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EU biofuel policies: income effects and lobbying decisions in the German agricultural sector

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Abstract

European Union (EU) policymakers have persistently supported first-generation biofuels despite the clearly emerging picture of small or even negative ecological benefits. This leads to the conclusion that support is driven by other objectives, for example income effects. Against this background, the main objective of this article is to analyse the income effects of abolishing biofuel policies, as well as to explore the link between these effects and lobbying decisions taken by farmers' associations representing different groups of German farmers. Income effects are estimated for different farm types and regions, and differences between farm net value added and family farm income are analysed. To understand the link between income effects and lobbying decisions, our quantitative results are compared with the biofuel policy positions of different farmers' associations. Our results suggest that, in the long run, average income effects are small, especially if the ownership of production factors is accounted for in the income calculation. Many farms show losses, but others even benefit from lower rental costs and experience positive income effects. Farmers' associations seem to be able to well assess the income effects of EU biofuel policy for different types of farms.

Keywords: biofuel policy, income effects, equilibrium model, farm group model, political economics

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1. Introduction

In recent years, energy from biomass has been increasingly promoted as an alternative to fossil energy sources. In the European Union (EU), policymakers have fostered an increase in the share of liquid biofuels in the transportation sector. According to the EU 'Renewable Energy Directive' (EC, 2009) each member state is required to ensure that 10% of total transport energy comes from renewable sources by 2020. The practical implementation of the 10% target is left to the EU member states. In Germany, the main instrument is an obligatory blending quota for biofuels with fossil fuels (Rauch and Thöne, 2012). As a result of these policies, the share of biofuels in total EU transportation energy evolved steadily and reached 4.27% in 2010. In combination with the use of renewable electricity (0.43%), this has resulted in a 4.7% total share of renewables in transportation. Up to date, biofuels are mainly made from crops – so called first-generation biofuels (ECOFYS, 2012).

EU policymakers claim to pursue several objectives with this policy: positive contributions to energy security, greenhouse gas (GHG) emission reduction and income generation in rural areas (Fonseca et al., 2010). However, while legislators in the EU focus on increasing the use and production of biofuels, the economic and societal environment has fundamentally changed: due to a combination of agricultural policy reform and rising global agricultural prices, biomass has become scarce on EU markets. In addition, the true capacity of biofuels to be sustainable and climate- and people-friendly is increasingly questioned, as increasing biofuel demand leads to rising agricultural prices and results in indirect land use change and intensification effects on a global scale. High emission reduction costs were reported (Doornbosch and Steenblik, 2007) and shortly thereafter it was questioned whether biofuels even contribute to GHG emission reductions at all (e.g., Searchinger et al. 2008).

Despite increasing concern regarding support for first-generation biofuels put forward by a broad coalition of development and environmental NGOs, international organizations, and academic institutions, the direction followed by the EU biofuel policy seemed unaffected until recently (Grethe et al., 2013). In October 2012, the European Commission published a first proposal to amend the Renewable Energy Directive and the Fuel Quality Directive (European Commission 2012) with a directive limiting biofuels from food crops to 5% of total transport fuels. The agricultural lobby and the biofuel industry powerfully contested this amendment, and it was eventually adopted by the parliament with a number of revisions. After years of negotiations, first-generation biofuels have been curtailed to 7% of total transport fuels (Agrarzeitung, April 17, 2015), a substantial setback compared to the original proposal.

The persistent support of first-generation biofuels by EU policymakers despite the clearly emerging picture of small or even negative ecological benefits from the policy leads to the conclusion that this policy is driven by other objectives. Keeney (2009) analysed the distributional effects of US biofuel policies and concluded that this type of analysis "fills an important gap that improves our understanding of how biofuel policy impacts rural welfare and by extension provides insight into the political economic impacts of potential alternatives to status quo […] policies."

Many studies quantify the impacts of biofuel policies on agricultural commodity prices, but without explicitly quantifying income effects. In general, it is concluded that a higher demand for biofuel feedstock will boost prices of agricultural commodities and will thereby increase income in the agricultural sector. Accordingly, an abolishment of biofuel policies is assumed to result in negative income effects.

Furthermore, only a few studies report income effects at a disaggregate level (e.g., Louhichi and Valin, 2012) and usually impacts on farm net value added are estimated instead of family farm income. Farm value added, however, includes wages, rents and interest paid by the farm family and does not provide explicit information on the income of the farm family.

Against this background, the objective of this article is to analyse the income effects of an abolishment of biofuel policies at a disaggregated level for the German agricultural sector. Effects are estimated for different farm types and regions. Furthermore, differences between farm net value added and family farm income are analysed. To understand the link between income effects and lobbying decisions, our disaggregated results are compared with the positions of different farmers' associations regarding biofuels policies. As a result, this article contributes to explaining associations' positions and provides insights into agricultural lobby decision-making. The structure of the paper is as follows: first, the underlying methodology and scenarios are presented. Then, quantitative results are provided and the political economic context of the analysis is explored. Conclusions are drawn in the last section.

2. Methodology

2.1. Quantitative analysis

To quantify the income effects from changes in European biofuel policies, a modelling system consisting of an agricultural sector model and a farm level model of the German agricultural sector is applied. The modelling system is described in detail in Deppermann et al. (2010). The linking of the two models allows quantification of the adjustment processes at the sectoral level and at the same time analysis of farm-group specific policy impacts at a more disaggregate level. In the following, the two models are presented briefly.

ESIM (Grethe, 2012) is a comparative-static and net-trade partial equilibrium model of the European agricultural sector. It depicts the EU-27 at the member state level as well as the rest of the world, though in greatly varying degrees of disaggregation. Altogether ESIM contains 31 regions and 47 products, as well as a high degree of detail for EU policy, including specific and ad valorem tariffs; tariff rate quotas; intervention and threshold prices; export subsidies; coupled and decoupled direct payments; production quotas, and set-aside regulations.

All behavioural functions (except for sugar supply) in ESIM are isoelastic. Supply at the farm level is defined for 15 crops, six animal products, pasture, and voluntary set-aside. Human demand is defined for processed products and each of the farm products, with the exception of rapeseed, fodder, pasture, set-aside, and raw milk. Some of these products enter only the processing industry (e.g., rapeseed) and others are used only in feed consumption (e.g., fodder or grass from permanent pasture). Processing demand is defined for raw milk (which is divided into its components, i.e., fat and protein), oilseeds, and inputs for biofuel production. The biofuel module depicts the production of bioethanol and biodiesel. Inputs for ethanol are wheat, corn, and sugar. Biodiesel is produced from rape oil, sunflower oil, soy oil and palm oil. Input ratios are endogenously determined by a CES function. Byproducts of biofuel production are accounted for and are used as additional feedstuff in the livestock sector. The price formation mechanism in ESIM assumes an EU point market for all products except for non-tradables (raw milk, potatoes, fodder, silage maize, and grass), for which prices result from a market-clearing equilibrium of domestic supply and demand at the EU member state level.

FARMIS is a comparative-static process-analytical programming model for farm groups (Osterburg et al., 2001; Bertelsmeier, 2005; Offermann et al., 2005). Production is differentiated for 27 crop and 15 livestock activities. The matrix restrictions cover the areas of feeding (energy and nutrient requirements, calibrated feed rations), intermediate use of young livestock, fertilizer use (organic and mineral), labour (seasonally differentiated), crop rotations and political instruments (e.g., set-aside and quotas). The model specification is based on information from the German Farm Accountancy Data Network, supplemented by data from farm management manuals. Data from three consecutive accounting years is averaged to reduce the influence of yearly variations common to agriculture (e.g., due to weather conditions) on model specification and income levels. Key characteristics of FARMIS are: 1) the use of aggregation factors that allow for representation of the sectors' production and income indicators; 2) input-output coefficients that are consistent with information from farm accounts; and 3) the use of a positive mathematical programming procedure to calibrate the model to the observed base year levels. Prices are generally exogenous and are provided by market models. Exceptions to this are specific agricultural production factors, such as the milk quota, land, and young livestock. For these, (simplified) markets are modelled endogenously, allowing the derivation of respective equilibrium prices under different policy scenarios. FARMIS uses farm groups rather than single farms, not only to ensure the confidentiality of individual farm data, but also to increase the manageability and the robustness of the model system when dealing with possible data errors at the individual level. Homogenous farm groups are generated by the aggregation of single farm data. For this study, farms were stratified by region, type, and size, resulting in 628 farm groups representing the German agricultural sector, of which 467 are located in western Germany. Table 1 provides an overview of the number and type of farms represented in different regions of Germany.

Table 1. Type and regional prevalence of farms represented in the analysis (base year).

	Total	North	South	Center	East
Number of farms	214,976	71,954	101,455	27,340	14,228
Percentage of which are:					
Arable farms	22%	24%	17%	22%	50%
Dairy farms	33%	26%	44%	18%	12%
Other grazing livestock farms	10%	12%	8%	9%	12%
Mixed farms	22%	26%	20%	21%	25%
Pig and poultry farms	5%	10%	3%	1%	1%
Permanent crop farms	7%	1%	7%	28%	0%

NB: *North*: Nordrhein-Westfalen, Niedersachsen, Hamburg, Bremen, Schleswig-Holstein; *South*: Bayern, Baden-Württemberg; *Centre*: Hessen, Rheinland-Pfalz, Saarland; *East*: Berlin, Sachsen, Mecklenburg-Vorpommern, Sachsen-Anhalt, Thüringen, Brandenburg.

In other applications (e.g., Depperman et al., 2014) ESIM and FARMIS were linked through the exchange of solution variables (vectors of price and yield changes from ESIM to FARMIS and vectors of quantity changes from FARMIS to ESIM) until both models converged on these variables in the analysis of joint scenarios. For this study, in contrast, no significant feedback effects occurred. In fact, the models are coupled in a top-down manner, i.e., ESIM quantifies price changes resulting from the abolishment of EU biofuel policies at the sectoral level and FARMIS depicts production and income effects at the farm group level in response to the ESIM-simulated price changes.

2.2. Scenarios

The modelling system described above is calibrated to a base period (average of the years 2006-2008). Subsequently a baseline (serving as a reference scenario) and a reform scenario are conducted for the year 2020. The reform scenario is evaluated in comparison to the baseline to account for impacts of European biofuel policies, providing a comparative-static analysis of exogenous policy changes.

For the baseline scenario, the EU is assumed to reach its renewable energy target of 10% in the transport sector in 2020. Furthermore, the baseline includes population and income updates as well as technical progress and world market price projections made by the OECD/FAO (2013). So-called first-generation biofuels from oilseeds, cereals and sugar beet will account for 8% of total transportation energy of the EU in 2020. Assumably, the remaining 2% will be covered by renewable electro-mobility and biofuels from waste and non-food lignocellulosic material. The biodiesel/bioethanol ratio, measured in energy content, will be 67/33. This compares to a recent (2010) ratio of 78/22 (ECOFYS 2012). In addition, the 2003 reform and the ‘Health Check’ of the Common Agricultural Policy are fully implemented, except for the abolishment of milk quotas. No further changes in external trade policies of the EU are assumed until 2020.

As the only change compared to the baseline, the second scenario “NoSup” assumes the abolishment of all political support for biofuels produced from crops in the EU. As a consequence, we assume that demand for biofuels from crops will drop from 8% to 1% of total transport energy, i.e., by seven percentage points, and that the biofuel supply will fall accordingly to slightly less than 1% of total transport energy. This includes a long-term adjustment and assumes that biofuels from crops will not be economically viable except in some niche markets (1%) due to their production costs being substantially above the cost price of fossil fuels. In the short run, the adjustment process may be slower, as investments in refineries have already been made and installations may be kept running as long as the variable costs are covered. Under the "NoSup" scenario, the human demand for biofuels in countries other than the EU is assumed to remain constant compared to the reference scenario, i.e., lower biofuel demand in the EU will not, via falling international prices for biofuels, contribute to more biofuel demand in other countries. This is because many countries have defined quantitative targets for their biofuel demand, resulting in non-price-responsive demand. However, in some countries where biofuel use is primarily market driven, such as Brazil, biofuel consumption may be extended, while others may take EU political action on biofuels as a model and likewise reduce their supporting policies.

2.3. Theory of political economic assessment and survey

To understand how issues to be addressed are selected by organized interests, we refer to organizational and interest group theory. In the following, we distinguish organized interests on the basis of empirical categories into multipurpose organizations and single-purpose organizations, with multipurpose organizations being involved in more issues compared to single-purpose groups (Browne, 1990).

An example of a multipurpose organization in the German agriculture policy domain is the German Farmers' Association, which defines itself as representative of all German farmers regardless of farm type, size or region located (DBV, 2011). Accordingly, we assume that the German Farmers' Association also addresses the issue of biofuel policy. As per organizational theory, a position in favor of (against) a policy supporting biofuel is consequential and efficient if the majority of members benefits from (is adversely affected by) the support. Moreover, the allocation of resources to issues that address majority interests is fundamental to maintaining a coalition of support large enough to ensure long-term group survival (March and Simon, 1955). Minority interests within a multipurpose group may be neglected to some extent due to the broadness of the organization's focus, which triggers the unavoidable problem of asymmetric interest representation within the group (Bethusy-Huc, 1976).

The German Farmers' Association must in specific face the fact that it can no longer represent the interests of all members due to the increasing differentiation between farmers, e.g., in the manner and type of production (Sontowski, 1990; Heinze, 1992; Feindt, 2003). As early as 1970, Ackermann (1970) predicted a huge loss of power for the German Farmers' Association in the coming decades. As several studies showed, however, Ackermann's prediction was possibly exaggerated (Wolf, 2001; Lehmbruch, 1994). On the one hand, the political clout of the German Farmers' Association has decreased since that time, as highlighted by the separation of 7500 dairy farmers back in the year 2000 (Busse, 2006). The departing dairy farmers no longer felt represented by the milk- and quota policy of the association and thus founded their own single-purpose association, “BDM” (Association of German Dairy Farmers). Despite this, the association has overall managed to maintain its status as the most important representative of German agricultural interests (Andersen and Woyke, 2003). Reasons for the relatively constant and high degree of organization, with roughly 90% of German farmers as members (Andersen and Woyke, 2003), are considered to be the traditional association ideology and the comprehensive range of services provided to members (Niemann, 2003).

Single-purpose organizations (e.g., poultry farmers associations) are by theory more likely not to address the issue of biofuel policy, so long as the benefits and costs are low for their members. Since positioning is costly, they concentrate resources only on the major interests of their members. It must also be noted that, rather than being entirely self-directed, organizations formulate their activities to a certain extent in response to demands placed upon them by other organizations (Pfeffer and Salancik, 1978). Hence, it could be argued that single-purpose organizations such as livestock associations depend on the political endorsement of multipurpose organizations in certain policies (e.g., animal welfare) to increase their legitimacy and assertiveness in lobbying. In return, multipurpose organizations might expect approval or at least non-interference from single-purpose organizations on issues that are secondary to them (e.g., biofuel policy).

Regarding biofuel policy, the case of the United States demonstrates that such inter-organizational cooperation, a so-called “advocacy coalition” (Thompson, 1967; Jenkins-Smith and Sabatier, 1994), between single-purpose organizations of livestock farmers and multipurpose organizations of farmers is not self-evident. For several years now, US interest groups in the livestock sector have strongly opposed the governmental support of biofuels initiated under George W. Bush in 2005 (TaZ, 2012). By blaming feed component price increases on US biofuel policy, livestock interest groups strongly confront the interests of multipurpose farmers’ associations. Thus the benefits of an abolishment of biofuel policy are considered to be very high by some single-purpose livestock organizations in the US. Still, US and EU farmers may face different impacts from biofuel policies due to different policy designs (the US relies predominantly on ethanol, while the EU relies more on biodiesel) and different farm structures (Taheripour et al., 2011).

To reflect the results of the quantitative analysis with regard to the theoretical considerations outlined above, we conducted a written survey of 26 multi- and single-purpose associations of

German farmers in May/June 2014[1] asking about their positioning on the EU support for biofuels. We received 13 answers, constituting a return rate of 50%. For the category of multipurpose organizations we asked the German Farmers' Association and its 15 regional associations, which together represent around 90% of German farmers (Andersen and Woyke, 2003), and received nine responses. As single-purpose organizations, we asked ten associations of livestock farmers (including dairy- and grazing livestock-, poultry- and pig farmers) and received four answers from associations representing between approx. 24% and approx. 95% of the German farms specialized in the respective sectors. The survey only focused on the positioning of interest groups for different kinds of farmers. Organizations from the upstream and processing industries, as well as the fuel industry, were excluded from the survey.

Additional demand for biofuel feed stocks is likely to increase crop prices and, on average, income in the agricultural sector. Thus, we hypothesize that multipurpose organizations of German farmers promote biofuel policy. In the case of single-purpose organizations of German livestock farmers, it is more difficult to predict their position on biofuel policy: A supportive position would be unlikely. It is, however, not clear whether they oppose (due to higher feed costs like in the US) or rather do not position themselves at all due to other reasons (possibly because impacts are expected to be small, or in order to build an "advocacy coalition"). Furthermore, a comparison of quantitative results and survey results can indicate how well farmers' associations tend to anticipate the impacts of policy on their clientele.

3. Quantitative Results

A drop in first-generation biofuel demand of 7 percentage points of energy consumed in the European transportation sector in our study amounts to 14 MTOE (million tons of oil equivalent) of biodiesel and 7 MTOE of ethanol. The reduced demand for biofuels results in a decline in processing demand for biofuel feedstock, and thus leads to declining prices for agricultural products (Figure 1). According to the market model ESIM, the highest price impacts can be observed for oilseeds in general, and rapeseed in particular. This is due to the fact that a large share of European biodiesel is produced from rapeseed. Ethanol feedstock is much less affected than biodiesel feedstock, mainly due to the relatively low share of ethanol in total biofuels and to the larger market size of these products. Due to a high level of integration

[1] Questionnaire is available upon request from the authors.

between the EU and the world market, price changes in Germany are similar to changes at the world market.

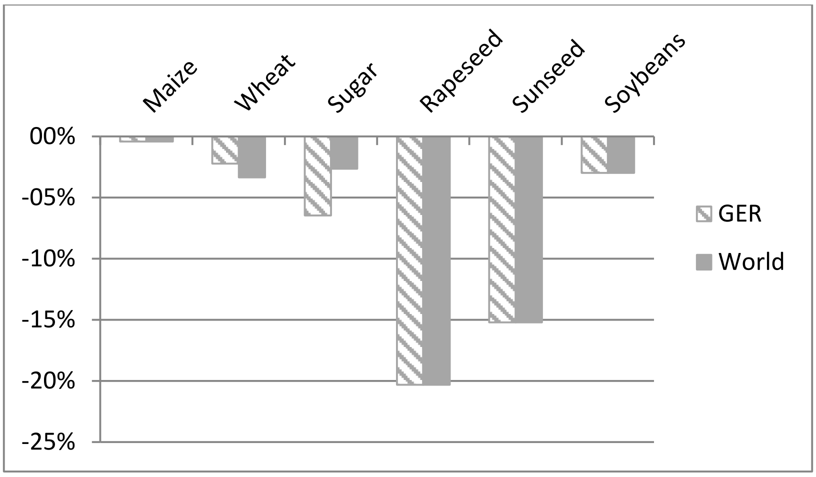

Figure 1. Price effects of the NoSup scenario relative to the baseline in 2020.

The estimated price effects are broadly in line with other studies, however the variability of results is generally high and the price effects of this study are in the lower range compared with other studies. Gohin (2008), for example, simulates the impacts of a 13.8 MTOE demand shock for biofuels and finds higher price effects for oilseeds (39% rapeseed) and wheat (10.8%), but also smaller ones for sugar (0.2%) and maize (0%). Louhichi and Valin (2012) estimate from a shock similar to the study at hand (21.8 MTOE first-generation biofuels) that world market prices for rapeseed change by 22%, while EU prices change by 43.3%.

On the other hand, some studies find lower price impacts. Edwards et al. (2010), e.g., report marginal price effects of additional biofuel demand. According to their simulation, carried out with the AGLINK-COSIMO model, the shock used in this study would lead to a 2.6% decline in oilseed prices[2]. In Cororaton and Timilsina (2012), an increase of biofuels in total liquid fuel demand for transportation of more than 10 percentage points in the EU, and an additional increase of biofuel demand in other regions of the world, leads to only 3% higher world market prices for oilseeds.[3]

Declining prices give incentives to farmers to decrease their production. In response to the ESIM-simulated price changes, results of the agricultural supply model FARMIS indicate a declining production in the German agricultural sector, mainly for rapeseed and sunflower

[2] Not taking price effects on oilseeds arising from changes in ethanol demand into account.
[3] A comparison of further studies is presented in Louhichi and Valin (2012, 247).

production (Figure 2).[4] Sugar is only slightly affected and cereal production even increases. Aggregate land use in the German agricultural sector only decreases by less than 0.1% (Figure 3). These effects partly occur due to the high share of rented land (68%, on average, in the baseline), as well as the high rate of capitalisation of price changes in land prices assumed in FARMIS. As a result, land rental prices decline significantly in the NoSup scenario and, thus, average production incentives are hardly affected. Only the composition of aggregate production is affected due to changing relative prices among single commodities: the production of those crops with the highest price drops is substituted by other crops.

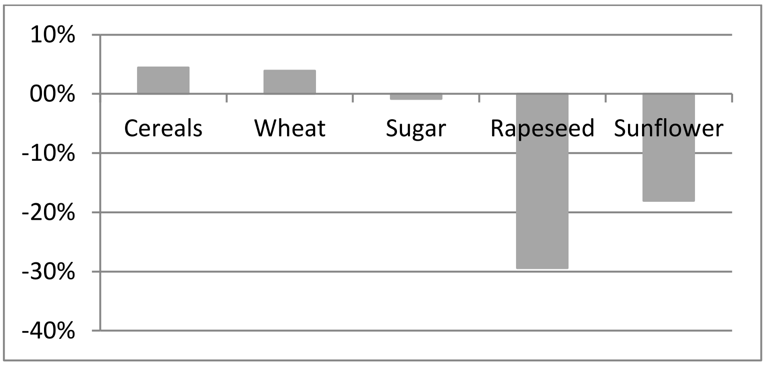

Figure 2. Supply changes under the NoSup scenario relative to the baseline in 2020 for the German agricultural sector.

Many studies conclude that less demand for biofuels causes lower agricultural prices and thus decreases aggregate agricultural income. However, the studies that explicitly quantify income effects mostly apply farm net value added (FNVA) or related income indicators. FNVA includes wages, rents and interest paid by the farm family and does not provide explicit information on how much family farm income is affected. In contrast, the indicator family farm income (FFI) provides information on the return to land, labour, and capital resources owned by the farm family, as well as the remuneration of entrepreneurial risk.

Fonseca et al. (2010) report, based on the CAPRI model, that overall farm income (gross value added plus premiums) in the EU27 would decrease by 3.5% as a reaction to a shock similar to the one modelled in this paper. Louhichi and Valin (2012) calculate a 10% change in operating surplus for French arable farms. Gohin (2008) reports a change in agricultural value added of 3.8% in the EU15.

[4] By absolute levels, rapeseed production is much more important (1538 t ha in the baseline) than sunflower production (17 t ha).

We find that FNVA for agriculture in Germany decreases by 3.9% (Figure 3). Due to the dominance of corporate farms in eastern Germany, no comparability between different farm structures could be ensured when using FFI as an indicator. As such, changes in FFI are displayed only for western Germany. To illustrate the difference between the indicators FNVA and FFI, both figures are presented solely for western Germany. Losses in FNVA are slightly lower (2.8%) when eastern German regions are excluded. However, income losses decline to 0.9% when FFI is used as an indicator. Thus, it is obvious that a large share of income losses for family farms can be compensated by reduced factor costs, especially for farms with a high share of rented land. This is of particular relevance because a large share of the remuneration of land and capital leaves the agricultural sector and cannot be denoted as support to the agricultural sector. That said, the high rate of capitalisation of market revenue in land prices that is assumed in FARMIS reflects a long-term perspective. In the short run, land markets might be less adaptive and income losses might be higher due to higher factor costs.

Furthermore, in our analysis we find that labour demand is only affected to a minor extent by the reduced biofuel demand. Biofuel cropping in Germany is not specifically labour-intensive, and since available agricultural land is generally fully utilised in our scenarios, replacement of biofuel crops by other products when biofuel policies are abolished leads to a decline in labour demand by only 0.19% (642 agricultural working units) for the German agricultural sector. In contrast, Gohin (2008) quantifies 43,000 additional farm jobs (+1.3%) in EU15 agriculture due to biofuel policies.

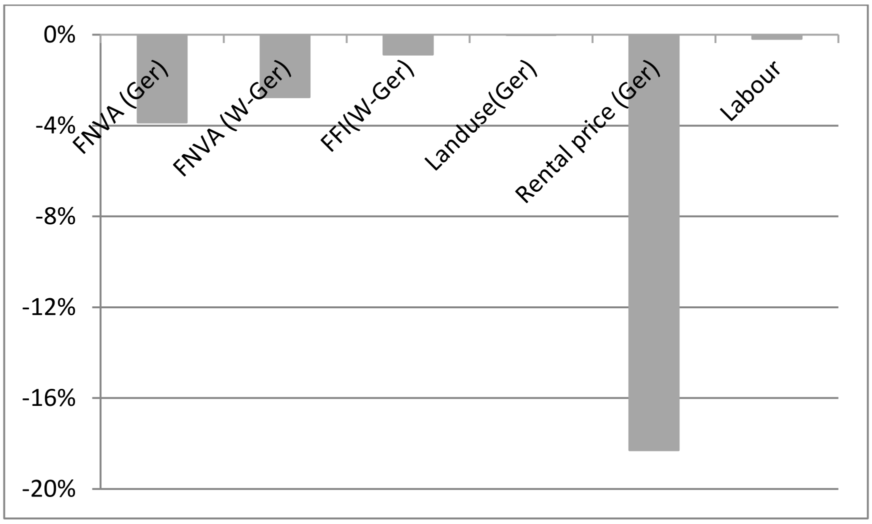

Figure 3. Aggregated income and factor use indicators of the NoSup scenario relative to the baseline in 2020 for the German agricultural sector.

In a disaggregated analysis we look at income effects on different farm types and different regions (Table 2). At first, changes in FNVA are discussed. FNVA is directly affected by changes in commodity prices and the resulting production quantities. However, changes in labour, capital and land prices are only indirectly reflected through their impacts on production levels.

Very diverse effects appear with regard to different farm types. Arable farms are affected strongest, as they have the highest income share from oilseed and cereal production. This observation also fits well with the results of Louhichi and Valin (2012), who found a 10% change in operating surplus for French arable farms. From a regional perspective, arable farms in eastern Germany bear the highest losses (-13.2%) on average. This is due to a higher share of oilseed production in total production compared to average farms in other regions. Mixed farms also have high shares of oilseed production in total production and are thus also affected more than average (4.3% losses in FNVA).

Among livestock producers the direct effect of declining prices on FNVA is less relevant compared to crop producers. However, among livestock producers, pig and poultry farms bear relatively strong losses (2.2%), while losses for dairy farms and other grazing livestock farms are relatively moderate (1.5% and 1.2%, respectively). The strong effects on pig and poultry farms result from increasing prices for the by-products of biofuel production, some of which can be used as feedstuff, especially as a substitute for protein-rich concentrated feed. With a reduced production of biofuels, by-products become scarcer and prices increase. In contrast to pig and poultry production, these by-products account for a smaller share of feeding rations in dairy cow and other grazing livestock production. In addition, feed costs generally constitute a lower share of overall production costs for these farm types. Thus, on average increasing by-product prices have stronger effects on pig and poultry farms compared to other livestock producers. Permanent crop farms, mostly comprising orchards and vineyards in Germany, are hardly affected due to their specific crop production structures.

When taking long term FFI as an indicator, losses are much smaller compared to FNVA figures. Some farms even have a positive income effect, since they can profit from lower rental prices, have a low share of oilseed or cereal production and benefit from lower prices for roughages. This is particularly the case for other grazing livestock farms in central and southern regions. Furthermore, dairy farms and permanent crop farms only have marginal losses in FFI. Regional differences occur mainly due to the differing production patterns and abilities of regional land markets to absorb declining commodity prices.

Table 2. Disaggregated income effects of the NoSup scenario relative to the baseline in 2020.

FNVA	Arable farms	Dairy farms	Other grazing livestock	Mixed farms	Pig and poultry farms	Perm. crop farms	All farms
North	-6.85%	-1.48%	-1.03%	-3.04%	-1.39%	-0.02%	-2.94%
South	-6.41%	-1.17%	-1.65%	-3.17%	-4.14%	-0.30%	-2.39%
Centre	-9.58%	-1.89%	-0.21%	-5.76%	-3.20%	-0.13%	-3.25%
East	-13.22%	-3.03%	-1.35%	-5.91%	-2.71%	-0.05%	-7.68%
all	-9.30%	-1.50%	-1.22%	-4.29%	-2.16%	-0.18%	-3.86%
FFI							
North	-4.54%	-0.04%	-0.37%	-1.14%	-0.57%	-0.06%	-1.18%
South	-1.76%	-0.13%	0.68%	-0.53%	-3.42%	-0.19%	-0.52%
Centre	-4.14%	-0.20%	2.67%	-2.03%	-2.34%	0.02%	-0.97%
N.+S.+C.	-3.68%	-0.10%	0.32%	-1.00%	-1.39%	-0.06%	-0.87%

NB: *North*: Nordrhein-Westfalen, Niedersachsen, Hamburg, Bremen, Schleswig-Holstein; *South*: Bayern, Baden-Württemberg; *Centre*: Hessen, Rheinland-Pfalz, Saarland; *East*: Berlin, Sachsen, Mecklenburg-Vorpommern, Sachsen-Anhalt, Thüringen, Brandenburg. N.+S.+C. – North + South + Centre.

On the basis of our quantitative analysis, it is clear that income losses from declining biofuel demand are limited for the western German agricultural sector as a whole in terms of family farm income (-0.87%). Effects, however, differ widely depending on the production patterns of the modelled farm groups, or stated differently: not all farms profit in the same way from political support for biofuels. According to our analysis, the biggest beneficiaries in the agricultural sector are farms with high shares of crop production, i.e., mostly arable farms. Mixed farms and pig and poultry farms are also affected, although to a lesser extent, while effects for dairy and other grazing livestock farms and permanent crop farms are marginal.

4. Political-economic context

In the following section we analyse how these results can be reflected from a political-economic point of view. The survey conducted among different farmers' associations was answered by four single-purpose associations (three from the dairy- and grazing livestock sector; one from the poultry sector) and nine multipurpose (regional and national) farmers' associations.

For the multipurpose organizations, the emerging picture of the survey is very clear: As supposed earlier, all strictly support current EU biofuel policies. Since positioning is costly for organizations, it seems that the beneficiaries of biofuel policy have a strong influence on the political alignment of multipurpose farmers' associations in Germany. In our analysis, arable farms represent only 22% of the total farm population (Table 1); however, together with mixed farms, the second most affected farm type, they account for almost half of all farms.

In contrast to the multipurpose associations, the four single-purpose associations from the livestock sector declared that they do not have any official position with regard to this topic (neither pro nor contra). This indicates that they expect the benefits and costs to be rather small for their clientele. Since income in the livestock sector, and especially of dairy and grazing livestock farms, is only slightly affected on average, it is rational for these organizations to not position themselves regarding biofuel policies in face of the costs of positioning. The costs of positioning may even be increased due to the negative effects of leaving a possible "advocacy coalition" with multi-purpose associations.

We also asked if associations are aware that single farms may be impacted negatively due to political support for biofuels. From the single-purpose group only one association answered this question, declaring that they would not exclude the possibility that single farmers may be affected negatively. We received eight answers to this question from the multi-purpose associations, five of which stated that they are aware of or that they would not exclude the possibility of negative impacts for single farmers, and three stating that, in their opinion, no farmers were negatively impacted by policy support for biofuels. Furthermore, all of the associations except one stated that they are aware that not all farms benefit equally from current biofuel support. Thus, it seems well understood by both groups of associations that biofuel policy in the current form may have a negative impact on single farms, or at least may not benefit all farms equally.

5. Conclusions

In this paper we analyse the effects of an abolishment of EU biofuel policies. Income effects are analysed at a disaggregate level for the German agricultural sector and differentiated between farm net value added and family farm income. We find that an abolishment of biofuel mandates has, on average, a negative impact on agricultural income. However, in the case of family farm income, only some farms have losses, while others even benefit from lower rental costs and experience positive income effects.

In general, income effects are small in the long run, especially if accounting for ownership of production factors when calculating the income of family farms. Due to a high share of rental land in Germany (68% in the baseline), landowners, many of which are not active farmers, profit from biofuel policy. Our findings indicate that the transfer efficiency of biofuel policy is limited for the agricultural sector and, as a consequence, agricultural income effects are not suited to justify the current EU biofuel policy.

The fact that a specific group of farms (arable farms) profit mainly from biofuel policy, while others barely benefit, or even have disadvantages due to higher rental prices, is interesting from a political-economic point of view. Based on a survey among multi-purpose (general farmers') associations and single-purpose (livestock farmers') associations in Germany we can conclude that the majority of the answering organizations have a good understanding of the income effects of EU biofuel policy on different farm types and, based on this knowledge, are able to analyse the costs and benefits for their organization when lobbying on the issue.

Multi-purpose farmers' organizations in Germany clearly support EU biofuel policy due to the fact that it is beneficial for many of their members. Accepting that minority interests may be neglected to some extent, the behaviour is rational in terms of organizational theory since the benefits of biofuel promotion seem to be higher than the costs.

All of the single-purpose livestock farmers associations that answered the survey declared that they do not take a position regarding biofuel policy. This behaviour is rational, assuming that the costs of lobbying exceed the benefits, as indicated by the quantitative analysis in this paper. The strategic choice of German single-purpose organizations not to address the issue strongly contrasts with the behaviour of US livestock organizations that have opposed biofuel policy for several years. One explanation for these different actions could possibly be the different German and US feedstuff costs. Another more politically-oriented approach could assume that particular interests are more developed in the agriculture policy domain of the U.S. than in Germany, which is an opportunity for further research.

In regard to a reform of current EU biofuel policy, this paper highlights that a generalized argument that does not consider aspects of unequal distribution of benefits may be oversimplified and misleading. In contrast to the public statements of several interest groups, we argue that the abolishment of current EU biofuel support does not affect all farmers significantly, and may even have positive effects for some farmers.

In our analysis, only income effects in the agricultural sector are considered, and effects on the biofuel processing industry are excluded. In line with this, only farmers' associations were asked for their position on biofuel policies. Extending the analysis to cover the impacts on upstream and processing industries and the positions of their respective lobby organizations could further improve our understanding of the political economics of biofuel policies.

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