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Structural Implications of the CAP Reform after 2020 – The German Case

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Structural Implications of the CAP Reform after 2020 –

The German Case

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For the funding period 2021-2027, the European Commission wants to redesign the payment scheme in order to achieve a fairer distribution of funds. In this paper we simulate some of the proposed reforms with the agent-based model AgriPoliS. The analysis focuses on the effects of the capping of direct payment and stronger redistributive payment scheme for the first hectares on structural change, farm performance and their implications on land markets. The results show that the Commissions set goals can only be partly achieved by the proposed reform. Our analysis reveal political unintended redistributive effects at the expense of small farms.

Keywords: structural change, land market, CAP reform, agent-based modeling

JEL Code: Q15, Q18, C63

1 Background and Motivation

Since the MacSharry reform, the uneven distribution of direct payments between farms is recurrently subject to intensive discussions in all previous Common Agricultural Policy (CAP) reforms (Agra Europe, 1991; European Commission, 1997; Hill, 2000). In 2005, the “modulation” was implemented, which is a compulsory payment reduction of 5% for all farms receiving more than €5,000. Additional cuts for large farms were proposed by the EU Commission in 2008 (European Commission, 2007). Extensive discussions on that issue finally led to stepwise increasing modulation rates up to 10% in 2012 and 4% higher modulation rates for large farms. In the CAP Reform 2013, the greening, additional payments for first hectares and for young farmers were implemented. With higher payments for the first 46 hectares and additional redistribution of direct payments towards smaller farms were introduced in the CAP reform 2013 (BMEL, 2015).

For the funding period 2021-2027, the European Commission is planning to reform the CAP. In the course of the reform, environmental and climate protection are expected to become a higher priority. Direct payments will still remain an essential part of the CAP. However, the Commission wants to redesign the payment scheme in order to achieve a fairer distribution of funds. This includes more flexibility for the member states in the allocation of the payments. The goal is to support the small and mid-sized farms. Farms which previously received between €60,000 and €100,000 in direct payments will receive less, and at €100,000, direct payments will be capped. In both cases, the cost of labor can be deducted, so in theory a farm which spends €200,000 on labor could still receive €300,000 in a direct payment. The redistributive payment scheme (extra payment for first hectares), which is currently optional, would become compulsory for all member states. Moreover, it is proposed that at least 2% of the budget has to be used for the support of young farmers. That is more than twice as much as the 0.8% at present (European Commission 2018).

It is the objective of this contribution to model and simulate some of the proposed reforms of the CAP from 2021 to 2031 with an agent-based approach. Modeling farms individually allows each

farm's payment to be calculated, in addition to the extent it will be capped, as well as how farms react to avoid capping. The analysis focuses on the effects of the capping of direct payment and redistributive payment scheme for the first hectares on structural change, farm performance and their implications on land markets.

2 Method

AgriPoliS (Agricultural Policy Simulator, see Happe, 2004; Happe et al., 2008; Sahrbacher et al., 2012a; Balmann, 1997) is a spatially explicit and dynamic agent-based model of structural change and policy response. A detailed documentation of the current version can be found in Kellermann et al. (2008). A protocol following the ODD standard (Overview, Design concepts and Details) is available in Sahrbacher et al. (2012b). In AgriPoliS, individual farm agents are assumed to maximize profits or household income by use of a mixed-integer programming model, and are able to react to price or policy changes by renting or leasing land, by changing their production system, or by choosing to quit agriculture. These individual farm agents compete for land with their neighbors by interacting on the land market, which is implemented as a repeated auction. Within the auction, every farmer first selects the available plot that is most valuable to the farm and then calculates a bid for this plot. Every farm's bid equals a specific proportion (e.g. 80%) of the marginal gross margin of this additional plot. The bid considers transportation costs that are assumed to be proportional to the distance between plot and farm. The farm with the highest bid receives the plot and is able to use it for a specific contract length (cf. Kellermann et al., 2008, p. 28 ff.). Afterwards, all farms can again submit bids that are compared again. This procedure continues as long as land is available.

2.1 Case Study Region

AgriPoliS is adapted to selected regions by specifying farm types that are typical for that region and which are weighted to match regional characteristics. The analysis is conducted in the Altmark, in the north of the Federal State of Saxony-Anhalt. The Altmark is defined by a large-scale agricultural structure, typical of North-East Germany. It is dominated by large corporate farms which specialize in arable farming as well as mixed farms with a high share of dairy farming. There is a total of 1,070 farms operating in that region, which use an average of 256 ha of land (STALA 2016). Compared to other regions in north-east Germany, the share of grassland (25%) is high in the region (STALA 2016).

2.2 Scenarios

To reflect the proposed reforms, we simulate the following scenarios for the Altmark region in AgriPoliS (Table 1). The "Base" scenario reflects the current implementation of the CAP. In the "Capping" scenario farms which previously received between €60,000 and €100,000 in direct payments will stepwise receive less, and at €100,000, direct payments will be capped. To elaborate more on the effects of a redistributive payment scheme, we increased the additional payments for first hectares in the "First hectares increase (FHI)" scenario. Accordingly, farmers will receive 100€ extra pay per hectare for the first 100 hectares. As an alternative for the proposed reform, we implemented the "Phasing out" scenario in which the direct payments will stepwise be abolished over 10 years.

Table 1 Scenarios

Scenario	Description																		
Base	50 €/ha extra pay for the first 30 ha, 30 €/ha for the next 16 ha No capping																		
First hectares increase (FHI)	From 2021: 100€/ha extra pay for first 100 ha No capping																		
Capping	From 2021: <table border="1" data-bbox="635 607 1289 1016"> <thead> <tr> <th>Step</th> <th>Amount of direct payment (per farm annually)</th> <th>Capping (% of total amount of direct payments)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Up to 60,000 €</td> <td>0 %</td> </tr> <tr> <td>2</td> <td>60,000 € to 75,000 €</td> <td>25 %</td> </tr> <tr> <td>3</td> <td>75,000 € to 90,000 €</td> <td>50 %</td> </tr> <tr> <td>4</td> <td>90,000 € to 100,000 €</td> <td>75 %</td> </tr> <tr> <td>5</td> <td>Over 100,000 €</td> <td>100 %</td> </tr> </tbody> </table>	Step	Amount of direct payment (per farm annually)	Capping (% of total amount of direct payments)	1	Up to 60,000 €	0 %	2	60,000 € to 75,000 €	25 %	3	75,000 € to 90,000 €	50 %	4	90,000 € to 100,000 €	75 %	5	Over 100,000 €	100 %
Step	Amount of direct payment (per farm annually)	Capping (% of total amount of direct payments)																	
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3	75,000 € to 90,000 €	50 %																	
4	90,000 € to 100,000 €	75 %																	
5	Over 100,000 €	100 %																	
Phasing out	Gradual phasing out of direct payments over 10 years starting from 2021.																		

3 Analysis

The simulation is carried out for the period from 2016 to 2041. Our analyses are conducted for the period 2019 to 2031. We analyze impacts of the CAP scenarios on farms and the Altmark region while focusing on three aspects: 1) the structural change in the Altmark region in terms of farms and farm sizes, 2) the performance of farms, and 3) the competition for land between farms.

3.1 Structural change

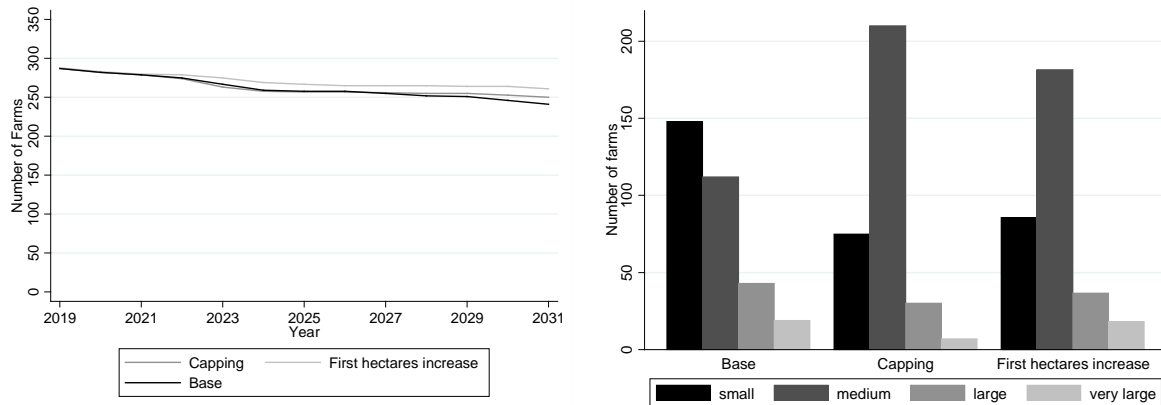


Figure 1 Development of number of farms over time and distribution of farms in different size groups in 2031. Note: “Small” are farms with a UAA of less than 100 ha. “Medium” are farms with at least 100 ha but less than 500 ha. “Large” are farms from 500 ha but less than 1,000 ha and “very large” are farms with 1,000 ha and more.

Figure 1 shows that the decline in the number of farms in the model region is slightly lower in “Capping” and even lower in “FHI” scenario. The right side of Figure 1 reveals a shift between size classes. In both, the “Capping” and “FHI” scenario the number of small farms is lower than in the “Base” scenario. Many of them shift into the group of medium sized farms. In the “Capping” scenario this effect is more distinct than in the “FHI” scenario. The number of very large farms does not change in the “FHI” scenario, but decreases in the “Capping” scenario.

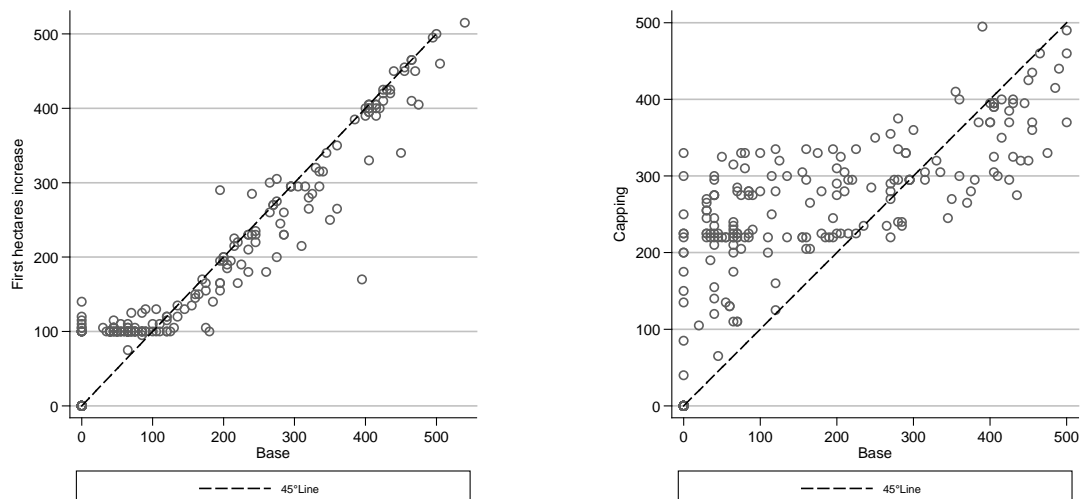


Figure 2 Farm sizes in 2031, in the First hectares increase (FHI) and Capping scenarios (model results). Note: Farm size in hectares of single farms in 2031. Farms that are on the 45° line are equally sized in both scenarios. Farms underneath the 45° line are larger in the Base scenario, while farms above the 45° line farm more hectares in the FHI or Capping scenario. For better visibility the graphs are cut at 500 hectares.

The scatter plots in Figure 2 shows how individual farms develop in terms of their sizes in hectares Utilized Agricultural Area (UAA) in the “FHI” and “Capping” scenario. In the “FHI” scenario, there

are a number of farms with 100 or slightly more hectares. Most of these farms are smaller or even closed in the “Base” scenario. Most of the other farms are larger in the “Base” scenario. The other larger farms reach larger farm sizes in the base scenario. In the “Capping” scenario (scatter plot on the right-hand side) there are a huge number of smaller and medium sized farms that reach larger farm sizes than in the “Base” scenario. At around 300 hectares there is the turning point. Farms above this threshold reach larger farms sizes in the “Base” scenario.

3.2 Farm performance

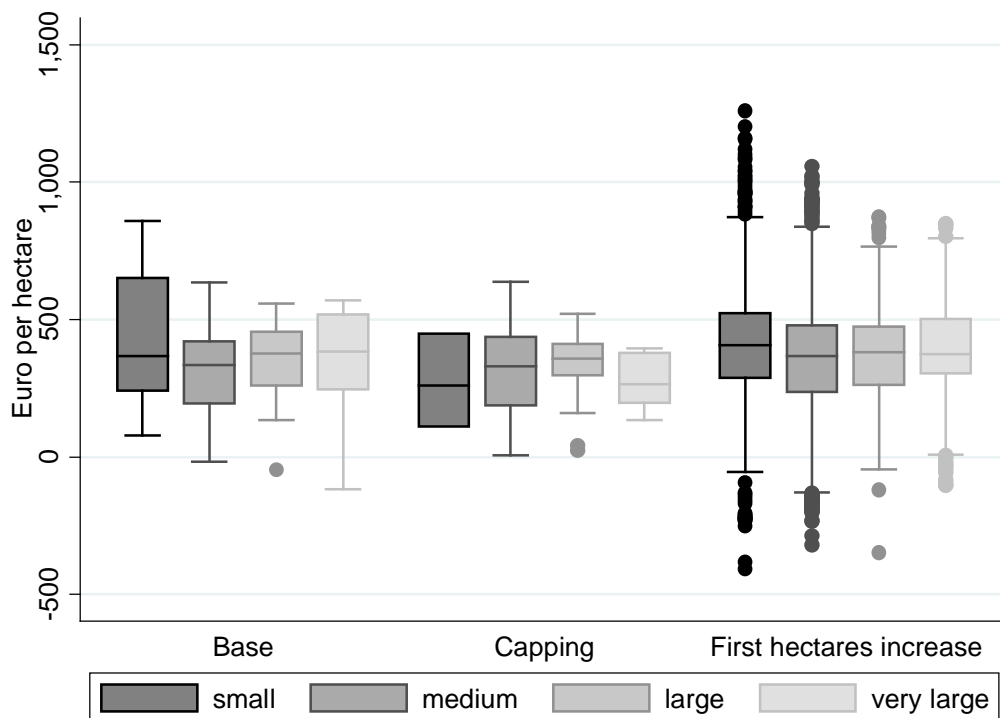


Figure 3 Distribution of profits per hectare in different size classes for Base, Capping and FHI scenario in 2031. Note: “Small” are farms with a UAA of less than 100 ha. “Medium” are farms with at least 100 ha but less than 500 ha. “Large” are farms from 500 ha but less than 1,000 ha and “very large” are farms with 1,000 ha and more.

Figure 3 shows profits in Euros per hectare in 2031 for different farm size classes. Although for mid-sized and large farms the difference between the scenarios is minimal, small and very large farms gain slightly lower profits on average in the “Capping” scenario. For these two size classes the variance in profits decreases too. In the “FHI” scenario the variance in profits increases for each size class.

3.3 Land market

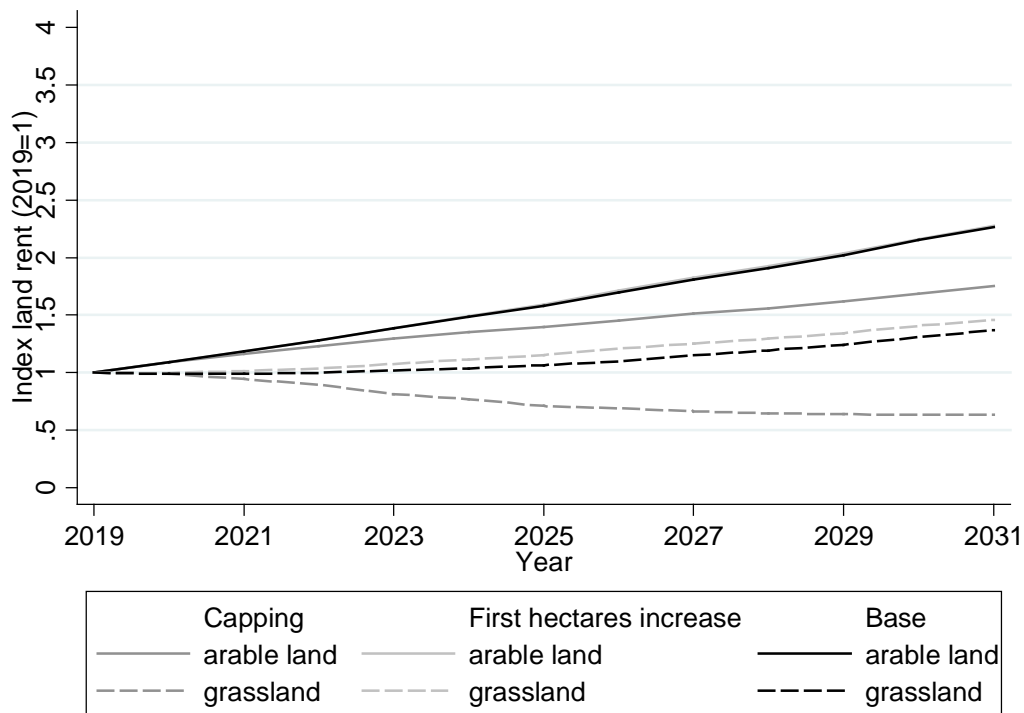


Figure 4 Development of rental prices over time in the Capping, FHI and Base scenario

When looking at rental prices (Figure 4), they are the highest for arable land in the “Base” scenario and in the “FHI” scenario. They are almost congruent for these two scenarios. The “Capping” scenario leads to a slower increase in rental prices for arable land. For grassland we observe an increase in rental prices in the “FHI” scenario compared to the “Base” scenario. In the “Capping” scenario the rental prices for grassland are lower than in the “Base” scenario.

3.4 Alternative scenario - “Phasing out”

In this contribution we analyzed the effects of an increase of the first hectares payment and the capping of direct payments. Additionally to these proposed reform scenarios we want to present some results for an alternative political scenario, namely the complete phasing out of direct payments. We see this as food for thought to stimulate the discussion on the proposed CAP reform.

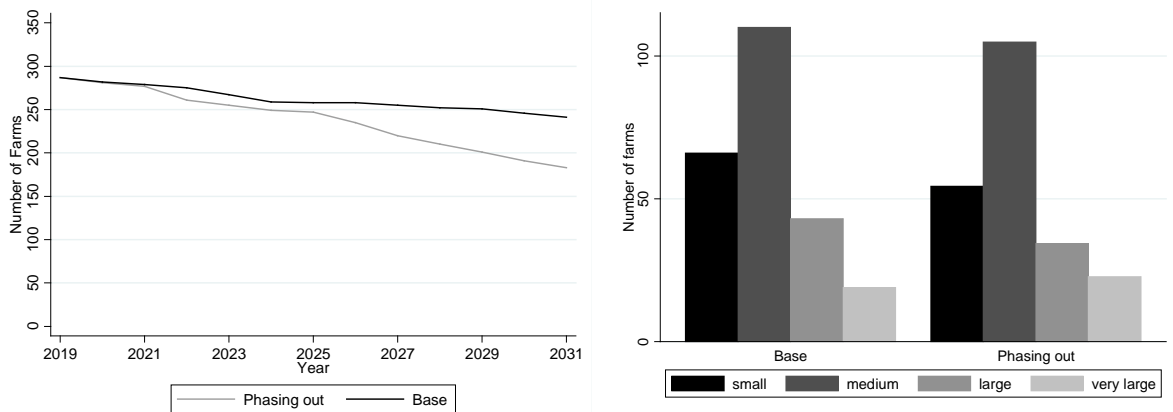


Figure 5 Development of number of farms over time and distribution of farms in different size groups in 2031. Note: “Small” are farms with a UAA of less than 100 ha. “Medium” are farms with at least 100 ha but less than 500 ha. “Large” are farms from 500 ha but less than 1,000 ha and “very large” are farms with 1,000 ha and more.

The number of farms shows indications of an accelerated structural change. By the end of the simulation there are about 60 farms less operating than in the “Base” scenario (Figure 5). This is also considerably less than in “Capping” and “FHI” scenarios. In contradiction to the “Capping” and “FHI” scenarios, there is no substantial redistribution between farm size classes.

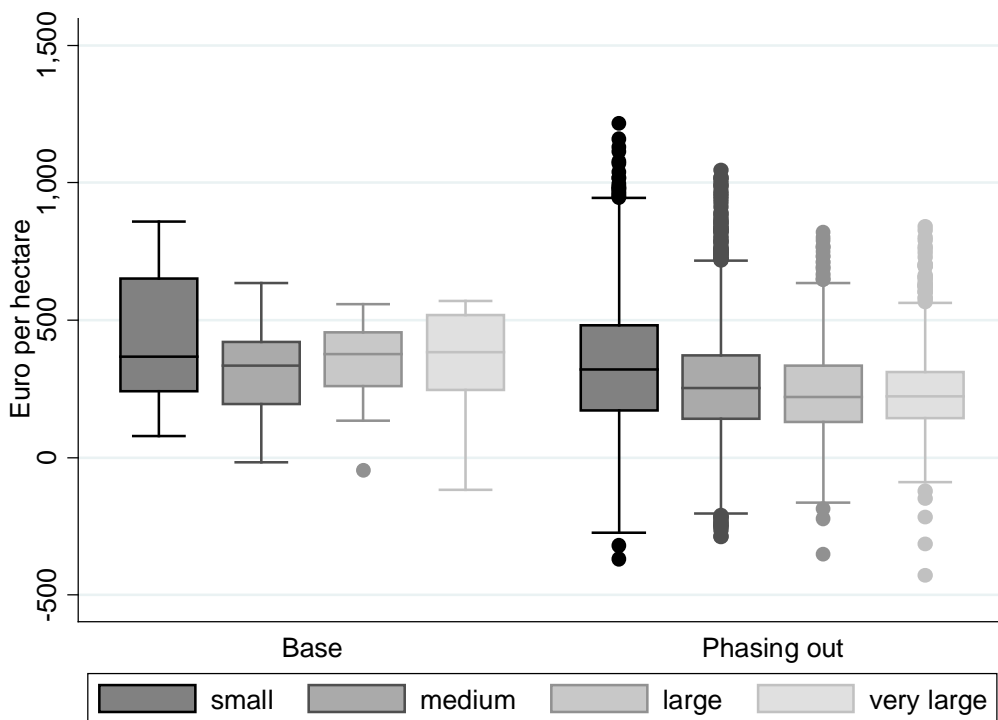


Figure 6 Distribution of profits per hectare in different size classes for the Phasing out scenario in 2031. Note: “Small” are farms with a UAA of less than 100 ha. “Medium” are farms with at least 100 ha but less than 500 ha. “Large” are farms from 500 ha but less than 1,000 ha and “very large” are farms with 1,000 ha and more.

Also Figure 8 shows that there is – additional to a slight general decrease in the profits per hectare on average – a higher variance of profits per hectare for all farm size classes. Large and very large farms have on average a slightly greater disadvantage than smaller farms.

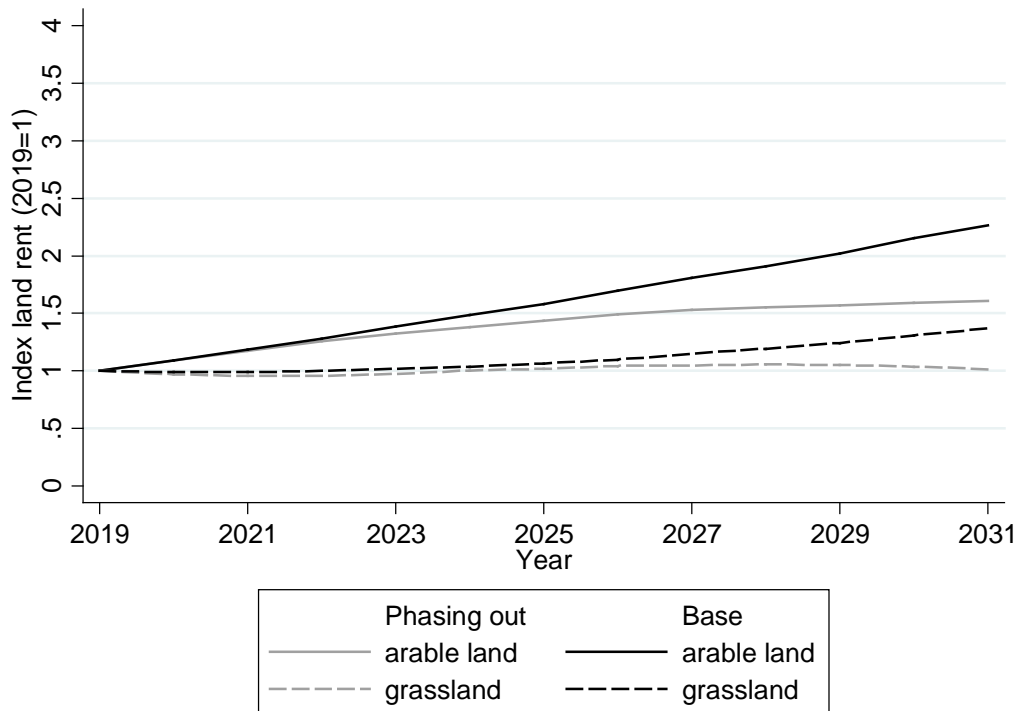


Figure 7 Development of rental prices in the phasing out scenario.

The rental prices for arable and grassland stagnate proportionally in the “Phasing out” scenario (Figure 7).

4 Discussion and conclusion

Our analyses show the different implications of currently discussed policy scenarios for the Common Agricultural Policy after 2020. We analyzed the effects of a capping of direct payments and a stronger redistributive payment scheme. Additionally, we implemented a hypothetical complete phasing out of direct payments.

For the scenario “FHI” our simulations reveal that the policy not only helps small farms to survive. It actually leads to a decrease in the number of small farms, because these farms grow into the next larger size class. However, they are not going to exceed 100 hectares by very much.

Farmers form their bids on land markets according to the marginal gross margin of the respective hectares. As direct payments contribute to this marginal gross margin, the bids will be accordingly higher as long as the farm do not exceed the size until the higher direct payments are granted. Therefore, the farm size until which the higher direct payments in the redistributive scenario are applicable represents a kind of barrier to growth. This barrier affects only small farms. On a bid which would cause a farm to exceed this barrier, the farm calculates their bid with the reduced direct payments, resulting in lower bids and a reduced probability of receiving additional land. In contrast, large farms are barely affected by the redistributive payment scheme. Due to economies of scale their marginal gross margin and therefore their competitiveness on the land market is higher anyway.

Moreover, we observe – at least for grassland - a spillover effect. Due to increased rental prices, a certain proportion of the increased payment for the first hectares is transferred to the land owners.

In the scenario with a capping of direct payments, small and medium sized farms can increase their land bank compared to the “Base” scenario, while farms with more than 300 hectares generally reach larger farm sizes in the base scenario. However, this is not correlated with a higher profitability of smaller farms. Farms with under 100 hectares have even lower profits in the “Capping” scenario. Mid-sized and large farms perform about the same as in “Base”. Very large farms are negatively affected by the capping of direct payments. These farms cannot grow their land bank as much as in the “Base” scenario and have lower profits on average. Therefore, the capping of direct payments leads to a redistribution in favor of medium sized farms.

In reality, the capping would most likely lead to the breaking up of large farms into farms under the cap size. Further, we did not account for the deduction of labor costs. This would reduce the observed effects of the capping. Further, this could be seen as equivalent to cross-subsidizing labor-intensive production.

As an alternative scenario we implemented a complete phasing out of direct payments over ten years. Although, the profitability of farms and also the number of farms decreases, we do not observe political unintended redistributive effects at the expense of small farms as in the “Capping” and “FHI” scenario. Therefore, one could conclude that in order to obtain a “fairer” redistribution between farms or at least to strengthen smaller farms, the direct payments would not have to be redistributed, but would have to be abolished. In addition, this would lead to a much demanded or desired stagnation of rental prices, which would probably make further political intervention and land market regulations unnecessary.

Literature

AgraEurope (1991): 11 January, P2.

Balmann, A. (1997): Farm-based modelling of regional structural change: a cellular automata approach, European review of agricultural economics Found. Eur. Rev. Agric. Econ., 24 (1), pp. 85-108

BMEL (2015): Umsetzung der EU-Agrarreform in Deutschland URL: http://www.bmel.de/SharedDocs/Downloads/Broschueren/UmsetzungGAPinD.pdf?__blob=publicationFile [2019-03-14]

European Commission (1997): Agenda 2000: For a stronger and wider Union, COM/97/2000 final - Vol. I, Brussels, 16 July.

European Commission (2007): Preparing for the "Health Check" of the CAP Reform, COM(2007) 722 final, Brussels, 20 November.

European Commission (2018): Proposal for a Regulation of the European Parliament and of the Council [...] URL: https://eur-lex.europa.eu/resource.html?uri=cellar:aa85fa9a-65a0-11e8-ab9c-01aa75ed71a1.0003.02/DOC_1&format=PDF [2018-11-01]

Happe, K. (2004): Agricultural policies and farm structures - agent-based modelling and application to EU-policy reform Stud. Agric. Food Sect. Cent. East. Eur., 30 (IAMO)

Happe, K., Balmann, A., Kellermann, K. and Sahrbacher, C. (2008): Does structure matter? The impact of switching the agricultural policy regime on farm structures J. Econ. Behav. Organ., 67 (2), pp. 431-444

Hill, B. (2000): Farm incomes, wealth and agricultural policy, 3rd ed. Aldershot: Ashgate.

Kellermann, K., Happe, K., Sahrbacher, C., Balmann, A., Brady, M., Schnicke, H., Osuch, A. (2008): AgriPoliS 2.1 – Model Documentation.

Sahrbacher, C., A. Sahrbacher, K. Kellermann, K. Happe, A. Balmann, M. Brady, H. Schnicke, A. Ostermeyer, F. Schönau (2012b): ODD-protocol of AgriPoliS. IAMO

Sahrbacher, C., Sahrbacher, A. Balmann, Ostermeyer, A. and Schönau, F. (2012a): Capping Direct Payments in the CAP: Another Paper Tiger? EuroChoices, Vol. 11, No. 3, pp. 10-15.

STALA (2016): Agrarstrukturerhebung Teil 1: Bodennutzung 2016, Landwirtschaftliche Betriebe nach der jeweiligen Fläche und Anbaukulturen sowie nach Größenklassen der landwirtschaftlich genutzten Fläche, Bodennutzung – Teil ökologischer Landbau. Available: https://www.statistik.sachsen-anhalt.de/download/stat_berichte/6C424_3j_2016.pdf [2017-09-26].