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Disentangling the Links between Energy and Agricultural Markets: The Shale Gas Phenomenon

Ignacio Pérez-Domínguez,
IPTS, European Commission, Ignacio.perez@ec.europa.eu

Sergio-René Araujo-Enciso,
IPTS, European Commission, sergio-rene.araujo-enciso@ec.europa.eu

Fabien Santini,
IPTS, European Commission, Fabien.santini@ec.europa.eu

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Abstract

Technological developments in recent years, especially the 'fracking' technique, have allowed for a economically profitable extraction of shale gas, evolving into an increasingly important source of energy in the United States. Agriculture is increasingly more linked energy markets, traditionally through the input side (i.e. energy and fertilizer costs), but since the 2000s also through the production of biofuels. To analyse the potential effects on agricultural markets of the 'shale gas boom', a scenario analysis is carried out with the Aglink-Cosimo model. This scenario depicts a situation where the North America (US and Canada) benefits from certain energy price advantage versus the rest of the world. Our analysis shows a sizeable gain in competitiveness for US crop producers, with average production costs in the US decreasing considerably over the baseline period. These lower costs of production are expected to trigger lower producer prices and higher production, especially for energy intensive crops such as maize, sorghum and sugar beet. However, the presence of uncertainty regarding the future development of crude oil prices can considerably affect these margins.

Key words: shale gas, agriculture, fertilizer markets, energy, modelling

Conclusions

The price linkages between the energy and agricultural markets, i.e. traditionally through the energy costs of production, were reinforced when the production of biofuels picked up in the 2000s. Now, with the shale gas boom in the US, we observe an additional potential link through the lower costs of fertilizer production.

This paper contributes to the literature on energy input costs in agriculture and presents an innovative analysis about how a new market phaenomenon like the shale gas boom can affect the competitiveness of farmers and, consequently, have an impact on agricultural prices. More specifically, the price transmission from the energy to the agricultural sector is analysed within an uncertainty framework.

The results presented show that price levels certainly matter. The medium-term baseline underlying our analysis assumes a moderate development of crude oil prices, with a Brent price in 2024 slightly above 80 USD/barrel. Trying to depict the uncertainty underlying this estimate, our analysis is expanded into a larger range of possibilities for the development of energy prices based on past

observations within a consistent stochastic framework. Results show large differences in results when focusing on two subsets of crude oil price developments (i.e. high and low). For instance, trade of coarse grains and oilseeds between the US and the rest of the world can significantly be affected.

Some limitations to our approach need to be highlighted, as for example the lack of a consistent set of macroeconomic assumptions for the different crude oil price assumptions or the lack of a more elaborated representation of fertilizer markets, differentiating between nitrogen, phosphorus and potassium.

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