The problem with taxing meat

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Food Policy on Trial
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Meat Tax Studies

• Wirsenius, Hedenus and Mohlin, 2011: considered only GHG emissions; EU in scope
• Springmann et al, 2017: considered GHG emissions and diet-related disease; global in scope
• Springmann et al, 2018: considered only diet-related disease; global in scope
• None of these studies examined impacts on biodiversity, chemical inputs, soil health or water quality, so we only get a very narrow and incomplete picture of what constitutes healthiness/sustainability
• No consideration of specific issues relating to the UK: e.g. 66% of farmland under grass, mostly for environmental and agronomic reasons; climate and soils in much of the UK unsuitable for crop production; meat and fats from grass-fed animals superior to grain-fed animals
UK Farmland, 2017 (% of total agricultural area)

- Cropland: 54%
- Common rough grazing: 7%
- Temporary grassland: 6%
- Permanent grassland: 6%
- Other: 27%
Study limitations

• The associations between red meat consumption and disease not proven and causal (Springmann et al, 2018 based their assertion on just 4 studies). Evidence on processed meat stronger, but causal factor(s) still unclear.

• Impacts of a meat tax on food substitution were examined in Springmann et al, 2018, but they could not discount the possibility of a shift to more damaging consumption patterns (e.g. more sugar, refined carbohydrates and, one could add, palm oil).

• No consideration was given to the fact that environmental impact and micronutrient quality vary enormously with production system, e.g. extensive grass vs. intensive grain; organic vs. non-organic; species-rich pasture vs ryegrass monoculture.
Red meat and disease – conflicting evidence

• Associations between unprocessed red meat and CHD, stroke, diabetes, colorectal cancer NOT proven or causal; evidence contradictory

• Two research teams\(^1\) have found red meat reduces risk of mortality when part of a balanced diet

• Intensive chicken and fish often put together. Production methods vary

• Theoretical case that high chicken consumption could increase dementia risk. Not yet explored

\(^1\)Lee et al. 2013 and Dehghan et al. 2017
CHD cases per year at the Edinburgh Royal Infirmary

Very limited data on CHD in early 20th century. However, there is data from the Edinburgh Royal Infirmary. Note, no cases of CHD between 1920 and 1925, but annual increase thereafter. Significant that in 1920 almost all dietary fats came from animal sources, high in SFAs. What limited evidence there is suggests that saturated fat consumption did not increase during the 20th century. However, foods containing hydrogenated vegetable oils, mostly soya bean oil, started to be introduced. And therefore, that UK population started to consume unnatural trans fats. In addition, intake of fibre fell from 1890, after steel roller mills allowed an extra 10% of bran to be removed from white flour, then fell further as refined, sugar-rich breakfast cereals were introduced from 1912 in US and slightly later in UK.

Sources: Dr Rae Gilchrist, 1971. ERI, and R. M Marquis, Smith, Kline and French, Cardiovascular Forum (Swann Press 1979), cited by Dr Walter Yellowlees, 1993, A Doctor in the Wilderness
Dramatic rise in sugar consumption during 19th century followed a few decades later by emergence of CHD as a major issue. WHO revised the definition of CHD several times during the early 20th century but substantial rise in heart attacks is still generally accepted. This could not have been caused by SFAs. Free cigarettes to soldiers during WW1 also a key factor.

Source: Diet and Coronary Heart Disease (1974), DHSS
Saturated fat – recent analysis

• “The total body of evidence suggests that attention should be shifted from the harmful effects of dietary SAFA per se, to the prevention of the accumulation of SAFA in body lipids. This shift would emphasise the importance of reducing dietary carbohydrate, especially carbohydrate with a high glycaemic index, rather than reducing dietary SAFA.” Kuipers et al, 2011

• “Current evidence does not clearly support cardiovascular guidelines that encourage high consumption of polyunsaturated fatty acids and low consumption of total saturated fats.” Chowdhury et al, 2014

• “In this cohort, substituting dietary linoleic acid in place of saturated fat increased the rates of death from all causes, coronary heart disease, and cardiovascular disease” Ramsden et al, 2013  Note: published results from the influential Sydney Diet Heart Study 1966-73 and the Minnesota Coronary Experiment 1968-73, both now known to have been incomplete, leading to seriously incorrect conclusions.
Red meat and GHG emissions

• Cattle and sheep numbers in the UK have fallen by more than 25% since the mid-1980s (Zayed, 2016)

• Using more accurate GWP* metric, falling sheep and cattle numbers in UK have actually contributed to a small cooling of temperatures, not a rise as suggested by the c.6% of total UK CO₂-equivalent emissions typically reported.

Sources: Oxford Martin School, 2017, Climate metrics under ambitious mitigation
See also Allen et al, 2018

Note: GWP100 does not fully account for the fact that CO₂ and N₂O persist in the atmosphere whereas methane breaks down to CO₂ + H₂O after a decade.
Red meat and GHG emissions (cont.)

• When evaluating GHG emissions based on nutritional value instead of mass of meat, **grass-fed beef has a similar or better GWP\(^{100}\) compared to poultry and pork, [so GWP* even better].** (MacAuliffe, Takahashi and Lee, 2018).

• If other factors (e.g. welfare, biodiversity, river catchment management, soil erosion and water quality) are taken into account, **grass-fed beef may compare even more favourably.**

Source: MacAuliffe, Takahashi and Lee, 2018,
EAT-Lancet diet – nutritionally deficient

- **Vitamin B12** – RDA is 2.4ug, the EAT diet is slightly deficient in providing 2.27ug.
- **Vitamin A** - The EAT diet provides just 17% of retinol recommended, however it does contain enough carotene – although this is less bioavailable and conversion to retinol is poor.
- **Vitamin D** – the EAT diet provides just 5% of vitamin D recommendation and some of that provided will have come from plants and not be D3, which is the body’s preferred form.
- **Vitamin K** – It does not distinguish between K1 (primarily found in leafy green vegetables) and K2 (primarily found in fermented foods and some foods of animal origin). 72% of the vitamin K in the EAT diet came from the broccoli (K1). As is the case with all nutrients, the animal form (K2) is better absorbed by the body.
- **Sodium** – the EAT diet provides just 22% of the sodium recommendation. Sodium is so often demonised that people forget that it is a vital nutrient.
- **Potassium** – the EAT diet provides just 67% of potassium recommended.
- **Calcium** – more seriously, the EAT diet provides just 55% of calcium recommended.
- **Iron** – the EAT diet provides 88% of iron recommended and most of this is not bioavailable haem Fe.

Source: Professor Michael Lee, Rothamsted Research & Bristol University, Pers. comm.
Shift to intensive poultry production

• Chicken consumption has increased greatly since 1950s, with recommendations for further increases (e.g. Committee on Climate Change, 2018)

• Chicken and pigs fed almost exclusively on grains and soya – production and imports of these would have to increase, with associated environmental issues and concerns around giving human-edible feed to livestock

• Overall, nutritionally inferior to grass-fed red meat (e.g. less B12, Zn and EPA+DHA)

• Welfare and antibiotic use issues

Source: Zayed, 2016
Potential impacts on UK livestock industry

• Traditional family farms would be unable to survive
• Only large-scale, intensive livestock systems would be viable – massive environmental, welfare and social change issues
• Most small abattoirs would close – greater meat miles, poorer welfare, impact on local economies, limited avenues for high quality, locally produced meat
• Large-scale conversion of pasture to deciduous woodland? Bad for grassland biodiversity. Could UK afford to fund loss of income for 300 years? Conifers more viable option, but only remove carbon for 4-5 decades before it is back in the atmosphere. Net benefit doubtful
• Pasture converted to grain production? Not feasible on most UK pastures, also c. 40% carbon loss from converting grassland to arable. Additional environmental issues with intensive cropping: water quality, biodiversity loss etc.
• Increased destruction of rain forest to produce yet more soya and palm oil
Increased crop production

• Intensive crop production = heavy application of fertilisers and pesticides, resulting in soil degradation and biodiversity loss

• LUC to soyabeans production = GHG emissions, biodiversity loss, soil degradation and erosion

• As primary plant source of essential amino acid lysine, soya production would increase if we were to shift to monogastric and plant-based sources of protein (Leinonen et al, 2019)

• Shouldn’t these be taxed too?
Nitrogen taxation – a better solution

• N fertiliser are a major cause of atmospheric and aquatic pollution. The European Nitrogen Assessment (Brink et al, 2011) and subsequent studies (Van Grinsven et al. 2013), estimated an environmental and health cost to the EU of between €35 to €230 billion p.a. in 2011 (= up to €18.4 bn in UK based on it using 8% of EU-28 nitrogen fertiliser)

• 3.5 times more reactive nitrogen in the ecosystem than is sustainable

• Taxing synthetic nitrogen would increase the cost of intensive grain-fed meat, but have only minimal impact on the meat from more extensive grass-based production. Better still would be to tax nitrogen loss using nitrogen budgets because this would be fairer to good farmers and less likely to result in increased imports. Net impact to make grain-fed meat more expensive
References

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