

## Extended Abstract

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<b>Paper Title</b>	<b>Oil and agricultural commodities nexus: the role of European emission trading</b>
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<b>Abstract</b>	<i>200 words max</i>
<p>The relationship between agricultural commodities and oil prices has a long-established association. However, the dynamics of the integration between the agricultural and energy markets is not constant due to policy interventions, economic growth, crisis and shocks. This research seeks to establish novel integration paths (relationship) between the two commodity markets (agriculture and energy). For this aim, we use correlation and cointegration models to build pass-through channels of price between oil to agricultural commodities, on the European context, which has the longest and most well-established carbon trading schemes (EU-ETS). Oil prices are taken as the average import price in the European region, for the period 2000-2020. European Emission Allowance's prices represent the futures prices since the introduction of the carbon trading in Europe in 2005. The prices concerning agricultural commodities are taken as the producers' price of beef, dairy, and sugar. The results show a positive relationship between oil and agricultural commodities since oil is considered an input for agricultural production. However, the relationship gets weaker as we move forward into more stringent European carbon trading phases. This shows that the European agricultural sector is adapting to environmental standards to limit the Green House Gas (GHG) emissions as set by the European Standards.</p>	
<b>Keywords</b>	Agricultural commodities, agricultural markets, energy markets, oil prices, carbon price, renewables, EU-ETS
<b>JEL Code</b>	Q13, Q020, Q40, Q580 see: <a href="http://www.aeaweb.org/jel/guide/jel.php?class=Q">www.aeaweb.org/jel/guide/jel.php?class=Q</a> )
<b>Introduction</b>	<i>100 – 250 words</i>
<p>For decades, conventional energy sources, such as petroleum products, have been used as inputs in the agricultural sector greatly affecting production and final costs, while generating environmental externalities, such as GHG emissions. This well establish and historically strong relationship between agricultural and energy markets varies according to time and other endogenous and exogenous factors. However, this relationship has been impacted by the demand side (active consumers and investors) and the most recent environmental policies that aim at de-coupling the two commodity markets and decarbonising the agricultural sector. If such policies have achieved their goal, we would expect a weaker relationship between both markets. In this research, we assume that the level of integration between the agricultural and energy markets is weaker after the introduction of the European Emission Trading Scheme (EU-ETS) and the European policy for renewable energy. The objectives of</p>	

this research are to first, analyse the dynamics of the oil-agricultural relationship with reference to emission allowance and renewable energy policies, and second, to provide an economic evaluation of both policies. We contribute to the literature by introducing the environmental policies dimension to the analysis of the oil-agriculture commodities relationship.

<b>Methodology</b>	<i>100 – 250 words</i>
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Previous literature has provided several models and methodologies to test the level of correlation between the two commodity markets. In particular, models vary from OLS time regressions to more sophisticated models. To achieve our objective, we verify the level of variance cointegration between the agricultural and the energy markets by using the GARCH models. To incorporate the observable indicators (or transition variables) use the Smooth Transition Conditional Correlation (STCC) GARCH modelling framework, as set out in Silvennoinen and Terasvirta (2009, 2015). Finally, we use the Structural Equation Modelling (SEM) to establish the path through which oil's price passes to the agricultural commodities' price. For this study, we use data of three main liquid agricultural producers' prices (beef, dairy, and sugar) in Europe, monthly data of EU average import oil price, and the futures prices of the emission allowance. For the purpose of this research and to capture the time dynamics, we split the total period from 2000 to 2020 according to the three trading phases of the EU-ETS since each subsequent phase is more stringent in terms of sectors covered, gases, and geographical coverage.

<b>Results</b>	<i>100 – 250 words</i>
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In general, we find a positive relationship between oil prices and agricultural commodities prices for the period of the study, which supports the literature findings. However, when we introduce the dummies for trading phases, and after splitting the sample into subsamples (that correspond to the carbon trading phases), we find a weaker relationship as we move to more stringent carbon trading phases. From 2000 to 2005 (before the introduction of the EU carbon trading), the relationship is found strong and positive, indicating that oil and its derivative products are strongly linked to the agricultural production. However, the introduction of the EU carbon trading phases, have brought weaker association between oil and agricultural commodities, especially, in the advance phases where the emission regulations are more stringent and binding.

<b>Discussion and Conclusion</b>	<i>100 – 250 words</i>
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The findings of this study have direct implications to the environmental practices, the dependence of agricultural activities on oil, and the decarbonisation of the agricultural sector. The persistent positive relationship between oil prices and agricultural commodities prices suggests that agricultural activity is still heavily dependent on conventional energies, and the decoupling between agriculture and the carbon has not yet been reached, and commodity produces are able to pass through carbon price into commodity price. However, we provide opposite conclusions suggesting that the relationship is getting weaker since the introduction of the European Carbon Trading Scheme. We conclude that a certain level of decarbonisation has been reached and the carbon market is efficient in internalising the environmental hazard from agricultural commodity sectors.