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CALCULATING THE 'GREENING' EFFECT

A CASE STUDY APPROACH TO PREDICT THE GROSS MARGIN LOSSES IN DIFFERENT FARM TYPES IN GERMANY DUE TO THE REFORM OF THE CAP

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Abbreviations

CAP	Common Agricultural Policy
EEG	Renewable Energy Law
EU	European Union
EFA	Ecological focus area
GDR	German Democratic Republic
LfL	Bavarian State Institute of Agriculture

Calculating the 'Greening' Effect
A Case Study Approach to Predict the Gross Margin Losses in Different Farm Types in Germany due to the Reform of the CAP

Abstract

Agricultural policy is designed to achieve certain goals. One goal that is of increasing importance in public discussion is 'public money for public goods', i.e. the compensation for the provision of public goods and the internalization of externalities. The European Union's Common Agricultural Policy is currently undergoing a reform process which inter alia aims to achieve a higher environmental standard in agricultural production by binding direct payments to practices beneficial for the climate and the environment (the so-called 'greening'). I simulate how farms would respond to these measures using a case study farm modeling approach and data for different farm types in Germany. I find that the considered and currently envisaged 'greening' measures can be expected to function in general due to the linkage to the direct payments, which provide a strong disincentive to forego participation. The individual economic outcome strongly depends on the current intensity of the farm in question and on the implementation details of the introduced measures. However, farms with very high gross margins per hectare will forego the support scheme.

Keywords

Greening, Common Agricultural Policy, reform of the CAP, agri-environmental measures, direct payments

1 Introduction

Agricultural policy is designed to achieve certain goals. One goal that is of increasing importance is to encourage farmers to comply with environmental standards. This is especially true in the European Union (EU), where the 'multi-functionality' of agriculture has long played an important role in discussions about agricultural policy design and the pros and cons of protection and support (e.g. ALEXOPOULOS ET AL. 2006). While other countries, such as Switzerland and Norway, have also gathered extensive experience with measures designed to 'green' agricultural support, among the major agricultural exporters the EU can be considered a pioneer in this respect.

A lively discussion is going on between politicians and agricultural stakeholders in the EU about appropriate instruments to make European agriculture more environmentally friendly. Many suggestions have been made, and recently the European Commission has tabled concrete proposals. A major goal is to appreciate the provision of public goods by farmers and to reduce/internalize negative externalities. The basic idea is to achieve these goals by binding the direct payments that are provided by the so-called 'first pillar' of the Common Agricultural Policy (CAP) not only to existing specific legislation as has been the case in the past (Cross Compliance) but also to a number of additional environmental requirements (referred to as 'greening').

In mid-October 2011 the European Commission presented its 'Proposal for a regulation of the European Parliament and the Council establishing rules for direct payment schemes for farmers under the common agricultural policy' (EUROPEAN COMMISSION 2011). This document contains parts of the draft legislation for the CAP after 2013. The proposal foresees no changes to the basic structure

of the CAP: the two pillar structure, the direct payments as well as cross compliance is expected to be maintained. However, the average size of the payments may decrease slightly and some of the cross compliance requirements will be amended by additional standards, which are generally discussed as 'greening' of the first pillar. Articles 29 to 32 regulate the 'greening' requirements ("Payment for agricultural practices beneficial for the climate and the environment"). They consist of three main points:

- crop diversification ("cultivation on the arable land shall consist of at least three different crops. However, none of those three crops shall cover less than 5% of the arable land and the main one shall not exceed 70 % of the arable land.", Article 30)
- maintenance of permanent grassland (Article 31)
- and ecological focus area ("Farmers shall devote at least 7 % of their eligible hectares […] excluding areas under permanent grassland, to ecological focus area such as land left fallow, terraces, landscape features, buffer strips and afforested areas […]", Article 32).

The Commission has proposed that 30 % of the direct payments be linked to compliance with these measures. Organic farms are excepted from the 'greening' requirements (Article 29).

Some analysts think that the 'greening' obligations are just ‚greenwashing', and that the real motivation behind the Commission's proposals is to craft a justification for maintaining the current magnitude of the agricultural budget now that the older justifications have become less compelling (e.g. the comment of JØRGENSEN (2011)). Accordingly, some experts as well as some farmers doubt the effectiveness of the proposal. They expect an intensification of agricultural input use on the remaining plots to maintain the current production quantity and expect many loop holes in the implementation of the 'greening' measures. Farmers feel constrained in their entrepreneurial decision making, some would prefer a slow reduction of the direct payment accompanied by a manifold catalogue of agri-environmental schemes where they can decide individually to participate or not.

The purpose of this paper is to provide a first assessment of the impact of 'greening' the CAP on different farm types. To this end, I employ a simple simulation exercise that compares the changes in gross margins when assuming different 'greening' scenarios. The results indicate that on the whole 'greening' can be expected to function in general in terms of formal compliance with the proposed measures. The overall picture indicate that the intensively operating farms show a clearly negative 'greening effect' – the very intensively operating can even expect significant losses – while the extensively operating emerge from the 'greening' less affected. However, in special cases farms would forego the direct payment scheme.

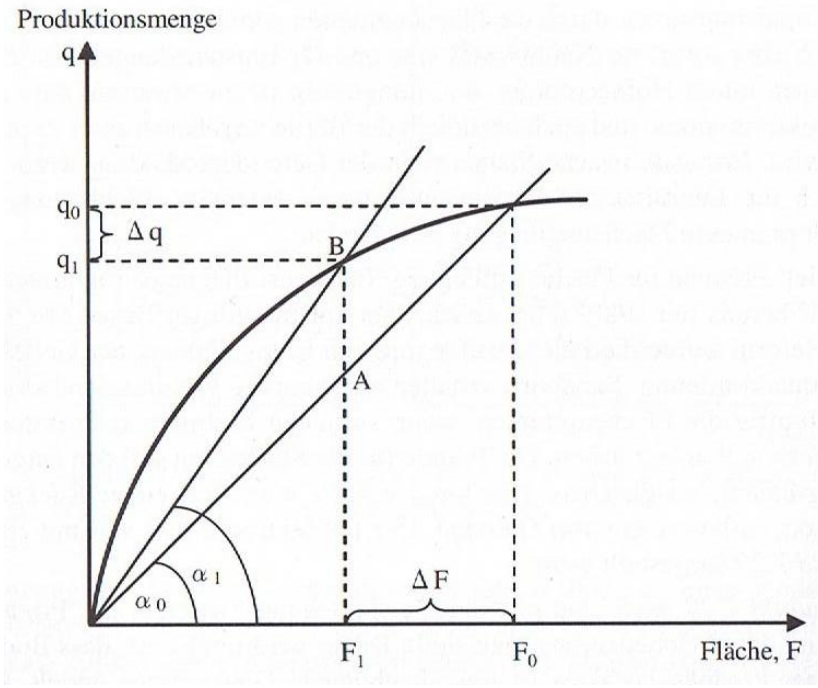
2 Theory

The Commission's proposal adds fuel to the fire in the discussion of what is meant by sustainability and multi-functionality in agricultural production and which measures are appropriate to achieve the intended goals. On the one hand, we face a growing global population, changing consumption patterns and additional substrate provision for bioenergy which lead to an increasing demand for food, feed and arable land. One may argue that the reduction of productive agricultural area - which results from environmental obligations - is not justifiable in these times.

On the other hand, Europe has committed itself to preserve biodiversity and to protect its natural resources and means of livelihoods for future generations (see e.g. EU biodiversity strategy to 2020

(EUROPEAN COMMISSION 2011a). It is argued that the current way of agricultural production is threatening these goals. TSCHARNTKE et al. (2005) and HOLZSCHUH et al. (2007) show that agri-environmental measures are more efficient in simple than in complex agricultural landscapes and that local diversity is enhanced by structurally complex landscapes which even may compensate for local high-intensity management. Therefore, a habitats management of medium quality but spatially comprehensive should be preferred to a high-quality managed small scale habitat. This might be the main argument for the introduction of the ecological focus area in each farm.

Figure 1: Impact of set aside obligation on overall production



Source: KOESTER 2010: 324

An incontrovertible fact is that the conversion of a certain percentage of the arable land to ecological focus area will not lead to a drop in agricultural production of the same percentage. KOESTER (2010: 323f) theoretically analyzed the former European set aside obligation. Assuming a neoclassical production function with a decreasing marginal productivity (see figure 1) he expects a less percental reduction in production (Δq) than the share of set aside in total arable land (ΔF) when reducing the input of land (F) from F_0 to F_1 and thus shifting the amount of production from q_0 to q_1 (point B). This seems to be reasonable as I would expect farmers to reduce those field crops with the lowest gross margin[1] first and this concept can basically be assigned to the envisaged ecological focus areas. Furthermore, he could show that in the long term farmers will adapt the intensity of the other factors to the reduced land input by reducing these inputs as well to establish a new equilibrium in value marginal productivity of all factors (KOESTER 2010: 324f). This is contradictory to the common

[1] This can have different reasons, e.g. because of low natural yields or due to a disadvantageous location of a certain plot with higher yields and higher soil quality.

assumption and statements of farmers that the 'greening' requirements will lead to increased intensities on the remaining plots.

POGGENSEE (1993) investigated the individual farm's perspective on the former voluntary European Community's set aside programs and the program's impact on factor use[2]. Due to a progressive design in the beginning of the set aside program and the time of POGGENSEE's study soils with higher quality were more likely used for set aside than those with lower quality (POGGENSEE 1993: 22). This is obviously not the case in the Commission's current proposal.

Following WILLSTACKE and PLANKL (1988), POGGENSEE (1993) used the gross margin for his comparison with the set aside premium. I used gross margins accordingly for calculating the 'greening' effects, because it is a well-known, relatively easy to obtain measure for short-term comparisons of production programs. This is what farmers need to do when deciding which crop to reduce or drop out of production to be able to fulfill the 'greening' requirements.

3 Data and Methods

In my research I model and compare several policy options on farm level, trying to depict the 'greening' of the direct payments planned by the European Commission for the CAP between 2014-2020. The calculations are carried out for 18 farms in total and for each farm separately. The farms differ in structure (share of arable land and grassland), specialization (crop rotation, livestock, biogas), size, location and environmental and soil conditions. I aim at depicting farms in Germany typical for different regions (without claiming representativeness for Germany or even the respective region[3]) to get an idea of which incentives arise from the way how the 'greening' requirements are designed. I capture the most important farm types (arable farming, biogas production, pork and poultry production, dairy farming and suckler cow keeping, mixed farming and viticulture) and differente between intensively and extensively operating farms. Because organic farms are excepted from the 'greening' requirements I did not include any organic farm into my model.

The data were derived from different sources, mainly from the publicly available part of the test enterprise network of the German Federal Ministry of Food, Agriculture and Consumer Protection supplemented by sources of the corresponding ministries and administrative offices of the Federal States in Germany. In some cases the publicly available data did not seem to provide a realistic picture of the farm type or specialization[4] though a couple of farms were derived from personal communication and expert assessments. Gross margins were taken from the standard gross margin database of the Association for Technology and Structures in Agriculture (KTBL), also completed by other sources[5] if necessary. The most important characteristics of each farm can be found in the upper part of figure 3.

To model the potential incentives and impacts imposed by the policy options discussed in the ongoing debate about the CAP reform I include the three 'greening' requirements (crop diversification, maintenance of permanent grassland, ecological focus areas) in my research. Figure 2 provides an overview of the applied modeling design for one farm. Maintenance of permanent

[2] There is a large literature in the USA about 'slippage' which looks at the impact of acreage restrictions, which the US had much earlier than the EU (e.g. HOAG ET AL. 1993).

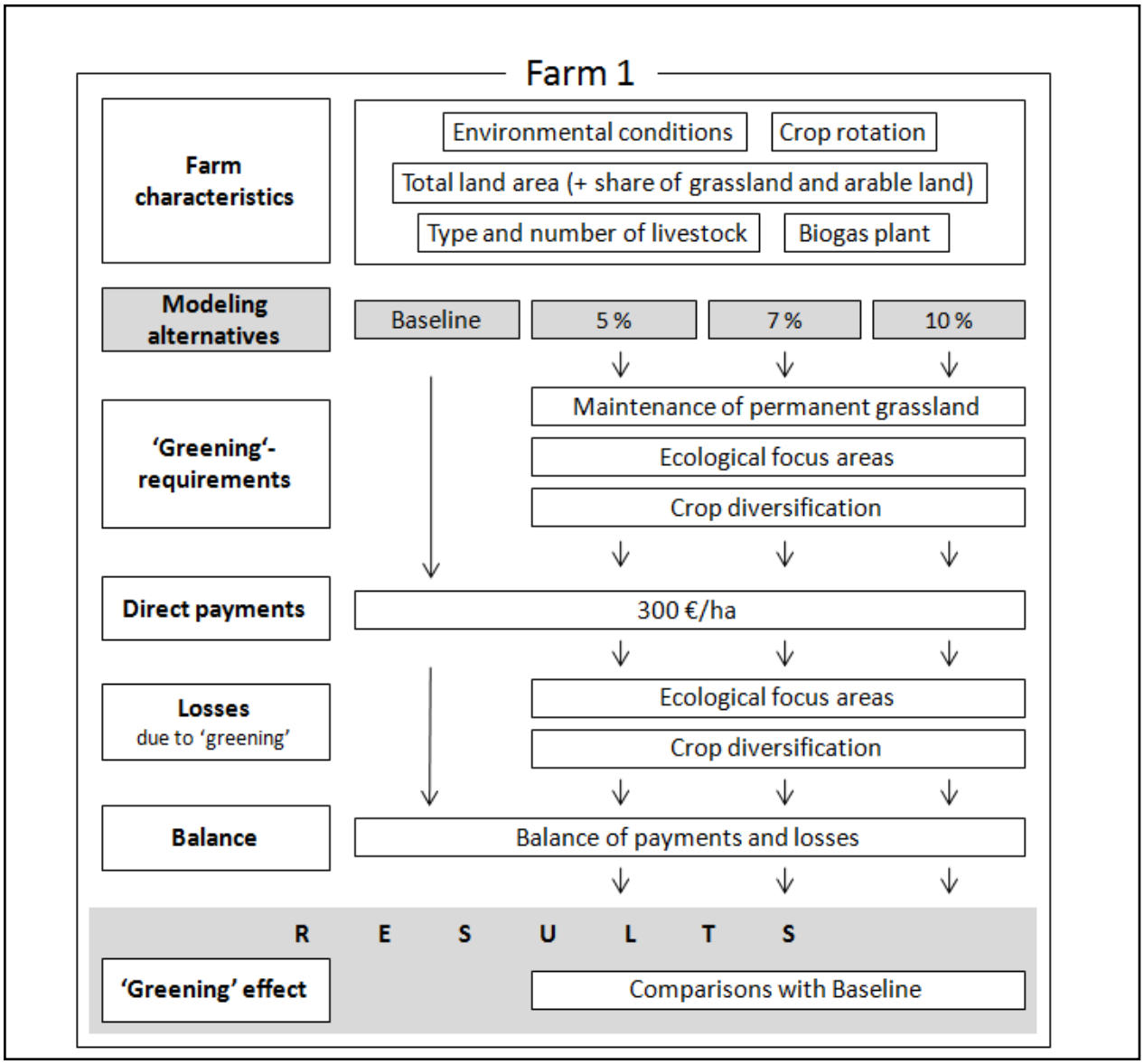
[3] Therefore, I do not discuss the typical farm modeling approach literature.

[4] This happens when the Federal State has a diverse agricultural structure which is not depicted by average numbers for the whole Federal State provided by the statistics.

[5] E.g. data of the Bavarian State Institute of Agriculture (LfL)

grassland is represented implicitly by not varying the share of arable and grassland; crop diversification and three variants of ecological focus areas are modeled explicitly. Because the overall level of direct payments is not expected to decrease substantially in Germany[6], I calculated with 300 €/ha consistently throughout all farms and did not include any variation in direct payment size. Still, farms located in bio-physically disadvantaged areas additionally receive payments of the less-favored areas support fund, farms in economically disadvantaged areas will not be eligible for these payments anymore.

Figure 2: Schematic depiction of the applied modeling design to obtain the 'greening' effect



Source: own illustration

[6] When referring to this, generally Annex II of EUROPEAN COMMISSION (2011) is given as a reference. Annex II consists of a table containing the national ceilings for direct payments; around 5.16 billion Euros are reserved for Germany for 2019. How everybody knows that this means a direct payment of 300 €/ha on average, does not become clear exactly.

The baseline alternative includes the (new) direct payments, less-favoured areas support and allows for former voluntary agri-environmental program participation. This alternative without any 'greening' serves as a comparison for the other modeling alternatives.

To account for the 'greening' in my calculations I actively model two instruments: the obligatory introduction of ecological focus areas and a crop diversification requirement. Both 'greening' instruments serve as a strengthening of cross compliance and are therefore obligatory to receive direct payments and public support in general. The crop diversification requirement demands that the cultivation of one farm shall consist of at least three different crops, the share of one crop shall not exceed 70 % of the farm's arable land and none of those three less than 5 %. The realization in the calculations is executed partly-manual in order to be able to display farmers' choices in a realistic way and to prevent mistakes generated by a mechanical solution which cannot account for individual restrictions[7]. The second 'greening'-requirement, the introduction of ecological focus areas is executed in three modeling alternatives to better understand the dynamics of this measure. In the three alternatives I chose to make 5, 7 and 10 % of the arable land of a farm obligatory for ecological focus areas. The 7 % alternative reflects the 7 % in the Commission's legal proposal, while the 5 % alternative is to ease the 7 %, which besides fallow also includes numerous already existing and not yet eligible landscape features, buffer strips and other now entitled structures. Several experts and environmental NGOs call for at least 10 % ecological focus areas (NABU (2012); JENNY (2011)).

To assess the impact of the expected changes imposed by the CAP reform I calculate the losses in gross margin caused by each requirement for each modeling alternative. I use gross margins for the individual crops and expect the farmers to reduce the crops with the lowest gross margins first. If farms have to diversify their crop rotation, I choose suitable crops for the region with suitable gross margins. The loss due to the crop diversification requirement is the difference between the gross margins of the old and the new crop. For the ecological focus areas I assume a complete loss of production on the affected areas. Again, I expect farmers to reduce those crops with the lowest gross margins first or – e.g. in the case of dairy farms – those less needed for basic feed production for ruminants.

Finally, I balanced public payments and losses and for each of the three 'greening' modeling alternatives. I calculate the 'greening' effect by comparing these numbers with the baseline alternative which does not include any 'greening'. Hence, the 'greening' effect depict the changes in gross margins due to the imposed 'greening' measures in relation to direct payments and less-favored area support, expressed in average losses per hectare based on both the overall farm size and on arable land. The 'greening' effect can also be understood as critical amount of public support (referring to one ha) where the farmer is indifferent of taking part in the 'greening' to receive direct payments and exiting the public support scheme because the losses are higher than the benefits of public payments. This assumption only holds true if the direct payments are not bound to any other additional obligation beyond specific legislation.

4 Results

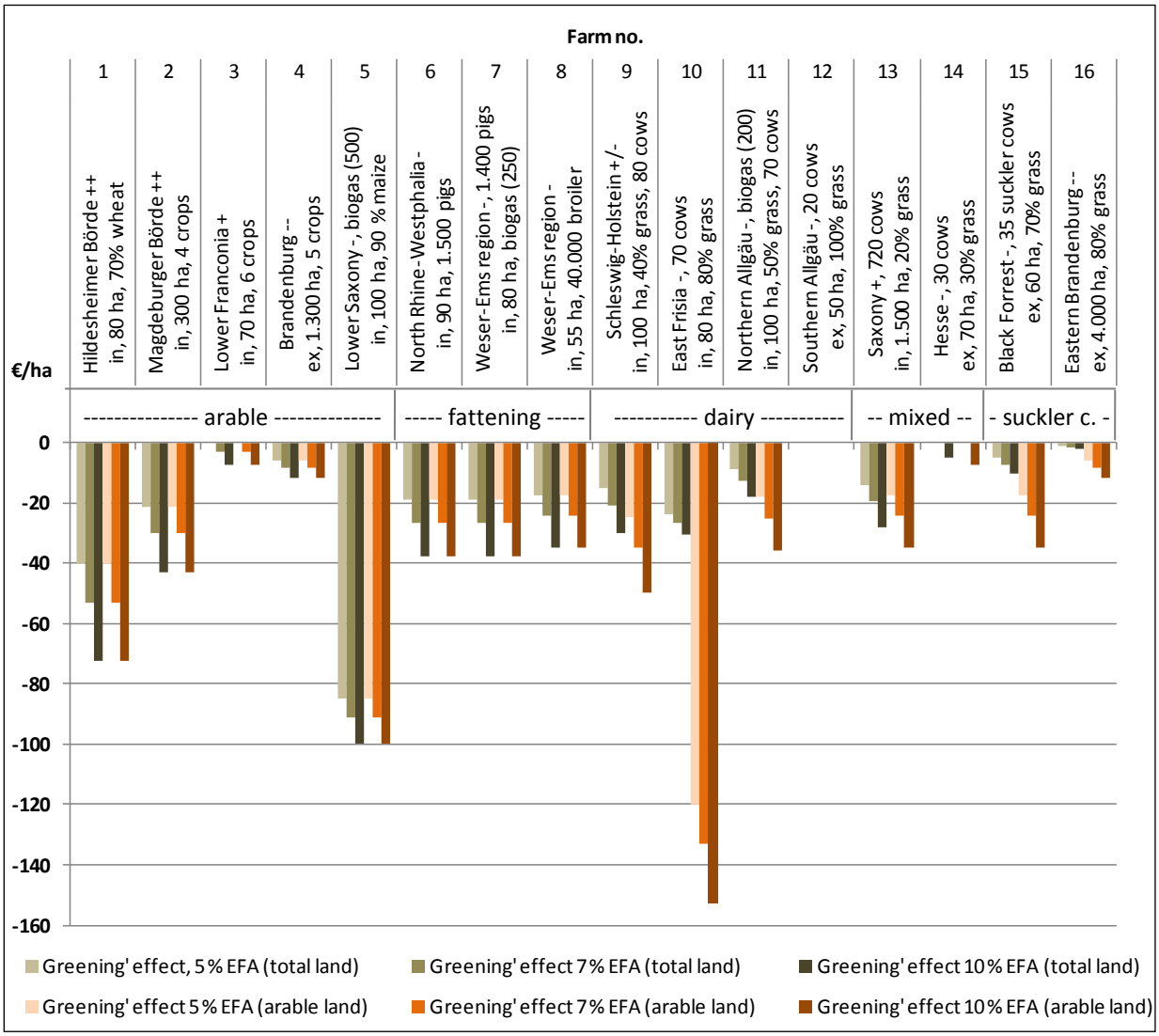
Results are presented in figure 3. It shows the 'greening' effect for farm no. 1 – 16. Farm no. 17 and 18, two vineyard farms, are excluded from the graphs, because their 'greening' effects lie in much

[7] E.g. it is quite complex to account for possible agronomic problems which can occur in crop rotation systems like an increased pest or disease pressure due to altered crop type proportions.

higher levels (between -450 and -900 €/ha) and to include them would reduce optically the differences between all other farms.

Farm no. 1 – 8 are farms without grassland; this is why the 'greening' effects based on arable and on total land are identical within each modeling alternative. Farms no. 1 – 5 are arable farms of different intensity, size, location and specialization. The 'greening' effects of farm no. 1 and 5 are apparently (together with farm no. 10) the highest in the whole sample. This is due to the fact that those three are affected by the crop diversification requirement; the others are solely affected by the ecological focus area obligation.

Figure 3: The 'greening' effect on total and arable land, 5, 7 and 10 % ecological focus area modeling alternatives, farms no. 1-16 [€/ha]



EFA: Ecological focus area; in: intensive; ex: extensive; ++ to -- = soil quality, very good to very low

Farm no. 1 is an intensive arable farm in Lower Saxony cultivating only wheat and sugar beet. Due to the crop diversification requirement the farm need to add a third crop, barley in this case. The size of the 'greening' effect substantially depends on the difference in gross margins between those two crops. Furthermore, the difference between the modeling alternatives is relatively high, reflecting the losses of the 'greening' on a hectare basis that – with an increasing ecological focus area - need

to be allocated to a shrinking share of remaining arable land. Farm no. 2 is an intensive arable farm as well, but with a wider crop rotation and located in the former German Democratic Republic (GDR) (Saxony-Anhalt). The farm is less affected by the CAP reform. Farm no. 3 and 4 show a relatively small 'greening' effect. Farm no. 3 is intensive with a diversified crop rotation located in Lower Franconia/Bavaria. Due to 5 ha unused land that can be used as ecological focus area the impact of the 'greening' is marginal even in the 7 and 10 % alternatives.

Extensive farm no. 4 in Brandenburg (former GDR) with sandy soils and relatively low gross margins is also little affected by the 'greening' obligations. To reduce the almost non-profitable rye production does not harm the farm substantially. The most impaired farm[8] is farm no. 5 – a farm running a biogas plant with maize, therefore the share of maize is currently 90 %. The crop diversification requirement is responsible for losses of 70 €/ha, assuming a rather conservative gross margin for maize of 650 €/ha. Nevertheless, farm no. 5 will currently not forego the public support scheme, because overall public support does not outweigh the losses due to the 'greening' requirement.

Farm no. 6, 7 and 8 are intensive pig and poultry (no. 8) fattening farms located in the Northwest of Germany. Despite some differences in structure (e.g. farm no. 7 runs a biogas plant) they do not differ substantially in their 'greening' effects. In the 5 % modeling alternative it is below 20 €/ha, increasing to 38 €/ha in the 10 % scenario. The biogas production as well as the fattening is not affected at all[9]. I did not include opportunity costs for the reduced area used (and needed) for the application of manure. These costs are expected to be considerably high in this region and they can lead to losses of individual competitiveness due to sunk costs and unused capacity.

Farms no. 9-12 are differently structured and located dairy farms. No. 12 is an extensive dairy producer in a hilly region that does not cultivate any arable land. This explains why the farm does not show any 'greening' effect – there is no arable land to 'green' under the proposed legislation. Farms no. 9 and 11 appear similar, but no. 9 is located in Schleswig-Holstein with heavy soils and with 40 % grassland, while no. 11 keeps dairy cows in northern Allgäu/Bavaria with 50 % grassland and a relatively small biogas plant of 200 kW. Farm no. 9 is more affected by the 'greening' due to higher gross margins of barley and wheat in Northern Germany. I expect the dairy farms not to reduce their animals and the basic feed they need but the regular cash crops. Notable is here that the 'greening' effects based on arable land is considerably higher than the ones based on total land. This is not an astonishing fact because the losses are related to a smaller basis. With a declining basis the per hectare losses increase substantially, this becomes obvious when we look at farm no. 10. It is located in East Frisia/Lower Saxony, a landscape with high shares of grassland. The farm cultivates maize on 20 % of its total land for basic feed production. When allocating the losses of the 'greening' to 20 % of the total land the highest 'greening' effect of my sample occurs (except the vineyard farms no. 17 and 18, not covered in figure 3).

[8] This farm is fictitious, and was created to address the ongoing discussion in Germany about the increasing share of maize in crop rotation in some counties due to biogas plants. To reach the (political) goal of an increasing supply of renewable power the German government released the so-called Renewable Energy Law (EEG) in 2000, which was amended in 2004, 2009 and 2011. The law guarantees certain feed-in tariffs for power generated from renewable resources, including not only wind and solar energy but also energy obtained from biomass. The incentives set by this law led to a building boom of biogas plants in certain rural regions involving a substantially increasing share of maize on the fields with consequences for landscape and biodiversity.

[9] I expect these farms to sell their crop yield completely and buy the feed needed for the fattening.

Farm no. 13 and 14 are mixed farms with dairy cows. No. 13 is an intensively producing cooperative in Saxony with 20 % grassland. The total 'greening' effect is slightly smaller than those of e.g. the fattening farms because the 'greening' obligations apply only to arable land and their losses are than distributed to the total land. Farm no. 14 is an extensive farm in Hesse with 7 % of its arable land as set aside that is why only the 10 % modeling alternative shows a 'greening' effect.

Farms no. 15 and 16 are extensive suckler cow farms; the first is located in the Black Forrest/Baden-Württemberg and the second in eastern Brandenburg and Mecklenburg-West Pomerania. Both still cultivate parts of their lands, 30 and 20 % respectively. The 'greening' effect of no. 16 is lower because of low gross margins on poor soils and little precipitation in this region.

Farms no. 17 and 18 are not shown in the figures. Both are viticulture farms, the latter apply more extensive production methods and light-green agri-environmental schemes than the first. Nonetheless, both farms obtain 'greening' effects between -450 and -900 €/ha. As a result, both would be expected to forego the public support system and not to receive any direct payments anymore. This is due to much higher gross margins per hectare in wine production than in other parts of agriculture. This is probably adaptable to other crops with very high gross margins (fruits, vegetables). If such a farm has to set aside parts of its land it is usually too costly to accept the obligations.

5 Discussion and Limitations

The overall picture indicates that intensively operating farms show a clearly negative 'greening' effect – the very intensively operating can even expect significant losses – while the extensively operating farms emerge from the 'greening' almost indifferently. Only farms with very high gross margins, such as viticulture, fruit and vegetable farms, will forego the public support scheme under the assumed conditions; public support do not outweigh the losses due to the 'greening'. This point out that the intended environmental goals can be expected to be reached – depending heavily on the exact implementation design of the requirements and the corresponding loop holes. However, a higher diversity of the farm structure seems to reduce the impact of the 'greening', because the obligations can be fulfilled with the branch of the farm with the lowest gross margin.

Highly intensive livestock husbandry in pork and poultry keeping is not affected by the 'greening', i.e. I do not expect these farms to reduce their intensity in livestock due to the 'greening'; as stated above this does not take into account opportunity costs for the area needed for manure spreading. Biogas production and the correlated maize cultivation are not much affected as well when biogas comprises only one branch of the farm. In contrast, intensive dairy farming is impaired by the 'greening', although the losses are smaller than in intensive arable farming. Nonetheless, the fact that pig and poultry keeping farms are less affected by the 'greening' than their counterparts in dairy production, could be considered inequitable and might not be accepted by policy makers, especially because intensive pig and poultry farms are those that draw most criticism by consumers and environmental NGOs when talking about intensive agriculture.

On the other hand, the differences between arable and dairy farms would probably increase if arable farms have, rent or purchase marginal land which is less valuable for them. Every additional unit of marginal land that an arable farm cultivates can be used to keep a unit of originally farmed arable land in production. This increases the demand for marginal land on the one hand and would cause an approximation of the arable farms' losses to the dairy farms on the other hand which would be a relative deterioration of the latter. Farmers - especially those with intensive and/or highly successful

grain and sugar beet production - report that they already have started to look for marginal or less valuable land compared to their currently plotted acreage to be able to fulfill the obligations without changing their actual production patterns.

Another important question is how dairy farms with a high share of grassland and little arable land shall comply with the crop diversification requirement. Mixtures or intercropping might be a solution as well as an exception to perform a crop rotation on a three year basis.

The Commission has proposed that 30 % of the direct payments be linked to compliance with the 'greening' measures. 30 % correspond to 90 €/ha in the German case. All modeling alternatives except the two vineyard farms and the 10 % alternative in farm no. 5 with biogas production only are below this amount. Undoubtedly, there are more aspects incorporated in the question of valuing burdens due to additional environmental requirements than losses in gross margins but they are an important reference point.

In conjunction with these thoughts and already mentioned by intensive arable farmers one can imagine a reaction by farmers that is not incorporated in my model. Intensive fattening farms produce at least part of their feed on their own land and especially in dairy farming the price, quality and quantity of staple feed is crucial to secure the farm's competitiveness. If a farmer is obliged to establish an ecological focus area on parts of his land, he may very well compensate by increasing the production intensity on the rest of the land. This contradicts the underlying goal of the ecological focus area of a measure to increase environmentally beneficial production practices. This argument can be disproved by the explanations of KOESTER (2010) presented in the theory chapter and the intensification effect may be caused by other contexts. Furthermore, the eligibility of terraces, landscape features, buffer strips and afforested areas as ecological focus areas will probably reduce the pressure on arable land and a number of farms will be able to fulfill the requirements without any changes.

The discussion of purchasing or renting marginal land indicates a limitation of my modeling. Many assumption only hold true if farmers cannot obtain other alternatives to evade the consequences of the 'greening'; such cases are not considered in this investigation. I did not introduce any mechanism to allow for changes of the factor endowment and/or responses to incentives to buy, rent or sell land. Nonetheless, it is possible to make corresponding adjustments to my model in order to maintain the ability to display farmers' choices in a realistic way and to prevent mistakes generated by a mechanical solution which cannot account for individual restrictions (cp. Data and Methods).

Furthermore, I have not accounted for effects that could emerge on a regional scale. Due to an increased demand for marginal land the supply of such land types can become shorter and induce a price increase. Likewise, a general higher demand for land including rising prices can be expected to compensate the losses due to the introduction of ecological focus areas. Especially farms with biogas plants face the need to run the plant and to feed it with sufficient substrate, but also those having built a new stable or have had other investments may be forced to pay more than the marginal value product of the land. Another effect on a regional scale might be the reduction in production of mainly feed grains. Farmers reduce those crops with the lowest gross margin which are often feed grains. This can induce a relative shortage on feed grain markets and thus an increase in prices (what again will make these grains relatively more attractive).

6 Conclusions and Implications

The aim of this research was to calculate the 'greening' effect for different farm types in Germany due to the reform of the CAP. I find that the currently envisaged 'greening' measures in Europe can be expected to function in general in terms of compliance with the regulation. Despite high costs this may be ecologically beneficial especially in intensively farmed regions. The overall picture indicate that the intensively operating farms show a clearly negative 'greening' effect – the very intensively operating can even expect significant losses – while the extensively operating emerge from the 'greening' almost indifferently. This result is especially obvious for the group of the arable farms. Farms in regions with low natural yield potential and low gross margins show much smaller 'greening' effects than those with high yields – in absolute terms. In general, a higher diversity of the farm structure seems to reduce the impact of the 'greening', because the obligations can be fulfilled with the branch of the farm with the lowest gross margin.

Upcoming (political) challenges seem to be the dairy farms with low share of arable land, that intensive livestock production is not much affected, the possible intensification of the remaining land (as a consequence of other causes), the treatment of farms with very high gross margins per hectare (which are traditionally obtained in fruit production, horticulture and viticulture) that otherwise would forego the direct payment scheme, the handling of the 'maize question' and biogas plants and – from an environmental point of view – to make the reform ecologically worthwhile.

From my point of view, the need to incorporate farms with very high gross margins into the public support scheme does not hold true for the biogas producing enterprises, because the high gross margins for biogas substrates are politically induced by the Renewable Energy Law. The high gross margins (as well as the willingness to pay very high land rents) reflect the subsequent necessity to keep the biogas plant running to receive the stipulated prices and to pay off the construction costs. Actually, the intention to introduce the maximum crop share obligation into the 'greening' could be partly a reaction on the increasing area planted with maize as a biogas substrate. To combat the consequences of one policy introduced by the Federal Ministry of the Environment with instruments of agricultural policy seem to be costly and little promising and worthwhile.

One goal of the reform – to be able to enter the regions with intensive arable farming – can be expected to be obtained, given that there are no remarkable loop holes in implementation design. It is not apparent how this could be achieved with voluntary measures. In contrast, the high costs for the society and the EU associated with the current proposal is apparent. Thus, it is questionable, if the remuneration of farmers for an obligatory provision of public goods and a reduction/internalization of negative externalities could be achieved more efficiently.

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Das Department für Agrarökonomie und Rurale Entwicklung

Die Wurzeln der **Fakultät für Agrarwissenschaften** reichen in das 19. Jahrhundert zurück. Mit Ausgang des Wintersemesters 1951/52 wurde sie als siebente Fakultät an der Georgia-Augusta-Universität durch Ausgliederung bereits existierender landwirtschaftlicher Disziplinen aus der Mathematisch-Naturwis-senschaftlichen Fakultät etabliert.

1969/70 wurde durch Zusammenschluss mehrerer bis dahin selbständiger Institute das **Institut für Agrarökonomie** gegründet. Im Jahr 2006 wurden das Institut für Agrarökonomie und das Institut für Rurale Entwicklung zum heutigen **Department für Agrarökonomie und Rurale Entwicklung** zusammengeführt.

Das Department für Agrarökonomie und Rurale Entwicklung besteht aus insgesamt neun Professuren mit folgenden Themenschwerpunkten:

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- Landwirtschaftliche Betriebslehre
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- Soziologie Ländlicher Räume
- Umwelt- und Ressourcenökonomik
- Welternährung und rurale Entwicklung

In der Lehre ist das Department für Agrarökonomie und Rurale Entwicklung führend für die Studienrichtung Wirtschafts- und Sozialwissenschaften des Landbaus sowie maßgeblich eingebunden in die Studienrichtungen Agribusiness und Ressourcenmanagement. Das Forschungsspektrum des Departments ist breit gefächert. Schwerpunkte liegen sowohl in der Grundlagenforschung als auch in angewandten Forschungsbereichen. Das Department bildet heute eine schlagkräftige Einheit mit international beachteten Forschungsleistungen.

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