varies substantially, dividing other predicted variables by calories or adding calories as a predictor should be considered.

Surveys of food purchases or consumption should include prominent warnings when there is a high correlation between time and internal measures such as response rate.

References

UK Data archive sources

Office for National Statistics. (2024). Living Costs and Food Survey. [data series]. 4th Release. UK Data Service. SN: 2000028, DOI: http://doi.org/10.5255/UKDA-Series-2000028

University of Cambridge, MRC Epidemiology Unit, NatCen Social Research. (2025). National Diet and Nutrition Survey Years 1-15, 2008-2023. [data collection]. 20th Edition. UK Data Service. SN: 6533, DOI: http://doi.org/10.5255/UKDA-SN-6533-20

Recent public comments on declining meat consumption

https://www.theguardian.com/environment/2023/oct/24/uk-meat-consumption-lowest-level-since-record-began-data-reveal

https://www.theccc.org.uk/wp-content/uploads/2025/02/The-Seventh-Carbon-Budget.pdf

Institute for Fiscal Studies longitudinal study on food purchases from 2019 to 2022

https://ifs.org.uk/sites/default/files/2024-04/OPRU-IFS_Report_final_edited_2.pdf

DLW studies

https://www.cambridge.org/core/journals/proceedings-of-the-nutrition-society/article/secular-trends-in-energy-expenditure-data-from-the-uk-national-diet-and-nutrition-survey-a-public-health-perspective/C198FBFC91503E298C3F0041A6D69804

https://pmc.ncbi.nlm.nih.gov/articles/PMC7394951/

https://app.box.com/s/sr7v9b7ftcsf6b6xiqlz5syz1deby1v0/file/1880797187262

https://pmc.ncbi.nlm.nih.gov/articles/PMC10445668/pdf/nihms-1882322.pdf

https://datasciencecampus.ons.gov.uk/eclipse/

https://www.bi.team/publications/counting-calories-how-under-reporting-can-explain-the-apparent-fall-in-calorie-intake

Discrepancies between expenditure surveys and macroeconomic reporting

https://www.nber.org/system/files/working_papers/w19544/w19544.pdf

https://wellcomeopenresearch.org/articles/6-350

NDNS

https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(21)00228-X/fulltext

https://pmc.ncbi.nlm.nih.gov/articles/PMC9365634/

Supply chain meat supply and consumption data

https://www.gov.uk/government/statistics/agriculture-in-the-united-kingdom-2023

https://data-explorer.oecd.org/vis?tm=meat&pg=0&snb=7&fc=Topic&fs[0]=Topic%2C0%7CAgriculture%20and%20fisheries%23AGR%23&vw=tb&df[ds]=dsDisseminateFinalDMZ&df[id]=DSD_AGR%40DF_OUTLOOK_2024_2033&df[ag]=OECD.TAD.ATM&df[vs]=1.1&hc[Commodity]=&dq=GBR.A.CPC_EX_SH%2BCPC_EX_BV%2BCPC_EX_PK%2BCPC_EX_PT.FO_PC..&pd=2000%2C2033&to[TIME_PERIOD]=false