"Analysis of Future Agricultural Policies: What Impact has the Parametrization of Agricultural Support?"

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Abstract

Decoupled payments such as the basic payment scheme in the EU still accounts for an important share of the EU budget spent for the Common Agricultural Policy. Since the impact of decoupled payments on farm level output decisions via other coupling channels such as capitalization in land value, farmers' risk behavior, credit accessibility, uncertainty about future policies and labor allocation is controversially discussed, the objective of this article is to provide a thorough review of the relevant literature to compile the best available estimated parameters, incorporate them in a CGE modelling framework and simulate different scenarios to quantify the impact about different assumptions on models' results.

Keywords

Computable General Equilibrium Modeling, EU Agricultural Policy, Decoupling, Sustainability

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Introduction

In recent years there is increasing awareness of the growing contribution of the agricultural sector to climate change and environmental pollution, and of the necessary increase in agricultural production to increase food and nutrition security. Therefore, a sustainable intensification of the agricultural sector is needed. Due to the problems arising from e.g., climate change, environmental pollution, increase in agricultural production, growing population, non-food use of agricultural products the United Nations agreed on country-specific targets to be met by the year 2030 (Sustainable Development Goals). These targets require also changes in agricultural, food, environment and rural development policies to support pathways to meet these targets.

Taking the Common Agricultural Policy (CAP) of the EU as an example, several reforms have been made in the last decades to move from a purely output and thus self-sufficiency oriented policy towards a policy that tackles income support to farmers and the reduction of environmental pollution at the same time by complying with WTO rules.

Currently, the CAP mainly uses policies that are decoupled from production (i.e., the basic payment scheme). The receipt of CAP payments is tied to fulfilment of specific basic rules related to protection of the environment, animal welfare, public and animal health - the so called cross-compliance - and the adoption of farming practices that help meet environment and climate objectives – the so called greening. The basic payment scheme is distributed to farmers based on entitlements and eligible land and should not create production incentives. However, the literature states production effects due to other coupling channels such as their influence on labor decisions, farmers expectations about future payments, risk awareness, and access to credits and also the capitalization of these payments into the value of land, leading to an increase in land rents and land prices and therefore gains passed on to land owners. As of yet, there is no consensus in the literature about how decoupled these payments really are.

Tools often used to analyze and evaluate different policies are Computable General Equilibrium (CGE) models. These models are extended to depict detailed agricultural policy instruments and capture e.g., climate and environmental effects, consider bio-based products, and impacts on food security and nutrition. However, the outcome of these models is sensitive to the parameters used. Accordingly, the following question arises: How can we model/incorporate decoupled payments in CGE modelling frameworks/ simulations of future pathways?

There are already a few attempts to assess the impact on output and international trade. But to the best of our knowledge there is no study available that analyses the impact of the underlying parametrization of the degree of decoupling on sustainability, namely impacts on the environment such as greenhouse gas (GHG) emissions, non-food use of agricultural commodities and food security.

Therefore, this study aims to contribute to filling this gap by extensively reviewing the relevant literature to compile the best available estimated parameters and incorporate them in a CGE modelling framework. Particularly, we aim to address the following research questions:

- How much does the chosen parametrization affect models' results and therefore creates a bias in the ex-ante policy evaluation?
- How much do baselines differ depending on the selected parameters with regard to production output, but also the impact of agricultural production on GHG emissions and the contribution to food security?

The remainder of this article as organized as follows. Section 2 reviews the recent literature analyzing the impact of decoupled payments on farm level output decisions in the EU, followed by the introduction of the modeling framework and scenario design in section 3. Section 4 presents the results and the final section the concluding remarks.

Methodology

This study applies the Modular Applied GeNeral-Equilibrium Tool (MAGNET) and the underlying Version 9.2 GTAP database, a global CGE modeling framework that is expanded to represent a detailed depiction of the EU CAP and specificities of the agricultural factor and input markets, the biomass usage in energy and feed, and greenhouse gas emissions. Therefore, it is well suited to investigate the costs and benefits of policy scenarios via changes in input and output prices and the allocation of primary factors of production (i.e., land, labor and capital), and intermediate inputs use across primary agricultural, processed food and non-agricultural sectors by also providing information on environmental impacts.

The implementation of a business as usual baseline that considers macroeconomic, technological and biophysical development using estimations of real GDP growths, population growth, development of labor and capital endowment, productivity and world energy price shocks, and changes in the EU CAP, enables the analysis of the effect of different coupling options over a medium term time horizon:

In the baseline decoupled payments are allocated at a homogenous rate across all primary agricultural sectors exclusively to the factor land. The payments fully capitalize into the land price which reflects payments that are fully decoupled from farm level output decisions.

To deviate from the assumption of fully decoupled payments in the baseline, we take estimates on the share of decoupled payments that capitalize into the value of land from the recent literature. The capitalization rate varies on average between 0 % and 85 % between EU member states (Scenario: MEDIUM). The remaining share of the payments is distributed at a uniform subsidy rate across all primary factors of production (land, skilled and unskilled labor, and capital) in all primary agricultural sectors. In addition, we use lower (Scenario:

LOW) and upper (Scenario: HIGH) bounds of the average estimates to simulate the impact of differing degrees of coupling with the lowest degree in the baseline, followed by scenario HIGH and MEDIUM to the highest degree in scenario LOW.

Results and Conclusion

Taking GHG emissions as an example, first results indicate a relative fall of agricultural production and in tandem with this a decrease of the impact of the agricultural sector on GHG emissions from increased coupling compared to the baseline. Depending on the selected capitalization rate the decrease of GHG emissions measured in million tons of CO_2 equivalents varies between -3.6 million tons (HIGH) and -9.2 million tons (LOW) for total agricultural production of which livestock accounts for -2.2 million tons (LOW) and -6.3 million tons (HIGH).

These results reveal the necessity of carefully analyzing the impact of the underlying assumptions with regard to the parametrization of decoupled payments on models' results. The outcome of this study is a comprehensive baseline that depicts a well-researched representation of the EU CAP and therefore forms a reliable basis for future ex-ante policy analysis. In addition, sensitivity analyses deliver further insights about the influence of the chosen parameters.