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# WINNERS AND LOSERS OF POLICY CHANGES – WHAT IS THE ROLE OF STRUCTURAL CHANGE?

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## **Abstract**

*In this paper several decoupling options are evaluated concerning their impact on structural change especially on farm incomes and their surviving. Therefore, the agent-based model AgriPoliS was used and extended to account the income of leaving farms. This enables the comparison of future incomes of leaving and surviving farms to find out whether leaving farms are losers or not. The disaggregated analysis of farms' household incomes showed that leaving farmers even benefit from their decision in case that enough off-farm jobs are available. Losers are farms that would have left agriculture under conditions of the Agenda 2000. After decoupling they stay in the sector and cannot increase their income as much as under Agenda conditions. Furthermore, the analysis displayed a persistence of farms in the sector despite it would have been more profitable for them to quit agriculture.*

**Key words: Structural change, decoupling, agent-based modeling, Common Agricultural Policy.**

## **1. Introduction**

Agricultural policy analyses usually focus either on the sector level or on the farm level. However, policy changes are supposed to affect structural change as well. We claim that, taking such a meso-level and dynamic perspective, important additional farm specific as well as aggregate effects can be considered for policy debates and refinement. The specific aim of this contribution is to reveal structural, equity and distributional effects of decoupling direct payments in the Common Agricultural Policy (CAP) Reform decided in 2003 and several alternative decoupling options.

In general, changing policy measures may lead to different adjustment reactions at the farm level. Some farms may be forced to leave agriculture because of financial problems or may decide to leave agriculture because off-farm job opportunities become more favourable. Farms staying in the sector benefit of the exit of other farms or start to specialise or diversify themselves as reaction to the policy changes. Considering these dynamic aspects in the analysis of farmers' benefits or losses caused by policy changes seems important as farmers, and most often policy makers prefer policies which avoid loss of income and slow down structural change. However, such policies may not be favourable to all farmers. By use of simulations with the agent-based model AgriPoliS, impacts of different decoupling schemes on structural change and household incomes are analyzed. AgriPoliS (HAPPE 2004, HAPPE et al. 2006 and KELLERMANN et al. 2007) reproduces the development of an agricultural region by considering actions and interactions of individual farms within the region. Exiting farmers receive income for hiring out household-owned labour, capital and land resources. In this paper the situation of exiting farm households is considered and compared with the financial situation of those farmers staying in the sector for several policy scenarios. The chosen policy scenarios are: the continuation of the Agenda 2000 policy as reference scenario, the actual German decoupling scheme, a pure single farm payment scheme and a bond scheme.

The paper is structured as follows. In section 2, the agent-based model AgriPoliS is described and main assumption and parameters explained. The necessary model extensions are documented in

section 3. Section 4 includes an overview on the study region Hohenlohe and in section 5 the simulated policy scenarios are described. Finally we present results in section 6 and discuss them in section 7.

## **2. Methodology (Basic assumptions and key parameters)**

The methodological basis is the agent-based model AgriPoliS. AgriPoliS is a normative spatial and dynamic model for simulating structural change in agricultural (HAPPE 2004, HAPPE et al. 2006 and KELLERMANN et al. 2007<sup>1</sup>). It represents an agricultural region as a system of interacting heterogeneous farm agents. Structural change in AgriPoliS is not driven by exogenously given parameter values, but results from within the model. The main purpose of the model is to understand how farm structures change in rural areas, particularly in response to various policies. For this purpose, AgriPoliS maps the key components of regional agricultural structures: heterogeneous farm enterprises and households, space, markets for products and production factors. These are all embedded in a technical and political environment. For the base period, the model is calibrated to the empirical data of the study region.

The main entities in AgriPoliS are the farm agents and the landscape in which the farms are embedded. The internal state of a farm is organized as a balance sheet that keeps track of factor endowments (land, labour, capital and quota), farmer's age, and expectations about future prices, along with a number of financial indicators. The landscape consists out of plots of equal size but varying qualities (arable land, grass land, non agricultural land), with some of the plots serving as farmsteads for the spatially-distributed farms.

Farms act autonomously in order to maximize their household income, and farms' actions are derived from a mathematical programming approach. Farm agents can engage in production activities, labour allocation, rental activities for land, production quotas, and manure disposal rights. To finance farm activities, farm agents can take on long-term and/or short-term credit. Liquid assets not used on the farm get interests at the bank. Simultaneously to the production planning, farms select from a set of investment alternatives. For investments, scale effects are considered. Furthermore, we assume investment costs to be sunk. A farm exits the sector either if its equity capital is negative or if opportunity costs of farm-owned production factors are higher than the expected agricultural income.

Interactions between farms are defined via markets for factor inputs and products. For products, capital and labour, prices are determined via an exogenous price function. The land market, which plays a central role in AgriPoliS, is modelled as an auction, where farms directly compete for available land plots.

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<sup>1</sup> HAPPE et al. 2006 is an online publication with a detailed description of AgriPoliS. In KELLERMANN et al. 2007 the model description is extended by the documentation of further developments since the online publication. For this paper, especially the expectation formation of the farm agents has been revised, what will be described in the following section.

To provide an idea about what drives the simulation results, we give a brief overview on the main assumptions. A more detailed description of these assumptions can be found in SAHRBACHER et al., 2007.

Generation change: We assume that individual farms are handed over to the next generation every 25 years. Furthermore, we assume that the potential successor can expect a 25% higher income from agriculture than an older farmer if he is looking for a new job, because he is better educated than older farmers. If the successor decides to stay in agriculture, opportunity costs are set back to the level prior to the generation change.

Land rental contracts: Land rental contracts run for a fixed period of time, which are set between 5 and 18 years. Whenever a rental contract terminates, the land is released to the land market and available for rent to all farms.

Heterogeneity of farms: As in reality, farms are differentiated by their managerial abilities, by assuming a 10% variation of production costs between farms.

Interest rates: It is differentiated between interest rates for long-term borrowed ( $i_{bc} = 5.5\%$ ) and short-term borrowed capital ( $i_{sbc} = 8.0\%$ ) and for equity capital ( $i_{ec} = 4.0\%$ ; all values DEUTSCHE BUNDESBANK 2003).

Labour costs: For hired labour we assume an annual increase of 0.5% for the costs for hired labour.

Output prices: Farms are assumed to be price takers. For decoupling scenarios we consider output price changes. These are taken from simulations with the European Simulation Model (ESIM)<sup>2</sup> for the corresponding scenarios (see BALKHAUSEN and BANSE 2007). Accordingly, the price increase for beef is 5%, for cereals 4% and for rape seed 3%. The price increases correspond to the price differences in 2009 between the ESIM Agenda scenario and the ESIM scenario with the actually implemented policy. The year 2009 was chosen to consider medium term effects. Price changes are introduced in AgriPoliS in one step in 2005, because farms in AgriPoliS react abrupt to policy changes.

### 3. Model extensions

For the purpose of this paper AgriPoliS was mainly extended in two directions. First, we introduced the possibility to keep track of farms which already quit farming and second, the decision whether farms should quit agriculture depending on opportunity costs or not was revised.

After each period, farms decide, based on the calculation of the expected agricultural income and the calculation of the opportunity costs, whether they stay in agriculture or not. The expected agricultural income is calculated for the next period with a mixed integer programming model (MIP) based on farms' current factor endowment. Thereby, also prices, especially labour costs of the next period and policy changes (at least to some extend) are considered. The calculated agricultural income is then reduced by rent expenditures (RE) and transport costs (TC) of the farm (Table 1). On the other hand opportunity costs are calculated for family labour, working capital, owned land and own milk quota.

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<sup>2</sup> ESIM is a partial equilibrium model (BALKHAUSEN and BANSE 2005, BANSE et al. 2005).

Table 1: Calculation of expected income and opportunity costs

Expected agricultural income	Opportunity costs	
	Factor	valued at
gross margin	family labour	off-farm labour costs
+ interest on liquid capital at bank	+ working capital	long-term savings rate
+ subsidies	+ owned land	average regional rent
- wages paid	+ milk quota	quota leasing price
- transport costs		
- rent expenditures		

Family labour is valued at the costs for hired labour, working capital at the long-term savings rate, which is assumed to be equal to the long-term interest costs ( $i_{bc} = 5.5\%$ ). Milk quota is valued at the quota leasing price and owned land at the average rental price ( $\bar{R}$ ) of the simulated region, which is endogenously calculated. Because the average rental price changes over time, future developments are considered in the calculation of the opportunity costs for owned land. However, the development of rental prices was not considered in the calculation of the expected income in previous versions of AgriPoliS. Only the farms' individual rent expenditures were subtracted. Hence, this has been changed for this study such that future developments are considered in the calculation of the expected rent expenditures. The expected rent expenditures (REE, equation (1)) are the average of the average rent expenditures ( $\bar{RE}$ ) of a farm and the average regional rental price multiplied by the rented land (RL) of a specific soil type (s).<sup>3</sup> With the factor  $\lambda$  we adjusted so far for each soil type the expected rent expenditures as well as the opportunity costs for land (OC) in case of structural breaks caused by policy changes ad hoc.

$$(1) (4) REE = \sum_{s=1}^S [RL_s \cdot (\bar{RE}_s + \bar{R}_s) / 2 \cdot \lambda_s], \text{ with } \lambda = 1 \text{ if no policy change}$$

The values of  $\lambda$  for different soil types are based on simulation experiments of Happe 2004 (chapter 8). To update and automate this procedure, the adjustment factors are now calculated in AgriPoliS. Therefore, the year of the policy change (tp) is simulated in advance and the average rental prices of the year in which the policy change takes place ( $R_{s, tp}$ ) is divided by the average rental price in the year before the policy change ( $R_{s, tp-1}$ ) to calculate the adjustment factor for the rental prices in the expectation formation (see equation (2)). Then the same period is simulated again under consideration of the adjustment factor. Equation (3) shows the calculation of the opportunity costs for owned land (owned land = OL) with the adjustment factor ( $\lambda$ ) for the year of policy change.

$$(2) \lambda_s = \bar{R}_{s, tp} / \bar{R}_{s, tp-1}$$

$$(3) OC = \sum_{s=1}^S [OL_s \cdot \bar{R}_s \cdot \lambda_s], \text{ with } \lambda = 1 \text{ if no policy change}$$

To find out whether leaving farms are winners or losers, we also analyze the accounting and financial situation of exiting farms, which considers payments for land, labour and liquid capital. For their

<sup>3</sup> Here we differentiate only between two soil types, arable and grassland.

owned land, leaving farmers receive the rent paid by the leaseholder. Wages for labour are based on the off-farm wages of surviving farms and increase like these annually by 0.5%. In case a farm closes during the generation change, the successor receives a 25% higher wage during the rest of the simulation time. Liquid capital can be saved, whereas the interest rate ( $i_{bc}$ ) is 5.5%, because we assume that the leaving farms can invest their money long-term. These payments are reduced by repayments and interest costs for still existing agricultural buildings and machinery.<sup>4</sup> The remaining income is reduced by minimum expenditures covering the costs for basic requirements of each family member. This minimum level is equal to the minimum withdrawal ( $WD_{\min}$ ) of the surviving farms. Further details about the calculation of the household income of surviving and leaving farms can be found in Table 2.

Table 2: Calculation of the household income

Indicator	Calculation for surviving farms	Calculation for leaving farms
household income =	gross margin agriculture + off-farm income + interest on working capital + subsidies - rent expenditures - depreciation - interest costs - current upkeep of machinery and equipment - farming overheads - transport costs - wages paid	gross margin agriculture + off-farm income + interest on working capital + subsidies + rent received - depreciation - interest costs
equity capital change =	household income (Y) - withdrawal (WD)	household income (Y) - expenditures (WD)
withdrawal =	$WD_{\min} + (Y - WD_{\min}) \cdot \varepsilon$ with $0 < \varepsilon \leq 1$ and $Y > WD_{\min}$	

#### 4. Data

The simulations are based on data about the study region Hohenlohe in 2001. The agricultural structure of Hohenlohe is virtually represented in AgriPoliS by weighting selected individual farms to cover regional characteristics, such as number of farms specialized in field crops, milk production, pig or poultry, etc., number of farms in different size classes, number of animals in respective size classes, etc. Therefore individual farms are derived from FADN data. The production structure and behaviour of the selected farms is then represented with a mixed integer programming model, as described in Section 2.

The region Hohenlohe with a utilized agricultural area (UAA) of 73,439 ha (STATISTISCHES LANDESAMT BADEN-WÜRTTEMBERG 1999) is situated in Southwest Germany. In general agriculture

<sup>4</sup> Furthermore, there are also some technical changes to facilitate the analysis. First, a new farm type for leaving farms, called “leaving\_farms” was introduced and second the total land of the leaving farms was set to zero.

is small structured in Hohenlohe. The average farm size is 26 ha and approximately half of the 2,858 farms are part time farms. These farms have less than 1 AWU or their total standard gross margin is lower than 16 ESU<sup>5</sup> (19,200 Euro). Part time farms use approximately 22% of the total UAA. Farms in Hohenlohe are mostly specialized in pig and poultry production (34%) or grazing livestock (32%). A detailed description about the virtual representation of a region can be found in KELLERMANN et al. 2007. Further information about the input data and the region Hohenlohe can be found in SAHRBACHER et al. 2005.<sup>6</sup>

## 5. Policy Scenarios

We implemented four different policy scenarios (Table 3). In the first scenario, Agenda 2000 will be continued. This scenario is called AGENDA and serves as baseline for analysing the impacts of decoupling. In addition to the baseline scenario, we implemented three different decoupling scenarios. The first decoupling scenario is called REFORM, because here we consider the implementation of the 2003 CAP reform in Germany.

Germany chose a hybrid dynamic decoupling scheme, which leads till 2013 to a regional payment. In Germany payment entitlements are calculated the following way:<sup>7</sup>

- COP-payments are transferred into a regional payment for arable land in each federal state.
- Slaughtering payments for cattle, additional payments for cattle and 50 % of extensification payments for cattle are distributed on the grassland of each federal state
- Payments for milk, suckler cows, special payments for male cattle, slaughtering payments for calves, ewe payments and 50 % of the extensification payments for cattle are distributed on the agricultural land of individual farms

Finally the farm specific payments and the hectare payment for arable land or grassland are put together in one payment entitlement per hectare. In Figure 1 we show the distribution of the payment entitlements in Hohenlohe in 2005 in AgriPoliS in groups with a range of 20 Euro.<sup>8</sup>

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<sup>5</sup> ESU = European Size Unit, equivalent to 1200 Euro, farms with a total standard gross margin of less than 8 ESU are not considered in the FADN in Germany.

<sup>6</sup> The model specification, calibration and data collection as well as further analysis have been done within the EU-project IDEMA.

<sup>7</sup> This is only a short description of the decoupling scheme in Germany. We described here only the parts which are important for modelling the regions.

<sup>8</sup> The payments presented here are calculated in AgriPoliS based on the production in a three years reference period. They differ partially from the real payments in the observed regions, as they are based on the production structure taken from AgriPoliS and not from reality.



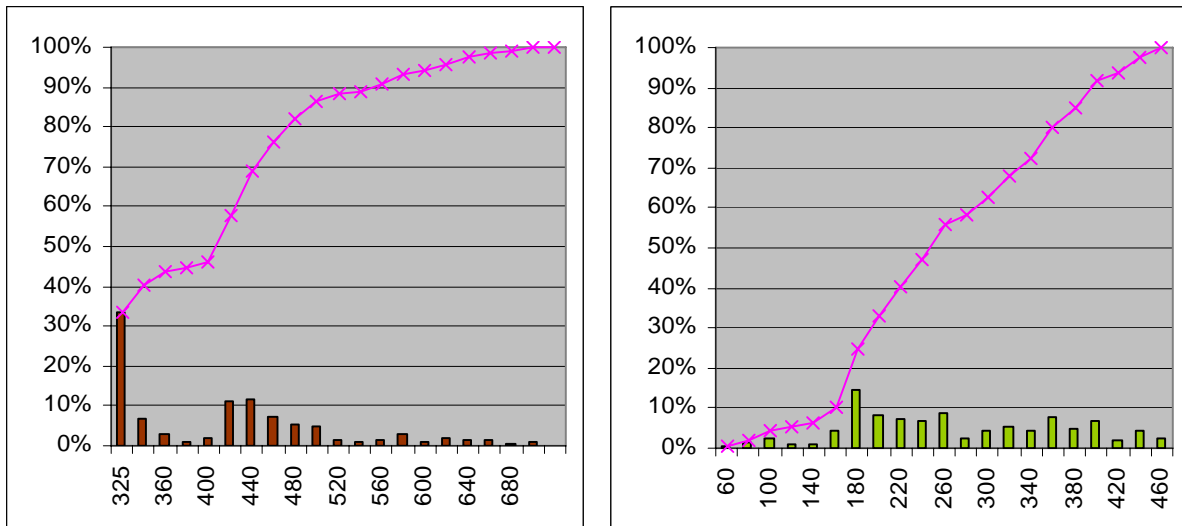


Figure 1: Distribution and cumulative distribution of arable land (left) and grassland (right) payment entitlements among the total UAA in Hohenlohe in 2005

Source: own calculations based on AgriPoliS simulation results

The value of payment entitlements for arable land varies between 325 and 700 Euro. As the regional payment for arable land is 325 Euro/ha, one can see that in Hohenlohe 33 % of the payment entitlements for arable land are not increased by farm specific payments. The majority (90 %) of payment entitlements for arable land have a value between 325 and 500 Euro. The value of payment entitlements for grassland is much lower than for arable land, which is caused by the lower regional payment for grassland. It varies between 52 and 460 Euros. Figure 1 shows also that 90 % of the grassland payment entitlements have a value of more than 160 Euro and are, in contrast to the payment entitlements for arable land, almost equally distributed.

From 2010 the difference in the value of payment entitlements to the final regional payment of 2013 will be stepwise reduced by 10, 30, 60 and 100 %. Simultaneously, payments for arable and grassland are increasing.

Table 3: Policy scenarios

Name	Description
AGENDA	- Continuation of Agenda 2000
REFORM	- Hybrid dynamic decoupling - Payment entitlements consist of a region specific and an farmspecific part - Value of payment entitlements differs at the beginning of decoupling - Differences between payment entitlements will be stepwise reduced after 2010 till 2013
SFP	- Farmspecific decoupling - Value of payment entitlements differs
BOND	- Fully decoupling, i.e. farmers receive the payment independent if they produce or not - Payment will be also paid after farm exit - Calculation of the payment is based on a three years reference period

As the European Commission initially suggested direct payments should be decoupled towards a pure single farm payment (SFP), we also simulate this policy to compare it with the hybrid dynamic decoupling scheme in Germany. The implemented single farm payment is without any coupling rates for specific products.

Since payments in the REFORM and the SFP scenarios are still coupled to the use of land, the problem of capitalization of payments into rental prices is not solved. Thus payments are in the fourth scenario (BOND) fully decoupled from the land use, according to the “Bond scheme”, which was suggested by TANGERMANN (1991). That means farmers receive a payment based on a reference period of three years independent if they produce anything or not, respectively they receive the payment even if they quit agriculture.

## 6. Results

The goal of this paper is to find out who are the winners and losers of the CAP 2003 reform. Therefore it is necessary to look at individual farms. As benchmark we have chosen the household income per family annual work unit (FAWU). The household income includes all incomes of the farmer’s family that means also the incomes of family members working off-farm. To get a brief overview, we look first at the average household income in all scenarios in 2004, the year before decoupling, and 2013, when there is only a regional payment in the REFORM scenario (Figure 2). We differentiate between farms surviving in all scenarios, leaving in all scenarios and all farms. The blue bars show the household income in 2004, whereas the other bars show the household income of the different scenarios in 2013. It is obvious that leaving farms have a smaller household income per AWU than surviving farms. But not only the household income is smaller, their average farm size too. Farms leaving agriculture in all scenarios have an average size of 18 ha in 2004 and surviving farms have at the same time an average size of 42 ha. Furthermore, Figure 2 shows that the difference in household incomes of surviving and leaving farms diminishes over the time. In 2004 the difference is approximately 6,500 Euro and in 2013 in the AGENDA scenario, approximately 3,000 Euro.

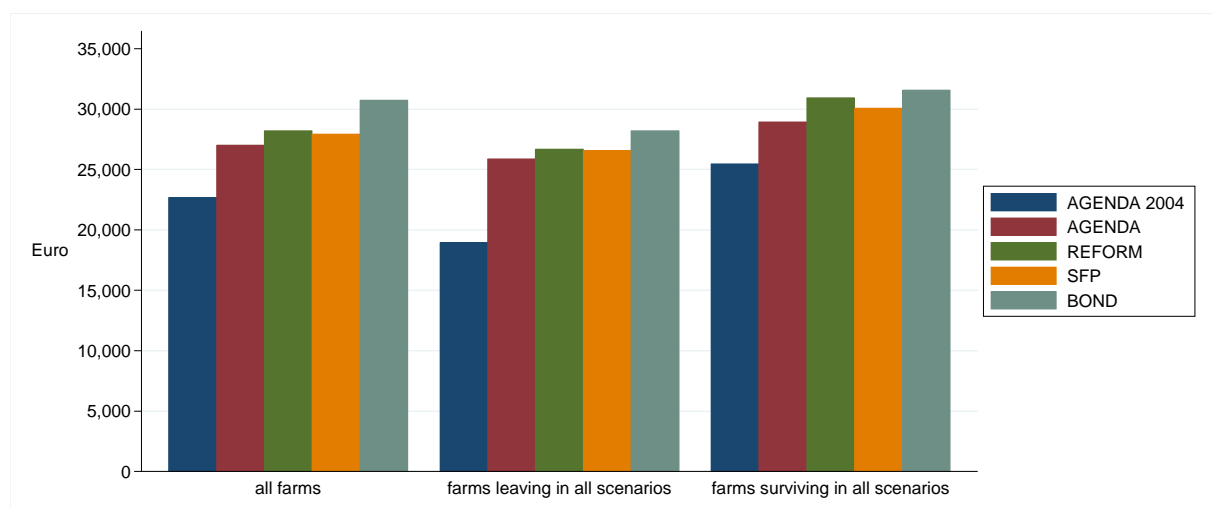


Figure 2: Average household income per FAWU for different policy scenarios in 2013 compared to 2004

For the further analysis the development of the prices for the input factors labour, land and capital will be presented, as they are important for the decision whether to quit or continue farming. First interests for capital are fix during the whole simulation time. Second, we assume that costs for hired labour and wages for working off-farm are annually increasing by 0.5%. Third, the rental price changes are endogenous and differ between the scenarios. Figure 3 shows the relative difference of arable and grassland rental prices between 2004 and 2013. One can see that rental prices are more or less stable in the AGENDA scenario, for grassland they are even declining till 2013. By contrast the rental prices are increasing in the scenarios REFORM and SFP, because in these scenarios profits are increasing resulting from farmers' increasing flexibility due to the decoupling of direct payments. The difference between the REFORM and the SFP scenario is caused by the different calculation of the payment entitlements in both scenarios, which results in different payment levels per hectare for arable land and grassland and finally in different rental prices. In the SFP scenario all payments of a farm are divided by the total UAA of the farm. This leads to a redistribution of payments from arable land to grassland and to an average regional payment entitlement for arable land of 348 Euro/ha. Whereas, in the REFORM scenario the average regional arable payment is calculated by dividing the sum of all payments for COPs by the total arable land in the region. Additionally to this average payment of 325 Euro/ha a farm specific top-up based on the livestock husbandry of each farm is added. The final average regional payment entitlement for arable land in the REFORM scenario is then 373 Euro/ha. The opposite is the case for the payment entitlements for grassland. In the REFORM scenario their average value is 262 Euro/ha and in the SFP scenario 400 Euro/ha. Thus rental prices for grassland are stronger increasing in the SFP scenario than in the REFORM scenario. On the other hand rental prices for arable land are stronger increasing in the REFORM scenario, as Figure 3 shows. However, for the following analysis is it only necessary to remember that in the AGENDA scenario rental prices do not increase, in the REFORM and SFP scenario they increase and in the BOND scenario they decrease, because payments are decoupled from land.

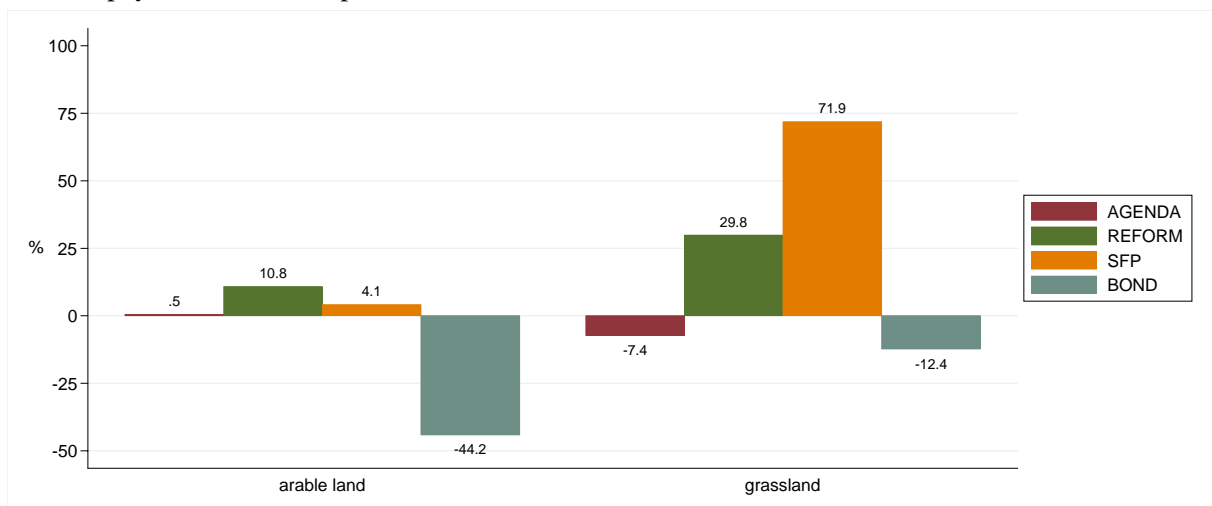
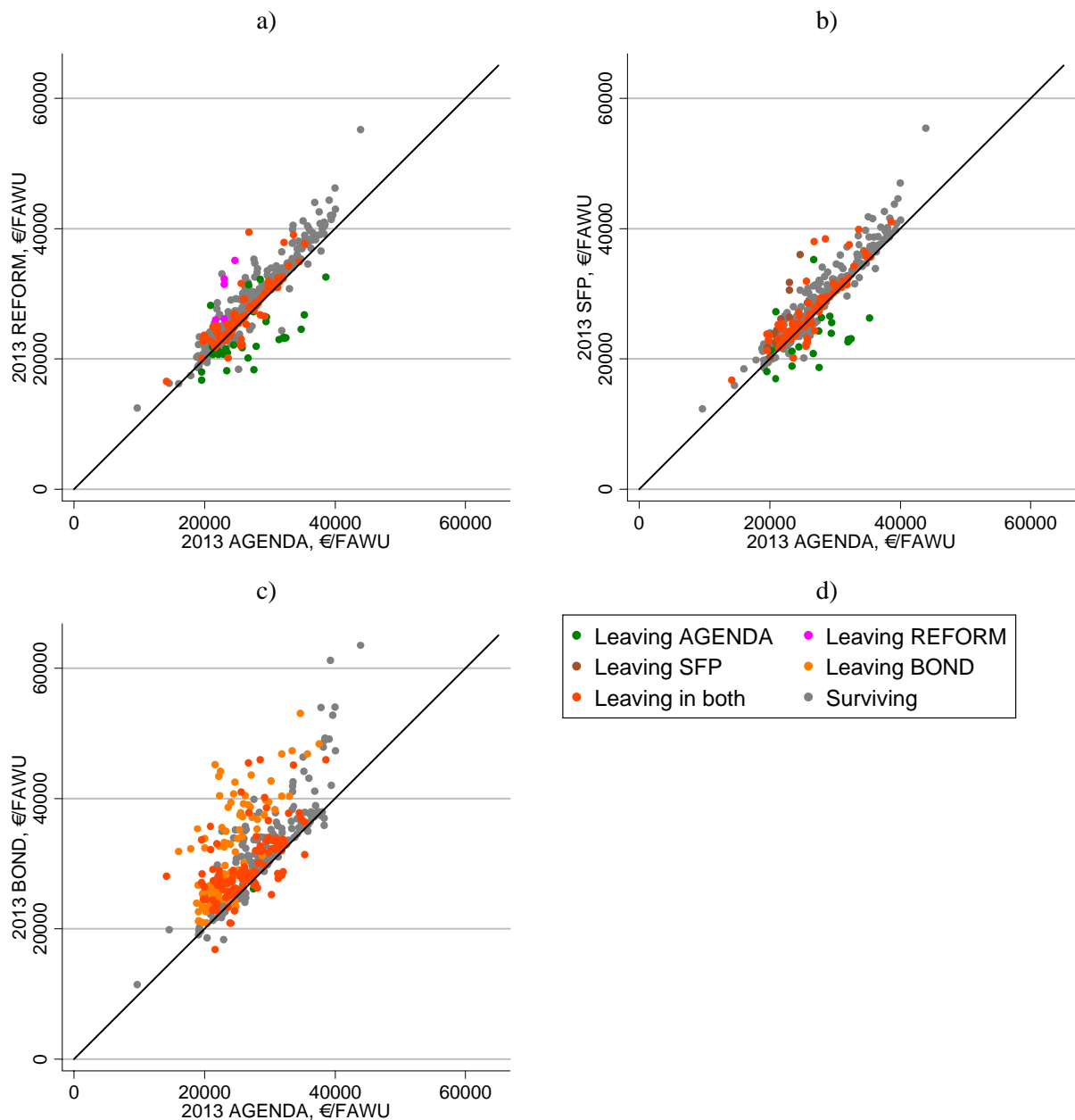


Figure 3: Relative rental price changes from 2004 to 2013

Coming back to the initial question: „Who are winners and losers of the CAP 2003 reform?“ we oppose in Figure 4 the household income for the surviving farms as well as the one for leaving farms of AGENDA scenario to one of the other policy scenarios for the year 2013. In Figure 4 it is marked in terms of colour, which farms leave only in one or in both policy scenarios or which survive in both

scenarios. Dots on the bisecting line represent farms whose household income development is independent of the policy. Grey marked farms survive in both scenarios presented in the Figure 4. It is obvious, that the farms surviving in both scenarios (red marked) are developing better in the decoupling scenarios (REFORM, SFP and BOND) than in the AGENDA scenario.



**Figure 4:** Household income per family work unit (FAWU) for leaving and surviving farms in 2013 and different policy scenarios

Simultaneously, in the scenarios REFORM and SFP decoupling of direct payments slows down structural change compared to the AGENDA scenario. (Table 3). This is because it becomes easier to receive payments after the CAP 2003 reform. For example maintenance of grassland is no longer guaranteed by payments for ruminants but by a grassland payment. The grassland payment only requires maintaining the grassland, but not how it should be done. Maintaining grassland can easily be done by mulching the land once a year, with less labour input than keeping ruminants. Thus mainly small farms reduce their labour input in agriculture and become part time farms instead of leaving

agriculture. In the BOND scenario, farmers have the largest set of opportunity to use their payments which leads to the strongest structural change. Furthermore Figure 4a/b show that some farms, which are leaving in the AGENDA scenario, survive in the scenarios REFORM and SFP (green marked).

**Table 4:** Decline in number of farms between 2004 and 2013

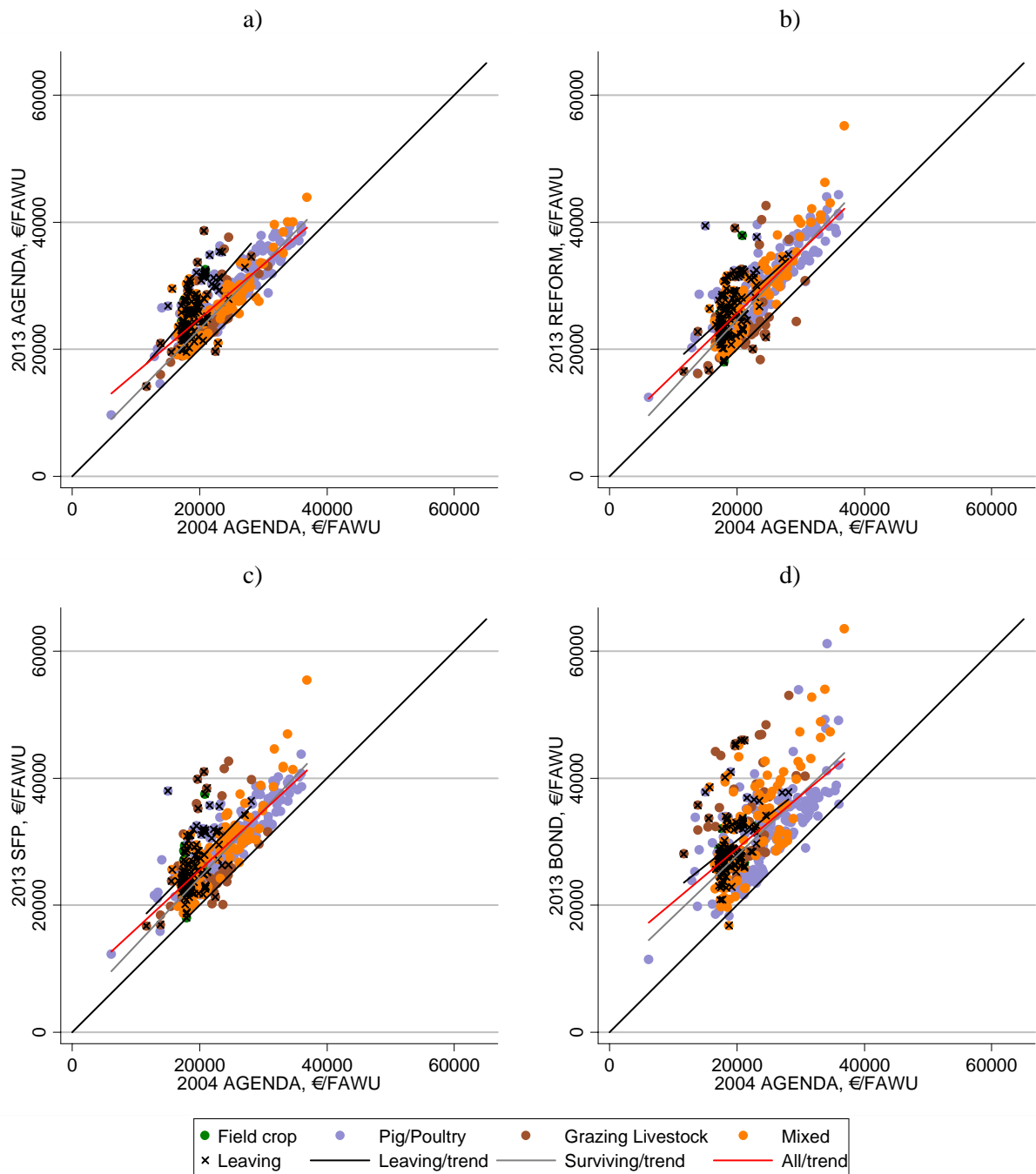
Scenario	Average annual decline	Total decline
AGENDA	3,9 %	30 %
REFORM	3,0 %	24 %
SFP	3,4 %	27 %
BOND	7,8 %	52 %

Source: own calculations

However, these farms have a lower household income in the scenarios REFORM and SFP than in the AGENDA scenario. Such farms can be called „willing to leave farms“ and can be counted as losers of the CAP 2003 reform because of their lower household income in the REFORM and SFP scenario. The same result appears comparing the BOND and the AGENDA scenario (Figure 4c). In the more liberal BOND scenario more farms are leaving and achieve in comparison to the AGENDA scenario a higher income in 2013. (orange marked farms).

By means of Figure 4 it is not possible to draw conclusions, whether the development of the household income from 2004 till 2013 was positive or not. Therefore, we compare in Figure 5 the household income per FAWU for surviving and leaving farms in 2004 and 2013.

The red regression line considers surviving farms as well as leaving farms. It shows like Figure 2, that the average household income of all farms increases in all policy scenarios till 2013. Indeed, several grazing livestock farms (brown marked) must accept losses in income in the scenarios REFORM and SFP. Other grazing livestock farms can achieve only small income increases. On the course of the red regression line is visible, that farms with a lower household income per FAWU benefit more in the AGENDA and the BOND scenario than in the REFORM and SFP scenario. Their household incomes increase more in absolute values than those of farms with already an initially higher household income per FAWU. This can be explained thereby, that in the BOND and AGENDA scenario farms with a low household income per FAWU decide to leave agriculture instead of becoming part time farms like in the REFORM and the SFP scenario. What means that in the latter two scenarios the incentive to stay in agriculture is stronger, despite the farms would gain more money when they leave. This situation is caused by the fact that farms look in the simulations only one year ahead to decide whether they leave agriculture or not. However, this might be similar in reality, where farms look more about their current situation than other possibilities. The outcome of this is a kind of persistence of some farms in the sector. Additionally to the stronger increase in the household income of smaller farms leaving agriculture, the chances to grow for the remaining small farms in the BOND and the AGENDA scenario are better than in the other two scenarios. The remaining farms benefit from the drop out of other farms. However, these leaving farms (marked with a cross in Figure 5) belong also not to the losers. As we already mentioned, their income increase is stronger than if they would stay in agriculture like in the REFORM and the SFP scenario. Though, it has to be considered that all family members working in agriculture are assumed to find a job off-farm – which is probably a restrictive assumption.



**Figure 5:** Household income per family work unit (FAWU) for leaving and surviving farms in comparison between 2004 and 2013 in different policy scenarios

## 7. Discussion and Conclusion

The goal of this paper was to find out which farms benefit and which suffer from the decoupling of direct payments. We made this by using the agent-based model AgriPoliS. Additionally, the development of farms leaving agriculture was also considered. Therefore, AgriPoliS was extended and improved in two directions: 1) the financial accounting of leaving farms and 2) the expectation formation for the decision whether a farm should continue or not. The question: “Who are winners and losers of decoupling” was compared for three different scenarios to a continuation of the Agenda

2000. First, the actually in Germany implemented hybrid dynamic decoupling scheme. Second, the originally by the EU planned farm specific decoupling scheme and third, as alternative a kind of Bond scheme as suggested by TANGERMANN (1991).

The analysis showed that the average income stronger increases from 2004 till 2013 are in the decoupling scenarios than in the continuation of the Agenda 2000 policy, because of farmers' higher flexibility concerning their production decisions in these scenarios. However, structural change in the hybrid dynamic and farm specific decoupling scheme is slower than in the AGENDA scenario. More small farms become part time farms in these scenarios instead of leaving the sector. According to the simulations, those farms which would leave agriculture under Agenda conditions but continue under decoupling become losers of decoupling because they would achieve a higher household till 2013 if they would exit. The comparison of the income development of similar farms, - leaving agriculture and not leaving - shows that leaving farms can increase their income stronger than the remaining farms. Hence, leaving farms cannot be counted as losers in general. However it should be considered that in the presented simulations no farm leaves agriculture because of illiquidity. Summarising we argue that in the long run leaving farms should not be considered as losers in general, at least regarding their financial situation, assuming there are enough off-farm job opportunities.

Furthermore, the analysis showed a kind of persistence of farms to stay in the sector. Like in reality, a significant number of farms do not leave agriculture in AgriPoliS, despite it would be more profitable for them in the long run. This persistence can be explained that farms in AgriPoliS are like in reality more oriented in their actual situation than in future options. In AgriPoliS farms look only one year into the future when they decide to leave farming or not. Non-monetary factors, which can be also a reason for the persistence of farms and the income disparity of many EU farmers, are not considered in AgriPoliS. Thus, structural change might be overestimated in AgriPoliS. However, the differences between the policy scenarios should be the same.

The analysis showed that the BOND scenario can be seen as an alternative to the REFORM and SFP scenarios because it makes it easier for marginal farms to leave and improves the development of surviving farms because it enhances structural change. Leaving farms benefit from the payments they could use like they want and the remaining farms benefit from declining rental prices and economies of scale.

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