

# *The distributional and nutritional impacts and mitigation potential of emission-based food taxes in the UK*

Article

Supplemental Material

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## References

E Audsley, M Brander, JC Chatterton, D Murphy-Bokern, C Webster, and AG Williams (2010) How low can we go? An assessment of greenhouse gas emissions from the UK food system and the scope reduction by 2050. Report for the WWF and Food Climate Research Network. Technical report, WWF - UK

J Banks, RW Blundell, and A Lewbel (1997) Quadratic Engel curves and consumer demand. *Review of Economics and Statistics*, 79(4):527-539

A Barten (1969) Maximum likelihood estimation of a complete system of demand equations, *European Economic Review*, 1:7-73

M Berners-Lee, D.C. Howard, J. Moss, K. Kaivanto, and W.A. Scott (2011) Greenhouse gas footprinting for small businesses - The use of input-output data. *Science of The Total Environment*, 409(5):883-891

M. Berners-Lee, C Hoolohan, H. Cammack, and C.N. Hewitt (2012) The relative greenhouse gas impacts of realistic dietary choices. *Energy Policy*, 43:184-190

H Billson, JA Pryer, and R Nichols (1999) Variation in fruit and vegetable consumption among adults in Britain: an analysis from the dietary and nutritional survey of British adults. *European Journal of Clinical Nutrition*, 53:946-952

RW Blundell and Costas Meghir (1987) Bivariate alternatives to the Tobit model. *Journal of Econometrics*, 34:179-200

A Briggs, A Kehlbacher, R Tiffin, T Garnett, M Rayner, and P Scarborough (2013) Assessing the impact on chronic disease of incorporating the societal cost of greenhouse gases into the price of food : an econometric and comparative risk assessment modelling study. *BMJ Open* doi:10.1136/bmjopen-2013-003543.

N Darmon and A Drewnowski (2008) Does social class predict diet quality? *American Journal of Clinical Nutrition*, 87:1107–17.

J Cawley and D Frisvold (2015) The incidence of taxes on sugar-sweetened beverages: the case of Berkeley, California. National Bureau of Economic Research, NBER Working Paper Series, Working paper 21465

Committee on Climate Change (2010) Reducing emissions from agriculture and land use, land-use change and forestry. In *The Fourth Carbon Budget - Reducing emissions through the 2020s*, chapter 7, pages 295-329. Committee on Climate Change

- T Cox and M Wohlgenant (1986) Prices and quality effects in cross-sectional demand analysis. *American Journal of Agricultural Economics* 4: 908–919.
- JG Cragg (1971) Some statistical models for limited dependent variables with application to the demand for durable goods. *Econometrica: Journal of the Econometric Society*, 39(5):829-844
- J De Irala-Estevez, M Groth, L Johansson, U Oltersdorf, R Prattala, and MA Martinez- Gonzalez (2000) A systematic review of socio economic differences in food habits in Europe: consumption of fruit and vegetables. *European Journal of Clinical Nutrition*, 54:706-714
- A Deaton (1988) Quality, quantity, and spatial variation of price. *The American Economic Review* 3: 418–430.
- A Deaton and J Muellbauer (1980) An Almost Ideal Demand System. *The American Economic Review*, 70(3):312-326
- W Diewert (1976) Exact and superlative index numbers. *Journal of Econometrics* 4: 115–145
- DL Edgerton (1997) Weak separability and the Estimation of Elasticities in Multistage Demand Systems. *American Journal of Agricultural Economics*, 79:62-79
- L Dyrh Edjabou and S Smed (2013) The effect of using consumption taxes on foods to promote climate friendly diets - The case of Denmark. *Food Policy*, 39: 84-96
- O Elteto and P Koves (1964) On a problem of index number computation relating to international comparison. *Statisztikai Szemle*, 42:507-518
- K Feng, K Hubacek, D Guan, M Contestabile, J Minx, and J Barrett (2010) Distributional effects of climate change taxation: the case of the UK. *Environmental science & technology*, 44(10):3670-3676
- T Garnett (2011) Where are the best opportunities for reducing greenhouse gas emissions in the food system (including the food chain)? *Food Policy*, 36:S23-S32
- A Gelman, JB Carlin, HS Stern, DB Dunson, A Vehtari and DB Rubin (2014) *Bayesian Data Analysis*, Chapman & Hall/CRC Texts in Statistical Science
- J Geweke (1992) Evaluating the Accuracy of Sampling-Based Approaches to Calculating Posterior Moments, in JM Bernardo, JO Berger, AP Dawid, and AFM Smith, eds., *Bayesian Statistics*, volume 4, Oxford, UK: Clarendon Press.
- N Gilbert (2012) One-third of our greenhouse gas emissions come from agriculture. *Nature News*, Oct 31, 2012

K.J. Hammond, D.J. Humphries, D.B. Westbury, A. Thompson, L.A. Crompton, P. Kirton, C. Green, C.K. Reynolds (2014) The inclusion of forage mixtures in the diet of growing dairy heifers: Impacts on digestion, energy utilisation, and methane emissions, *Agriculture, Ecosystems & Environment*, 197:88-95

M Harding and M Lovenheim (2014) The effect of prices on nutrition: comparing the impact of product- and nutrient-specific taxes. National Bureau of Economics Research. Working paper 19781

C Hoolohan and M Berners-Lee (2012) The greenhouse gas footprint of Booths. Technical report, Small World Consulting Ltd.

L Kaplow and S Shavell (2002) On the superiority of corrective taxes to quantity regulation. *American Law and Economics Review*, 4(1):1-17

P Kasteridis, ST Yen and C Fang (2011) Bayesian Estimation of a Censored Linear Almost Ideal Demand System: Food Demand in Pakistan. *American Journal of Agricultural Economics*, 93(5):1374-1390

LCF Living Cost and Food Survey (Expenditure and Food Survey) (2011) UK Office for National Statistics

D Moran, M MacLeod, E Wall, V Eory, A McVittie, A Barnes, B Rees, Pete Smith, and A Moxey (2008) UK Marginal Abatement Cost Curves for the Agriculture and Land Use, Land-Use Change and Forestry Sectors out to 2022, with Qualitative Analysis of Options to 2050. Report to the Committee on Climate Change. London, 2008

P Scarborough, PN Appleby, A Mizdrak, A Briggs, RC Travis, KE Bradbury, and TJ Key (2014) Dietary greenhouse gas emissions of meat-eaters, fish-eaters, vegetarians and vegans in the UK. *Climatic Change*, pages 179-192

A Schmutzler and LH Goulder (1997) The choice between emission taxes and output taxes under imperfect monitoring. *Journal of Environmental Economics and Management*, 32: 51-64

E Stehfest, L Bouwman, DP Vuuren, MGJ. Elzen, B Eickhout, and P Kabat (2009) Climate benefits of changing diet. *Climatic Change*, 95(1-2): 83-102

N Stern (2007) *The Economics of Climate Change - The Stern Review*. Cabinet Office HM Treasury

B Szulc (1964) Indices for multiregional comparisons. *Przeglad Statystyczny*, 3:239-254

MA Tanner and WH Wong (1987) The calculation of posterior distributions by data augmentation. *Journal of the American statistical Association*, 82(398):528-540

R Tiffin and M Arnoult (2010) The demand for a healthy diet: estimating the almost ideal demand system with infrequency of purchase. *European Review of Agricultural Economics*, 37(4):501-521

G Turrell and AM Kavanagh (2006) Socio-economic pathways to diet: modelling the association between socio-economic position and food purchasing behaviour. *Public health nutrition*, 9(3):375-383

N Webb, M Broomfield, P Brown, G Buys, L Cardenas, T Murrells, Y Pang, N Passant, G Thistlethwaite, and J Watterson (2014) UK Greenhouse Gas Inventory, 1990 to 2012 - Annual Report for Submission under the Framework Convention on Climate Change. Department of Energy and Climate Change.

F Vieux, N Darmon, D Touazi, and LG Soler (2012) Greenhouse gas emissions of self-selected individual diets in France: Changing the diet structure or consuming less? *Ecological Economics*, 75:91-101

TJ Wales and AD Woodland (1983). Estimation of consumer demand systems with binding non-negativity constraints. *Journal of Econometrics*, 21: 263–285

CL Weber and HS Matthews (2008) Food-miles and the relative climate impacts of food choices in the United States. *Environmental science & technology*, 42(10):3508-3513

M Wier, K Birr-Pedersen, H Klinge Jacobsen, and J Klok (2005) Are CO2 taxes regressive? Evidence from the Danish experience. *Ecological Economics*, 52 (2):239-251

S Wirsenius, F Hedenus, and K Mohlin (2010) Greenhouse gas taxes on animal food products: rationale, tax scheme and climate mitigation effects. *Climatic Change*, 108(1-2):159–184.

World Business Council for Sustainable Development and World Resource Institute (2004) GHG protocol: a corporate accounting and reporting standard, Washington DC

C Zhen, E Finkelstein, J Nonnemaker, S Karns, and J Todd (2013) Predicting the Effects of Sugar-Sweetened Beverage Taxes on Food and Beverage Demand in a Large Demand System. *American Journal of Agricultural Economics*, 96(1): 1–25.