

Extended Abstract

Please do not add your name or affiliation

Paper/Poster Title	Adapting a partial equilibrium model of UK agriculture to examine the effects of changing diets
---------------------------	--

Abstract prepared for presentation at the 98th Annual Conference of The Agricultural Economics Society will be held at The University of Edinburgh, UK, 18th - 20th March 2024.

Abstract	<i>200 words max</i>
<p>Concerns related to healthy diet, climate change and animal welfare have resulted in changes to UK consumers consumption patterns. For example, data indicates red meat consumption is declining as consumers look for more sustainable plant-based alternatives. In addition, there is interest in potentially using policy to influence consumption patterns in the future. In order to analyse these changes, models that were developed on the basis of historical diets and policy need to be adjusted. This discussion paper seeks to examine how developing an existing partial equilibrium model of UK agriculture can usefully investigate changing consumption patterns to estimate the effect of this on UK agricultural production and trade.</p>	
Keywords	Diet change
JEL Code	C63; Q11; Q17; Q56 see: www.aeaweb.org/jel/guide/jel.php?class=Q)
Introduction	<i>100 – 250 words</i>
<p>This paper aims to test and validate the addition of new commodities to an existing partial equilibrium model of UK agriculture as part of a broader, multi-disciplinary project, focusing on realigning food production and trade for transition to healthy and sustainable diets. The additional commodities modelled will include those that support healthier diets and alternative sources of nutrition. A full market for each of the commodities will be modelled and a medium-term baseline projection will be used as a point of comparison. Two scenarios are designed to test the consequences of changing diets and the impact on the existing commodities in the model. Environmental outputs from the model, including GHG emissions and a nutrient balance are also examined as part of the analysis.</p>	
Methodology	<i>100 – 250 words</i>
<p>The FAPRI-UK model (a collaboration between AFBI and the Food and Agricultural Policy Research Institute) is used for this investigation. This partial equilibrium model provides a projection of price, production, consumption and trade of 12 commodities in UK agriculture from 3 sectors; crops, livestock and dairy. To investigate changing diets in the UK, the model has been developed to include additional commodities which are of significance when investigating nutrition in UK diets. These include sugar, eggs, peas, beans, potatoes and fish. Similar to the existing commodities within the model, both a supply and demand market has been developed for each. Other commodities not produced in the UK, will also be considered with the</p>	

introduction of a partial market via imports. The demand for these commodities will also be examined.

A preliminary baseline is established projecting key sector variables out for 10 years. Two scenarios are performed that look specifically at peas and beans as an alternative source of protein for both human and animal feed. The scenarios are compared with the baseline and the interactions between commodities and trade with external markets is explored.

The FAPRI-UK model also projects nitrous oxide and methane emissions from agricultural activity, as well as calculating a fertiliser nutrient balance for the UK. The impact on the environment of alternative diets will also be assessed.

(Preliminary) Results

100 – 250 words

Production of peas in UK agriculture is currently used for both human consumption and animal feed, whereas bean production is predominantly used in animal feed. In the first scenario, pea domestic consumption in the UK increases each year throughout the projection period. This encourages a shift away from consumption of other commodities. Of particular interest is the impact on meat production and livestock numbers and the environmental response. In the second scenario, bean domestic consumption in the UK increases each year throughout the projection period. This is applied to both human consumption and animal feed use. The impact on existing animal feeds used in the model is examined. The reaction of the existing commodities in the model is observed, in particular crop production, use and trade.

Discussion and Conclusion

100 – 250 words

The further development of the FAPRI-UK model allows for the investigation of changing dietary trends within the UK. Scenario analysis allows identification of the potential changes in the supply chain if on average the UK moves towards healthier diets. It also validates the approach of investigating dietary change. The incorporation of environmental metrics in the model allows for trade-offs to be identified when introducing consumption of additional commodities, such as the impact on GHG emissions and surplus grass and crop nutrients.