

Extended Abstract

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Paper/Poster Title	Discussion Paper – Do flexible biofuel mandates have the ability to mitigate price spikes? Modelling potential biofuel production reductions in the context of the recent invasion of Ukraine.
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Abstract	<i>200 words max</i>
<p>This paper looks at how reducing biofuel production by introducing flexibility to mandates can have a potentially mitigating effect on price spikes. In particular we look at the recent price spike caused by the invasion of Ukraine and the consequent impact on global agricultural impacts. We model scenarios of reduced biofuel use in a global agricultural market model to see the impact on prices of the major cereals and oilseeds. A modest reduction of 10% of the use of cereals in biofuels can have a significant impact on the magnitude of the price spike for cereals and in particular maize. This modelling demonstrates the importance of biofuel mandates in global agricultural markets and consequently their impact on global food security.</p>	
Keywords	Biofuels, Agricultural prices, International markets, Food security
JEL Code	Q110 Agriculture: Aggregate Supply and Demand Analysis; Prices; Q160 Agricultural R&D; Agricultural Technology; Biofuels; Agricultural Extension Services see: www.aeaweb.org/jel/guide/jel.php?class=Q)
Introduction	<i>100 – 250 words</i>
<p>Commodity prices have increased substantially since the beginning of the recovery from Covid and particularly since the invasion of Ukraine by Russia. The increase in prices, alongside other factors such as the shock to incomes from covid, has had a significant impact in increasing food insecurity globally.</p> <p>Demand for basic agricultural commodities in rich countries is very inelastic which causes the quantity adjustment to come from non-food uses and food consumption of the very poorest globally who are budget constrained. Biofuel mandates, by making a significant portion of industrial demand for crops inelastic, play a part in forcing more of the adjustment on to the latter group with very high global welfare costs.</p> <p>Modelling the impact that a reduction in biofuel production enables us to explore the importance of biofuel mandates in exacerbating the current price spike and the potential that greater flexibility in mandates might have in limiting the frequency and magnitude of price spikes in future.</p>	

Methodology	100 – 250 words
<p>We use the OECD-FAO Aglink-Cosmo model, a global model of the agriculture market with a biofuel component. First, we perform a shock to create a baseline that includes the impacts of the invasion of Ukraine by reducing exports of wheat and maize from Russia and Ukraine as well as increasing the price of fertilisers and oil. This creates a baseline with significant price rises for these commodities in line with the price rises actually experienced in the Spring of 2022.</p> <p>On top of this new baseline we have implemented a set of scenarios reducing the amount of different agricultural feedstocks going in to biofuels. Due to the variation in mandate designs across countries and the fact that the biofuel market has not been observed without these mandates in place it is difficult to know how much loosening mandates will translate into less biofuel production. We therefore have taken to decision to model a range of fixed percentage reductions of biofuel production in major producing countries.</p>	
Results	100 – 250 words
<p>A modest reduction in biofuel production of 10% in the major producers can have significant impacts on the price of grains. The largest impact is in maize where 37% of the price spike that we have simulated is mitigated by reducing biofuel production by 10% in the G7 countries.</p> <p>The impact on wheat is smaller with only 11% of the price spike being mitigated and much of this effect coming from the cross price elasticity with maize. This is due to the fact that wheats use as a biofuel feedstock is much lower than maize.</p> <p>For vegetable oils the mitigation effect of reducing biofuel use by 10% is around 27% of the price impact of the Russian invasion, with the impact on the price of each individual oilseed being similar at 25-29%.</p> <p>We look at further scenarios where biofuel use is reduced by 20% and 30% and find that there continues to be a reduction in the price of agricultural commodities though there are slightly diminishing marginal returns.</p>	
Discussion and Conclusion	100 – 250 words
<p>This modelling exercise shows that the costs of biofuel mandates are very significant globally and this is particularly true when prices are spiking. Biofuels are one of the few areas of demand which governments have the ability to control without significant interference in disrupting the agricultural market and therefore risking exacerbating food security concerns. Building flexibility into biofuels mandates can be thought of as effectively increasing the amount of stocks if crops are allowed to flow back into the food and feed market when prices are high. However, without this flexibility mandates</p>	



increase the price of grains and can also exacerbate spikes by increasing the amount of inelastic demand.

We consider potential limitations of the modelling including the substitutability between different qualities of grain and secondary impacts on the oil market and do not believe they significantly undermine these conclusions.