Structural Implications of First Hectare Payments and Young Farmer Support within the EU CAP Reform 2013: The German Case

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Abstract

Within the reformed CAP, Germany decided to support small and young farmers by higher hectare payments. Because of heterogeneous farm structures with smaller farms in the south and large in the east, this causes regional redistributions. Agent-based simulations show that these policies create incentives for small farms to continue production but cannot provide perspectives. As small farms compete usually with other smaller farms additional support fulminates in small farm dominated regions in higher land prices and a structural conservation. Moreover, large farms are not harmed by reduced payments as they mainly compete with other large farms which are equally affected.

Keywords: Common Agricultural Policy, redistribution, young farmer, structural change, agent-based modelling

Introduction

After several years of intensive discussions, in September 2013, European Commission (EC), Parliament (EP) and Council agreed finally on the Common Agricultural Policy (CAP) for the financial period 2014 to 2020 (EU, 2013). Accordingly, the level of direct payments among member states will partly be harmonized. Moreover, direct payments to be paid per hectare will be split into basic payments of 70 % and a greening component of 30 % of the total payments. Highly disputed was until the agreement whether there should be a capping of direct payments for large farms (cf. Sahrbacher et al. 2012). Particularly the EC and EP suggested to limit the basic payments at a certain maximum level per farm (CAP2020, 2013). As a compromise, it was finally agreed that member states either would have to reduce direct payments per farm by 5 % for those payments above 150 000 € per farm (after deduction of salaries and social security payments) or the member states need to redistribute at least 5 % of annual national ceiling as top-ups for the first hectares of each farm. Accordingly, small farms can receive certain top-ups to their per hectare payments for up to 30 ha or the member state's average farm size. These top-ups will have to be financed by reduced general basic payments. In addition to these payments for small farms, the member states have to support young farmers by additional top-ups on a per hectare basis. This support for young farmers also has to be financed by reduced basic payments. Moreover, the member states can redistribute direct payments towards second pillar measures.

On November 4, 2013, the German Council of Agricultural Ministers (AMK), representing the federal government and the federal states' governments, agreed on rules to implement the reformed CAP. Accordingly, Germany will introduce first hectare payments of 50 €/ha for the first 30 ha and additional 30 €/ha for the next 16 hectares considering a national average farm size of 46 ha. These payments are supposed to redistribute 6.9 % of the basic payments (AMK, 2013) and is motivated by the aim to support small farms as well as to compensate them for the abolition of the previous progressive modulation of direct payments which disfavoured larger farms and was in favour of smaller farms (BMELV, 2013). The AMK also agreed to support younger farmers which take over a farm by additional 50 €/ha for up to 90 ha and five years. Moreover, it was agreed to harmonize the regional levels of basic payments in three steps until 2019. Last but not least, it was agreed to transfer 4.5 % of direct payments towards second pillar measures. In total, these regulations affect not only the structure of direct payments, but also cause significant transregional redistributions as well as they affect incomes, land market and structural change within the different regions.

In the remainder, we aim to assess the transregional as well as the structural effects of the proposed implementation for selected German regions. This is particularly motivated by the regional diversity of farm structures in Germany. While Eastern German agriculture is

dominated by rather large family and corporate farms, Southern Germany is dominated with small and medium-sized family farms. Therefore, we first analyse and interpret statistical information of farm size distributions as well as FADN data for eastern and southern German states. In a second step, we simulate the effects of the AMK proposal as well as a straight implementation of the CAP agreements for selected regions in the eastern and southern parts of Germany by using the agent-based model AgriPoliS. Based on the simulations we assess short and medium term structural and distributional effects. In a third step, we draw policy conclusions.

Transregional redistributions

In 2012, 70 % of all German farms farmed less than 50 ha (DeStatis, 2012). According to the proposed scheme for supporting first hectares of each farm, this means that these many farms receive first hectare payments for almost all of their acreage. However, these 70 % of all farms farm altogether only some 22 % of German farm land. The other 30 % of the farms receive the maximum of 1 980 € per farm for their first 46 ha. However, their average size is 152 ha. Accordingly, they receive these extra payments for less than 30 % of their land. Altogether, first hectare payments are paid for some 45 % of all farm land. Much lower is this share in Eastern Germany where farms with less than 50 ha farm only 4 % of the land. The other farms which farm 96 % of the acreage have an average size of 467 ha. Thus, these corporate and larger family farms receive only for some 10 % of their acreage first hectare payments. In total, Eastern German farms receive first hectare payments only for some 13 % of the acreage. This is completely different in the southern parts of Germany where agriculture is dominated by small and medium-sized family farms. For instance, Bavarian farms receive first hectare payments for approximately 75 % of the acreage and farms in Baden-Württemberg for 70 %. Assessing the redistributive effects of the first hectare payments means that Eastern Germany loses in total annually more than 85 million € respectively 15 €/ha while Bavaria and Baden-Württemberg gain approximately 48 million € respectively 10 €/ha.

The redistributive effects get even stronger by the extra payments for young farmers. One reason is that these payments are limited to family farms which have only a share of some 50 % of total farm land in Eastern Germany but for instance some 86 % in Bavaria. Moreover, many Eastern German family farms have an acreage significantly larger than 90 ha, the maximum amount of land benefitting from the top-ups for young farmers. As a result, one can assume that only some 20 % of Eastern German farm land is theoretically eligible for these extra payments. Considering that the time period for a generational change is some 20 to 35 years means that Eastern German farmland benefits to less than 5 % from young farmers' payments, i.e. on average less than 2 €/ha. On the other hand, almost all land in Southern Germany is farmed by family farms and the biggest share of land is farmed by farms with less than 90 ha (DeStatis, 2012). Accordingly, it can be assumed that approximately 80 % of the acreage is eligible. Thus one can assume that young farmers' payments will be paid annually for some 15 to 25 % of the farm land. Considering that some 6 €/ha will be redistributed within the young farmers program means that Eastern Germany will lose some additional 4 €/ha and in total more than 20 million € towards Southern German farmers which will gain another 4 €/ha.

Adding up the transregional redistributions of first hectare and young farmers' payments mean a difference of some 30 € per ha which is approximately 10 % of total direct payments and 17 % of the basic payments. This raises several questions. One is what the intraregional effects on farm income and farm structure are. Another is whether these redistributions are justified. While the first question will be answered in the next section, the latter will be addressed in the following by conducting simulation with the agent-based model AgriPoliS.

Table 1 shows structural figures for certain farm groups in Germany classified according to legal form, region and size. General insights are that smaller farms tend on average to be less profitable. Moreover they tend to operate with a higher labour and capital intensity. Particularly small family farms with a standard output of less than 100 000 € and part-time farms are less profitable. The low profitability may provide a social argument that these farms may need support. However, looking further into details indicates a number of insights that may wonder. For instance, family farms on average and even small family farms in Bavaria have substantial amounts of equity capital which is on average above 500 000 € per farm and 8 000 €/ha. Accordingly, one can assume that at least on average these farms are quite wealthy and are hardly financially constrained. On the other hand, the very successful Eastern German family farms show very low amounts of equity capital per hectare and also per farm. Total equity capital is even lower than that of small Bavarian farms. Particularly low is the equity per ha which is just 12 % of the corresponding figure for Bavaria. And even compared to the value of total assets the share of equity capital is below 50 %.[1] On the one hand, the low amount of total equity capital of Eastern German farms has to be explained historically. Many of these farms were newly or re-established in the early 1990s and the accumulation of equity takes time. On the other hand, land prices in East Germany were and still are quite low. These low rental prices created for many farms an incentive rather to maximise the amount of land per farm than for instance investing the limited amount of available capital in animal husbandry.

Table 1: FADN data by region farm size in SO and legal form in Germany in 2012/13

Figure	Size	Acreage	Labour intensity	Total assets	Equity capital	Equity captial	Income + wages	Profi-tability of equity	Rental price
Farm group	SO	ha	LU/100 ha	€/ha	€/ha	€	€/LU	%	€/ha
Germany									
Full-time farms	215	75	2.8	10 957	**8 536**	**640 200**	**35 548**	**2.9**	279
thereof < k€ 100 SO	76	40	3.7	13 267	**11 730**	**469 200**	**22 315**	**-1.7**	204
Part-time farms	45	28	3.5	14 313	**12 728**	**356 384**	**16 379**	**-3.3**	221
Bavaria									
Full-time farms	145	55	3.2	14 089	**11 843**	**651 365**	**31 785**	**1.3**	266
thereof < k€ 100 SO	77	35	4.1	16 132	**14 626**	**511 910**	**22 397**	**-1.6**	207
Saxony-Anhalt									
Full-time farms	346	253	1.2	3 554	**1 981**	**501 193**	**64 756**	**23.4**	236
thereof < k€ 100 SO	74	70	2.5	2 958	**1 649**	**115 430**	**19 988**	**-7.8**	135
Corporate farms	2 165	1 151	1.9	5 045	**2 943**	**3 387 393**	**42 887**	**9.8**	166
thereof >M€ 3 SO	4 588	1 873	2.4	5 921	**3 590**	**6 724 070**	**42 619**	**9.6**	178

Source: BMEL (2014); SO = Standard Output, LU = Labour Units.

On may wonder, why Bavarian farms are despite of their low profitability so wealthy. Even though many Bavarian farmers have additional off-farm incomes, it is rather unlikely that a farm can accumulate the equity from savings. A more plausible explanation is that the

[1] The FADN figures may underestimate the true equity values. Particularly in East Germany sales prices for land increased significantly over the past years. The values in the balance sheets do not reflect this development However, if farms would sell this land, in many cases the price difference would be subject to taxation which again would reduce the value.

equity is inherited. Indeed, the German agricultural inheritance laws suggest for most regions to transfer the farm in total to the successor and to compensate other heirs based on the earning-capacity value. As profitability is quite low, also the earning-capacity value is only a small fraction of the farms' sales values. As also the German inheritance tax for transferred farms is low, equity can be transferred easily from one generation to the next.

Table 1 illustrates also that further policy-relevant figures show a non-linear relationship regarding farm sizes. For instance, the group of the largest Eastern German corporate farms as well as small Eastern German family farms have a much higher employment intensity than average Eastern German family farms as it is shown for those in the Eastern German state Saxony-Anhalt. Accordingly, average Eastern German family farms get already now significantly higher direct payments per labour unit than small and corporate farms. At the same time, these family farms have quite high profitability figures. On the other hand, this indicates that the redistributive measures and the regulations of the young farmer support will most likely not harm average Eastern German family farms which hardly benefit. Nevertheless, one may wonder whether redistributive measures are really in accordance with policy goals like that of strengthening rural areas. Also profitability and equity seem to be nonlinear with regard to the farms' size and hardly correlated.

One can conclude that the redistributive measures transfer funds from profitable to less profitable farms and regions. On the other hand, the latter farms and regions are not necessarily poorer. Rather one has to assume that in the German case most beneficiaries are located in prospering regions which is particularly true for Southern Germany. Accordingly, one may assume that Southern German agriculture will be the winner of the redistributive measures. However, the analysis is based on a given static distribution of farm sizes. But farm structures change over time, though slowly. The redistributive measures my affect this process. In the following, these effects are analysed by using the spatial-dynamic agent-based model AgriPoliS which simulates structural development of selected regions. AgriPoliS provides insights in structural change, movements of land between farms, changes in rental prices and farm income depending on the political environment.

Study regions and policy scenarios

The analysis is conducted for two regions in Southern Germany with small farm structures, namely *Hohenlohe* in Baden-Württemberg and the Ostallgäu (hereinafter *Allgäu*) in Bavaria as well as for a region in Eastern Germany dominated by large farms, namely the *Altmark* in Saxony-Anhalt.

Table 2 gives an overview about the different payments between 2013 and 2020. Total direct payments decline stepwise to 298 €/ha in 2019 because of the redistribution between EU member states and Germany received until 2013 more than the EU-average payment. The new basic payment results from subtracting the other payments from the total direct payment. First hectare payments are already introduced in 2014. Thus, direct payments of 2014 are reduced by this value. Starting from 2015 4.5 % of the direct payments are transferred to the second pillar as well as the greening and young farmers' payment is introduced. In the *Base* scenario only the greening payment and the payments transferred to the second pillar are subtracted. The resulting basic payments per farm are then reduced as initially suggested by the EC by 5 % as they exceed 150 000 € after deduction of wages (see Table 3). Only few farms would be affected by such a payment reduction. Even considering a basic payment of 215 €/ha in the Altmark in 2015 and assuming a relative low ratio of labour to land of 0.8 LU/100 ha (0.9 LU/100 ha) and average wages of 20 000 €/LU only farms with more than 2 800 ha (4 400 ha) would be affected. After 2020 the reduction of the basic payment is replaced by a simple reduction of all basic payments equivalent to the reduction caused by first hectare and young farmers' payment.

Table 2: Overview payments 2013-2020

	Share of direct payments	2013	2014	2015	2016	2017	2018	2019	2020
Total direct payments per ha		319	313	305	303	301	299	298	298
Greening	30 %			92	81	90	90	89	89
Second Pillar	4.5 %			14	14	14	13	13	13
Young farmer	2 %			6	6	6	6	6	6
First hectares	6.9 %		21	20	20	20	20	20	20
		Direct payment				Basic payment			
Altmark		332	307	186	185	180	175	170	170
Allgäu		335	308	189	187	181	176	170	170
Hohenlohe		287	260	142	142	151	160	170	170
Base scenario									
Altmark		332	326	212	211	206	201	196	196
Allgäu		335	329	215	213	207	202	196	196
Hohenlohe		287	281	168	168	177	186	196	196

Source: Own calculations based on DBV (2013), AgraEurope (2011), Eurostat (2007), EU (2013) and AMK (2013).

The *Base* scenario is used as a benchmark to identify the impacts of the first hectare and young farmers' payments as agreed by the AMK. In the scenario *AMK* first hectare payments are introduced in 2014 as agreed in the AMK agreements instead of reducing the basic payments of farms receiving more than € 150 000. The basic payment is then reduced by the expenditures arising from the introduction of the first hectare payments and the young farmers' payment in 2015. Furthermore, the impacts of an abolishment of first hectare and young farmers' payments after 2020 are analysed in scenario *AMK 2020*.

Table 3: Overview policy scenarios

Scenario	Description
Base	- Basic payment reduction by 5% if basic payment is still higher € 150 000 after deduction of salaries and social security payments - After 2020 basic payment reduction as in AMK agreement
AMK	- € 50/ha extra pay for the first 30 ha, €30/ha for the next 16 ha - € 50/ha for maximal 90 ha and the first five years of a young farmer - Basic payment reduction equivalent to the expenditures for first hectare and young farmers' payment
AMK 2020	- Same as AMK, however after 2020: - Abolishment of first hectare and young farmers' payment - Basic payment is kept constant

Source: Author's illustration.

The agent-based model AgriPoliS

The Agricultural Policy Simulator (AgriPoliS, c.f. Happe et al., 2006 and Kellermann et al., 2008) is a spatial-dynamic agent-based model of structural change and policy response. With agent-based modelling structural change can be represented from bottom-up. Farms of a study region are individually modelled using mixed-integer programming (MIP). Based on the MIP farms act or interact with each other in order to maximise their income/profit (individual/corporate farms) depending on market prices and policies. Farms' actions are to decide which crops or animals to produce; to rent land; to stay in agriculture or to leave it and work full-time off-farm. For animal production farms can decide on investments, The advantage of the agent-based modelling compared to farm group models is that structural change is emerging from the individual decisions and not relying on econometric analysis of past developments. Relying on past developments is especially crucial in case of policy changes which might cause disruptions in structural change. Modelling farms individually also allows each farm's payment to be calculated depending on its size and farmers age. Farms interact via the land rental market. Land released by terminating contracts and exiting farms is distributed to the remaining farms via an auction. AgriPoliS is a spatial model and farms consider transport costs between the farmstead and their fields. Farms differ according their location in space, the amount of assets, debts, owned and rented land, the age of assets as well as of the farmer and last but not least a management coefficient which considers heterogeneity of farmers' managerial ability. The model is dynamic and farms evolve from year to year: they grow or shrink, adjust labour, continue farming or close down. Accordingly, structural change is simulated endogenously within the model.

For the analysis, the mixed-integer programme has been extended to model degressive payment after consideration of wages, greening (Table A4 in the Appendix), the first hectare payment and payments for young farmers (Table A5 in the Appendix). An average wage of 20 000 €/LU as well as an average workload of 1 800 h/LU is assumed. Labour demands for production and management are calibrated such that the average demand of labour units per 100 ha fits to empirical data of different types of farming. To fulfil the Greening conditions farms have to provide on 5 % of their arable land ecological focus areas. The crop rotations accord with the conditions of greening. Converting grassland into arable land is not possible.

Modelling the first hectare payments is straightforward. Farms receive for the first 30 ha 50 €/ha and for the next 16 ha 30 €/ha. The young farmers' payment of 50 €/ha is paid for maximum 90 ha, i.e. the max young farmers' payment is 4 500 €. Young farmers receive them only for five years (Time span young farmer). In AgriPoliS a farm is handed over to a successor every 25 years. The eligibility for young farmers' payments is determined by updating the "farm age" (time span somebody is managing a farm) on the right hand site (RHS). Furthermore, only natural persons are eligible for the young farmers' payment. Thus, farm age of legal persons is always set to 25. The solutions of the columns "Max young farmers' payment", "Older farmers" and "Young farmers" have to be integer (i), whereas they can be continuous (c) for all other columns.

Structural and income effects

The decline in number of farms is hardly affected by the first hectare payment in the regions Altmark and Allgäu (Figure 1). However, the farm exit rate declines in Hohenlohe with the introduction of payments for first hectares and young farmers. This difference could be explained by the different farm size structure. The average farm size in the Altmark in 2013 is around 350 ha, in Hohenlohe around 50 ha and in the Allgäu around 30 ha. Figure 2 shows the distribution of farms according to their size class in 2013 for the different scenarios in 2025. In all regions farms smaller than 90 ha benefit from the first hectare payments. Less of them cease farming till 2025 if they receive first hectare payments (AMK) compared to the

Base scenario. In the Altmark, only one fourth of the farms are smaller than 90 ha. So, only a small number of farms benefits from the first hectare payments, which does not affect the overall structural change. The opposite can be observed in the Allgäu. There, almost all (98%) of the farms are smaller than 90 ha. Thus, relative competitiveness between farms is less affected by first hectare payments. In Hohenlohe 92 % of the farms are smaller than 90 ha and especially farms with less than 46 ha in 2013 do not loose land till 2025 compared to 2013 (Figure 3). So the advantage of higher payments allows these farms to keep their land and to continue farming. Moreover, till 2025 only in the Altmark, farms with less than 90 ha in 2013 gain some land compared to 2013 (AMK vs. 2013). In the Allgäu these farms even lose some land in the same time. Without first hectare payments, farms with less than 90 ha in 2013 lose land compared to 2013 in all regions (Base vs. 2013). However, changes in land distribution are smaller than changes in farm numbers.

Finally, if payments for first hectares and young farmers would be abolished after 2020, the observed structural impacts would almost diminish till 2025 and structural change slowed down before would be caught up.

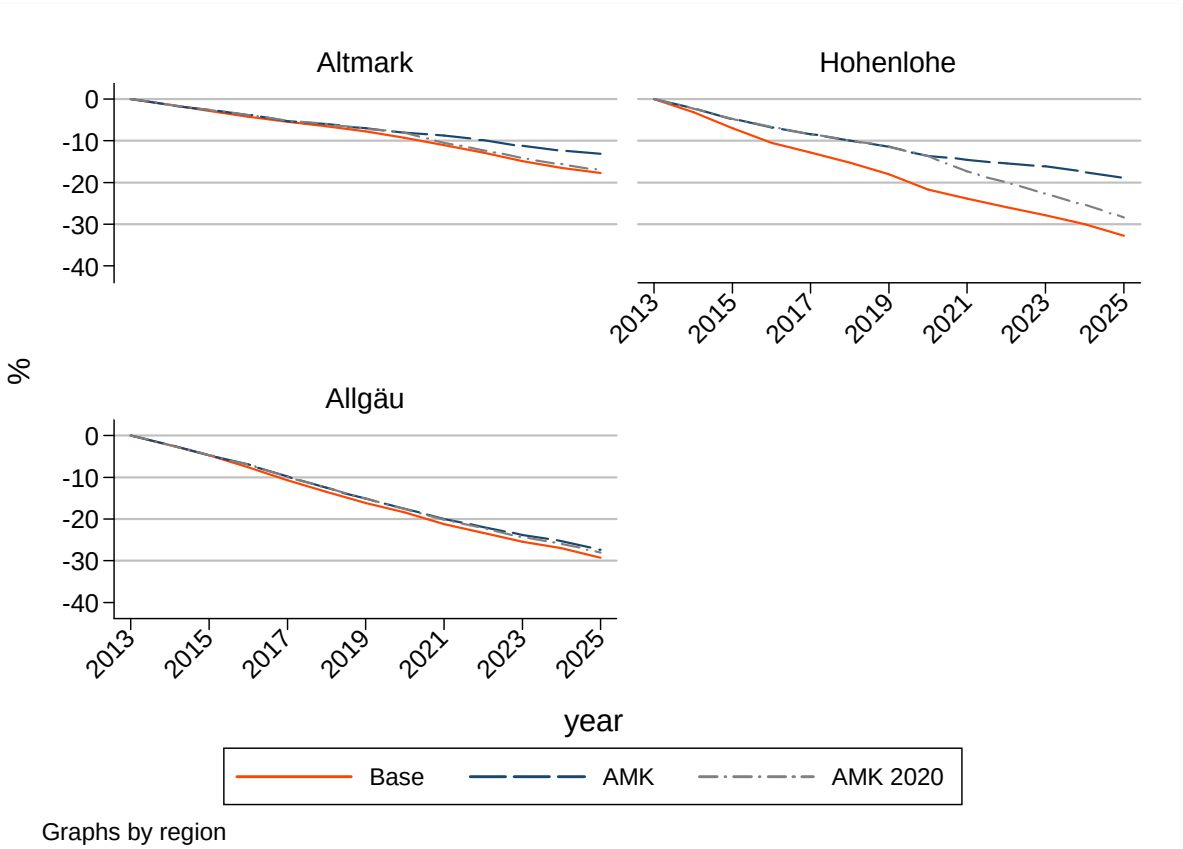

Figure 1: Relative decline in number of farms (own calculation)

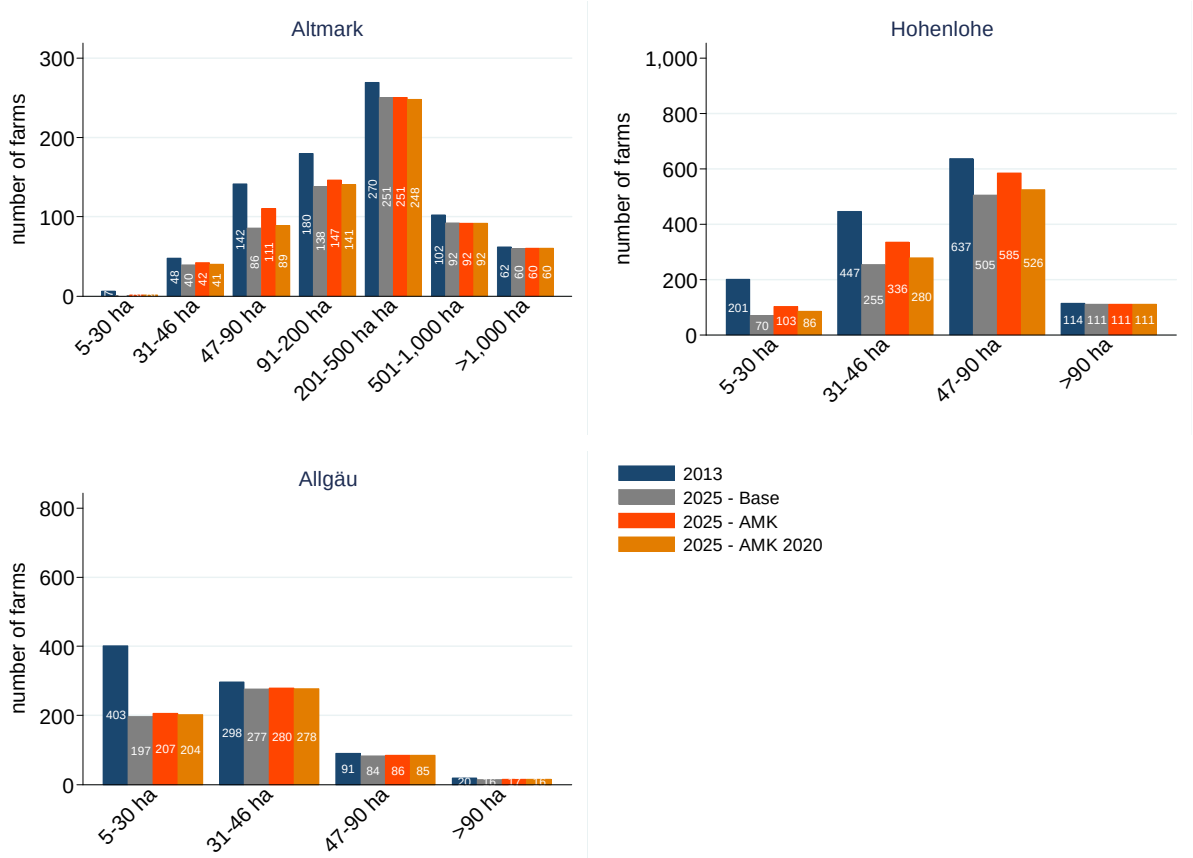

Figure 2: Number of farms by size classes of 2013 in 2013 und 2025 (own calculation)

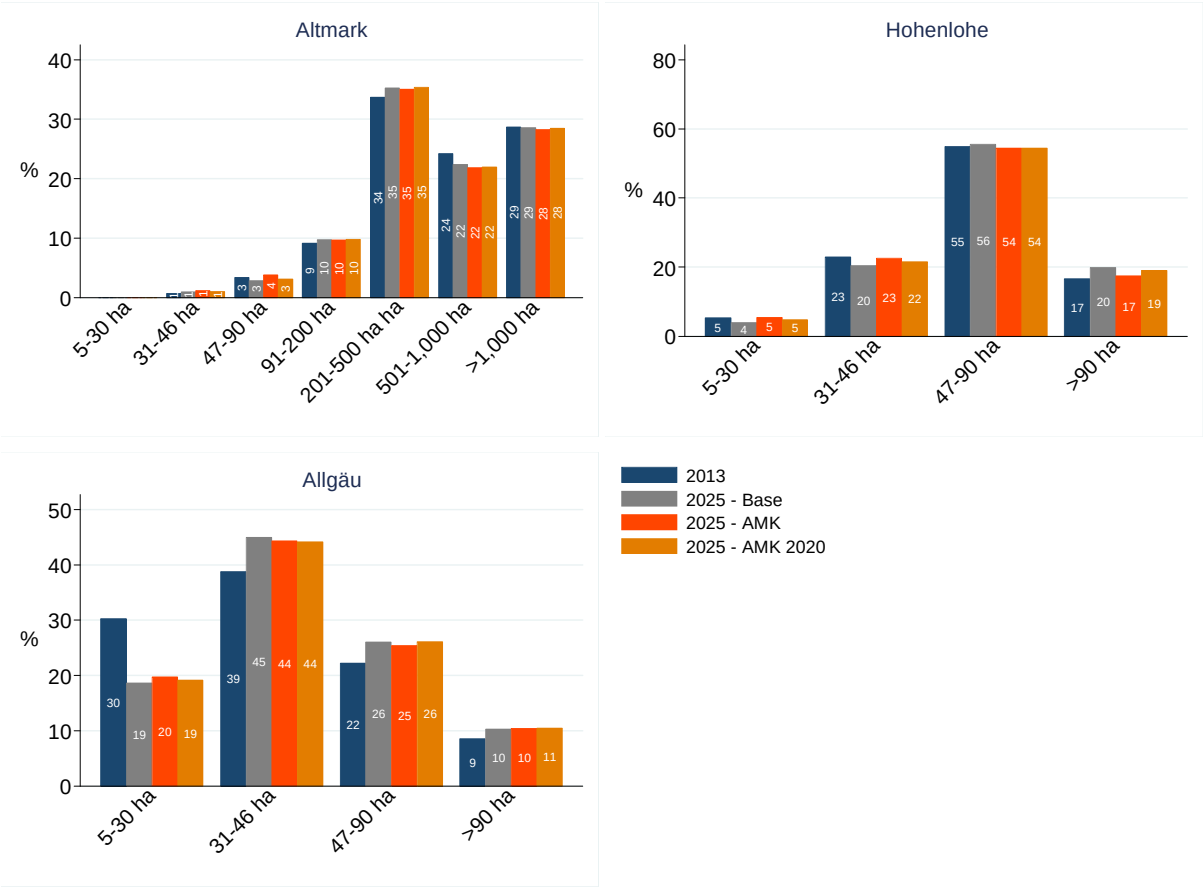

Figure 3: Total area utilized by farms by size classes of 2013 in 2013 und 2025 (own calculation)

As already mentioned above impacts of introducing first hectare and young farmers' payments on structural change are small. This can be explained by the fact that in small structured regions small farms are competing with other small and medium-sized farms for land. On the other hand, in large scaled regions small farms have only a marginal share in land markets. There, large farms compete with other large farms. Thus, in large farm regions such as the Altmark, payment reductions due to first hectare and young farmers' payments are transferred to the land owners via less increasing rental prices (Table 4). Vice versa, benefits of the many small farms in small structured regions lead to higher rental prices as without the first hectare and young farmers' payments (AMK vs. Base). Hence, these additional payments only slightly improve profitability of most of the small farms. Medium and large farms do not benefit because of higher rental prices in medium and long-term perspective.

Table 4: Rental price arable land (Altmark/Hohenlohe) and grassland (Allgäu)

Region	Scenario	2013	2020	2025
Altmark	Base		285	319
	AMK	211	277	314
	AMK 2020		277	313
Hohenlohe	Base		292	281
	AMK	342	299	307
	AMK 2020		299	288
Allgäu	Base		198	181
	AMK	199	202	198
	AMK 2020		202	191

Source: Own calculation.

Agricultural Policy Paradoxes and Policy Failure

The key findings of the analysis can be summarized as follows: beneficiaries of the additional payments are on the one hand land owners in regions dominated by small farms and on the other hand small farmers which on average even with the extra payments are in general not very profitable. Improved development perspectives for these farms are not provided. Their low development potential is limited by mainly two effects: on the one hand, significant steps to develop the farms would require investments in technologies which allow to exploit significant economies of size. For instance, looking at dairy farming which play an important role in small structured regions, one finds that most farms still use tethered housing. In 2010, still almost 80 % of the 43 400 Bavarian dairy farms applied this technology which is neither economical nor animal-friendly (DeStatis, 2010). Modernizing these farms which have on average 21 cows in an economic way would not only require investments in more recent technologies but for the very most also a significant growth. Despite the abolishing quota system would ease such investments, these farms would have to rent additional land for fodder and thus would have to compete with other farms which are in the same situation and those farms which are neither willing to grow nor to exit. In such a situation land-based subsidies fulminate mainly in higher land prices.

On the other hand, the reduction of the basic payment level to compensate for first hectare and young farmers' payments does however also not harm large farms. Probably the strongest individual costs arise for medium-sized farms whose development perspectives are affected by surviving unprofitable neighbouring farms. Would the redistributive and young farmers' payments be abolished after 2020, the anyway small structural impacts would disappear sooner or later. Thus, and ignoring that the payments are paid by taxpayers, one may wonder whether these extra payments are a problem at all? However, such payments and other well-meant policies create vested rights and create dependencies on the subsidies for at

least a number of farms. As a result, future political decision-makers have to deal with additional path dependences (Kay, 2003): they either continue subsidization or create future hardships and fight vested rights.

Moreover, important are also distributional paradoxes. The general and undirected support of small farms is to the benefit of (at least on average) relatively wealthy groups in society and which specifically in the German case are located in relatively wealthy and prospering regions. In such regions, exiting farmers have in general relatively good off-farm options. I.e., the farmers are less dependent on subsidies.

These paradoxes raise the question whether the relevant political decision-makers and institutions are aware of the structural realities or whether the decisions just address popular paradigms in order to justify the enormous budget. The main producers continue to benefit from the direct payments. Their price is that they continue to pay exaggerated land prices and the cost of reduced individual development perspectives as a result of a subsidy-based structural conservation.

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Appendix

Table A4: Exemplary MIP for degression with consideration of wages and greening

	Production activity I	Production activity II	Ecological focus area	Total basic payment	Payment AWU	Tranch1	Tranch2	Greening payment		
	c	c	c	c	c	c	c	c		
Objective function	GM	GM	Costs	1	0	0	0	1		*RHS*
Labour	11	12	9						<=	3 600
Arable land	1								=	1 200
Grassland		1							=	300
Basic payment	-194	-194		0	20 000	1	1		<=	0
Degression	0	0		1	-20 000	-1	-0.95		<=	0
Labour for payment	-11	-12	-9	0	1 800				<=	0
Tranch1						1			<=	150 000
Tranch2							1		<=	+ infinite
Greening payment	-85	-85						1	<=	0
Min ecological focus area	0.05		-1						<=	0

Source: Author's illustration.

Table A5: Exemplary MIP for first hectare and young farmers' payment

	Production activity I	Production activity II	Total basic payment	First hectares	Next Hectares	Young farmers' payment	Max young farmer payment	Older farmers	Young farmers		
	c	c	c	c	c	c	i	i	i		
Objective function	GM	GM	1	50	30	1	0	0	0		*RHS*
Basic payment	-174	-174	1							<=	0
First hectares				1						<=	30
Next hectares					1					<=	16
Count hectares	-1	-1		1	1					<=	0
Max young farmer payment						1	-4500			<=	0
Ha-payment young farmer	-50	-50				1				<=	0
Farm age								-20	-1	<=	**-farm age**
Payment condition							1	1		<=	1
Time span young farmer									1	<=	5

Source: Author's illustration.