EU-Wide (Regional and Farm Level) Effects of Premium Decoupling and Harmonisation Following the Health Check Reform

EU-weite (Regional- und Betriebsgruppen-) Effekte durch Prämienentkopplung und -harmonisierung in Folge der Health-Check-Reform

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Abstract

This article investigates the income effects of decoupled payments distributed at the farm-type or uniformly at the regional level within the European Union. The analysis was conducted using detailed information on the implementation of the Health Check policy package for agricultural activities in each of the 27 member states, which is included in the Common Agricultural Policy Regionalised Impact (CAPRI) model. In the simulation experiments, the transition from individual to uniform per-hectare rates at the country level was explicitly modelled. The results show significant income shifts only for single products, such as durum wheat. Moreover, income was redistributed away from traditional "Grandes Cultures" crop production to fodder production, an effect primarily caused by the capitalisation of decoupled premiums on previously unsubsidised land. Cattle, sheep and goat production was primarily affected in the animal sector. Land values are expected to increase considerably, especially those of grasslands.

Key Words

decoupling; direct payments; Common Agricultural Policy; Health Check reform; land rents; income distribution

Zusammenfassung

Der Artikel untersucht die Einkommenswirkungen von entkoppelten Zahlungen, die nach Betriebstypen oder einheitlich auf regionaler Ebene der Europäischen Union verteilt werden. Die Analyse wird durchgeführt basierend auf detaillierten Informationen über die Implementierung des Health-Check-Reform-Paketes pro landwirtschaftlicher Aktivität in jeder der 27 Mitgliedstaaten, die dann im CAPRI (Common Agricultural Policy Regionalized Impact)-Modell einfließen. In den Szenarien wird der Übergang von individuellen zu einheitlichen Hektarprämien auf der Ebene der Mitgliedsländer explizit modelliert. Ergebnisse zeigen signifikante Einkommensänderungen nur für einzelne Produkte wie Hartweizen. Außerdem wird Einkommen von den traditionellen Grandes Cultures zum Futterbau umverteilt, ein Effekt, der hauptsächlich durch die Kapitalisierung der entkoppelten Zahlungen von Land, welches vorher nicht subventioniert war, zustande kommt. Im tierischen Sektor sind besonders Rindfleisch, Schafe und Ziegenproduktion betroffen. Es wird erwartet, dass Landrenten deutlich steigen, insbesondere für Grünland.

Schlüsselwörter

Entkopplung; Direktzahlungen; Gemeinsame Agrarpolitik; Health-Check-Reform; Landrenten; Einkommensverteilung

1 Introduction

The use of decoupling payments to domestic agriculture to eliminate production- and trade-distorting effects has gained momentum since the URUGUAY ROUND AGREEMENT ON AGRICULTURE. According to that agreement, decoupled payments are defined as payments that are financed by taxpayers rather than by consumers and that are unrelated to current production, factor use or prices, and are thus based on the farm program of a historical period. In the European Union (EU), the legal basis for the decoupling of support payments was introduced with the 2003 reform of the Common Agricultural Policy (CAP), the Mid-Term Review (MTR), particularly with the introduction of single farm payments (SFP). A significant further step was taken with the Health Check (HC) policy package in 2008, which led to a nearly full decoupling of support, with only a few exceptions.

There has been ongoing discussion as to whether it is theoretically possible to completely decouple payments from production, and many studies have indicated that some coupling effects will often remain. Consequently, much attention has been paid to simulating the effects of decoupled payments on production, land allocation, farm income, market prices and trade. For the EU, BALKHAUSEN et al. (2007) provided an overview of selected simulation models that analysed the effects of the 2003 CAP reform. To our knowledge, only a few attempts have been made to model the effects of decoupling at the regional or farm-type level with a detailed implementation of the HC policy package for the entire EU-27. This paper attempts to fill this gap and extend the analysis with an introduction of uniform payments per hectare differentiated by member state (MS). The focus will be on the effects on income distribution and production shifts between farm types, the latter being revealed in land allocation and herd sizes.

The remainder of the paper is organised as follows. The next section will introduce the situation in the EU in more detail. Section 3 presents a summary of the theory on the production effects of decoupled payments and a review of the relevant simulation models for modelling decoupling in the EU. Section 4 provides a brief description of the CAPRI model and an overview of the scenarios simulated. The results of our analysis are presented in section 5, and the final section concludes the analysis.

2 Decoupling in the EU

In the EU, the first steps to reforming the CAP were taken with the MacSharry Reforms in 1992. The subsequent Agenda 2000 policy package was designed to stimulate European competitiveness while ensuring fair incomes for farmers, simplified legislation and good environmental conditions. Support payments were still coupled, but Agenda 2000 resulted in a further reduction in minimum prices, and it fixed the obligatory set-aside rate at 10% while maintaining existing exemptions for small farmers and energy crop production on set-aside land. The MTR and the subsequent Fischler Reform of the CAP in 2003 introduced important changes, among them the implementation of the SFP and the Single Area Payment Scheme (SAPS) as an immediate option for all new MSs.

The SFP was implemented during the period from 2005 to 2007. MSs were allowed to opt for different implementation schemes. In the historical approach, farmers were granted entitlements based on the individual historical amounts of payments received under coupled support. Under the regional scheme, farmers were granted entitlements based on the regional average payments received in the past. However, the SFP also allowed for hybrid systems, i.e., a mixture of the two approaches that could either be dynamic or static in its composition. Further flexibility was added by the possibility of partial decoupling, i.e., maintaining some coupled support for selected products by granting additional payments (or "top-ups") for some agricultural activities and by the possibility of differentiating flat rate payments between arable lands and permanent grasslands. The SAPS, which allows for uniform per hectare (ha) rates up to a national ceiling, was adopted by all new MSs, with the exceptions of Malta and Slovenia, which implemented an SFP approach.

In 2008, within the HC policy package, a further decoupling of payments (except for suckler cows, sheep and goats), a phasing out of milk quotas until 2015 and the abolishment of obligatory set-asides were introduced.[1]

[1] The eligibility criteria for decoupled payments, known as cross-compliance, include keeping the land in "good agricultural and environmental condition" (EUROPEAN COUNCIL, 2003).

3 Effects of Decoupling

3.1 Theory

Much attention has been paid to the question of whether the complete decoupling of payments is possible or whether some production effects will remain. A detailed literature review of potential coupling mechanisms based on theory is provided in BHASKAR and BEGHIN (2009). Most of the effects will, however, be sensitive towards factors such as the exact implementation scheme of the decoupled payments, the available amount and the tradability of entitlements (CIAIAN et al., 2008; KILLIAN and SALHOFER, 2008) or defined eligibility criteria.

1. Decoupled payments can influence land allocation by, e.g., providing incentives to retain land in agriculture or increase the production of lower-profit crops (BHASKAR and BEGHIN, 2009). The relative gross margins of crops receiving direct payments will increase (BALKHAUSEN et al., 2007).
2. Payments that are considered decoupled in a deterministic environment or for risk-neutral producers can potentially affect production decisions in light of uncertainty or risk aversion (HENNESSY, 1998). If the decoupled payment is linked to the source of uncertainty for the producer, the resulting insurance effect reduces the variability of income. In addition, decoupled payments can increase the average income of the producer, and the wealth effect can lead to an increase in production activity if the producer exhibits decreasing absolute risk aversion (DARA) (HENNESSY, 1998). In addition, decoupled payments can influence producers' risk appetites, and acreage may shift towards riskier crops and regions (ROCHE and MCQUINN, 2004).
3. Land values and rental rates can be increased because of the predictive nature of decoupled payments (ROE et al., 2003; PATTON et al., 2008).
4. Other effects that have been analysed include the impact on the number of farms (CHAU and DE GORTER, 2005) and farm labour supply (KEY and ROBERTS, 2009), the influence on creditworthiness and liquidity of farmers (GOODWIN and MISHRA, 2005) and the consequences for landscapes and biodiversity (BRADY et al., 2009).

In a numerical analysis conducted by HENNESSY (1998), the wealth effect from decoupled payments due to the DARA of the producers was small, and the insurance effect was much more significant. However, the insurance effect only arises if decoupled payments are linked to a source of randomness in the profit function, which is not the case for SFP. This result has been confirmed by a variety of other studies that have considered the wealth effect to be small because decoupled payments do not significantly alter wealth levels to a point on the utility function with significantly lower risk aversion (see, e.g., FEMENIA et al., 2010: 837). To our knowledge, the only study that has contradicted these findings is that of FEMENIA et al. (2010), who conducted a more detailed analysis and considered the ultimate beneficiaries of the direct payments. If land constitutes a large part of the farmers' assets, the wealth effect may be much more significant than if land is owned by a third party. However, consideration of these effects would require farm-level data on land holdings. In the case of credit constraints, the literature reviewed in BHASKAR and BEGHIN (2009: 136-137) has shown that the effects resulting from increased creditworthiness of farmers because of direct payments and the resulting higher land values seem to be negligible, especially in the long run.

3.2 Simulation Models

Simulation models are a standard tool for investigating policy impacts on the EU's agricultural sector. Traditionally, these models are grouped into computable general equilibrium (CGE) and partial equilibrium models. Whereas CGE models cover all sectors of an economy, partial equilibrium models are specialised models for the agricultural sector, typically featuring a higher level of disaggregation of sector activities. For a detailed analysis of the impact of decoupling on the EU agricultural sector, multi-commodity partial equilibrium models that cover the entire EU-27 are the most suitable. Single-country models, such as RAUMIS (KREINS and GOEMANN, 2008) and FARMIS (OFFERMANN et al., 2005) for Germany, often exhibit a high level of regional disaggregation but are of limited use for EU-wide analyses. We will restrict our discussion of the major multi-commodity partial equilibrium models covering the EU-27 to differentiating factors that are of particular importance in the context of this analysis. These factors are the level of spatial disaggregation and the degree of preciseness in policy modelling, especially the modelling and allocation of direct payments. A more detailed overview of the models is provided in, for example, BALKHAUSEN et al. (2007).

The FAPRI EU GOLD (grains, oilseeds, livestock and dairy) model of the FAPRI model family treats most of the EU-15 and the new MSs as one block of states. Single-country models are only included for the UK, France, Germany, Ireland, Italy, Poland, Hungary, Romania and Bulgaria (MOSS et al., 2008a). The EU-27 standalone component of the AGLINK model is composed of two modules (the former EU-15 and the EU-12 [OECD, 2007]). The ESIM (European Simulation Model), AGMEMOD and CAPSIM models cover all 27 MSs (BANSE et al., 2004; CHANTREUIL and HARANHAN, 2007; WITZKE and ZINTL, 2007; PÉREZ DOMÍNGUEZ et al., 2008). FAPRI GOLD and AGMEMOD allocate direct payments only at the product group level, and they use coupling factors to simulate links between direct payments and production (BALKHAUSEN et al., 2007; BRITZ et al., 2006). ESIM and CAPSIM use product-specific allocations of direct payments (BALKHAUSEN et al., 2007).

Not surprisingly, few simulation results exist concerning the regional and farm-type effects of decoupling in the EU after the implementation of the HC policies. A good summary of simulation results for the 2003 CAP reform and the MTR policy package at the MS level can be found in BALKHAUSEN et al. (2007) and the EUROPEAN COMMISSION DIRECTORATE-GENERAL FOR AGRICULTURE (2003). An early analysis of the legislative proposals of the HC policy package at the aggregate EU-27 level using FAPRI GOLD is presented in MOSS et al. (2008a), for example, whereas WITZKE et al. (2009) used the CAPSIM model to simulate the effects of the dairy reform within the HC. Some studies have analysed the regional impacts at the single-country level. GOEMANN et al. (2008) provide results of the HC policies for the German agricultural sector based on the AGMEMOD and RAUMIS and FARMIS models. MOSS et al. (2008b) investigated the impacts on the agricultural sector in the UK using the FAPRI GOLD and FAPRI-UK models.

To our knowledge, the analysis of the regional impacts of premium decoupling combining the 2003 CAP reform and the HC policy package at the EU-27 level is novel. In the following section, we describe the motivation for and the use of a simulation model, and we propose a set of counterfactual scenarios.

4 Description of the Model and Scenarios

4.1 The CAPRI Model

CAPRI is a deterministic comparative static partial equilibrium model for the agricultural sector developed for policy impact assessment of the CAP and trade policies from the global to regional scale. A detailed description of CAPRI is available in BRITZ and WITZKE (2008). CAPRI is solved by iteratively linking its supply and market modules. The market module is a global spatial multi-commodity partial equilibrium model using 28 trade blocs and 60 countries. Based on the Armington approach (ARMINGTON, 1969), products are differentiated by origin, enabling bilateral trade flows and the explicit implementation of both bilateral and multilateral trade instruments.

The supply module is composed of separate regional, non-linear programming models. The regional programming models determine a profit-maximising farm program under technological constraints, most importantly in animal feeding and fertilisation, but also constraints on inputs and outputs, such as young animals. In addition, the models contain econometrically estimated behavioural functions (JANSSON and HECKELEI, 2011). The supply module currently covers all the individual MSs within the EU-27, Norway, Turkey and the Western Balkans broken down to approximately 280 administrative regions (Nomenclature of Territorial Units for Statistics [NUTS] II level) and more than 50 agricultural products. For the EU MSs (with the exceptions of Bulgaria and Romania, due to missing data), the regions are further disaggregated to 1,823 farm-type regional models, each representing the aggregate of a particular type and size of farming enterprise in a particular region (GOCHT and BRITZ, 2011; GOCHT, 2010). The farm-type layer enables the highly detailed and explicit modelling of the implementations of the SFP as implemented in different MSs. Among all the agricultural policy simulation models that we are aware of, only CAPRI is able to simulate EU policies at such a high level of detail and disaggregation. Recently, CAPRI has been extended with land supply and transformation functions, allowing for the endogenous supply of arable land and grassland in response to changed marginal land rents, replacing the former fixed endowment constraints. The behavioural functions for land supply (publication in preparation) were parameterised based on the results of VAN MEIJL et al. (2006) and GOLUB et al. (2006), but they were adapted to the regional

resolution of CAPRI based on GIS analyses and simulation experiments using the Dyna-CLUE model (VERBURG et al., 2010).

4.2 Scenarios

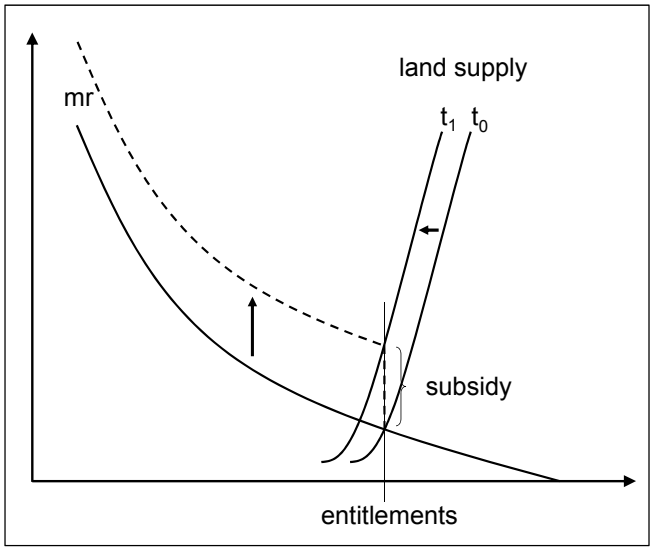
To produce the quantitative analysis below, we conducted deterministic comparative-static counterfactual runs for the period 2003-2005 against Agenda 2000 with the obligatory set-aside rate set to zero. The latter change to the actual policy in that period was introduced to exclude the distinct effects of changing set-aside rates on agricultural land use from the analysis and thus concentrate on the impacts of the remaining changes in the EU Common Market Organisations (CMO), especially the introduction of decoupled payments and their specific implementation. The comparison point thus reflects the prices, yields, production costs and global trade patterns in agricultural markets during the period 2003-2005 combined with a full implementation of the Agenda 2000 policy package. However, the comparison point is based on a counterfactual run against the 2003-2005 situation by setting the obligatory set-aside rate to zero. Comparing the HC implementation to this run allows modelling of the joint effects of the various decoupling steps in the EU and the accompanying changes in the CMOs.

In the HC package scenario, the Single Payment Scheme (SPS) is implemented, depending on an MS's choice, either in the form of a historical, regional or hybrid SFP or in the form of SAPS for a new MS (see table 3 in the Appendix). For an MS that adopted the historical model, the payment was computed by dividing the total historical payment by the number of eligible ha available on each farm-type. If the regional payment model was chosen, the total payment was instead distributed equally across all the eligible ha in the relevant region (generally each NUTS I region), where applicable, with separate payments for grasslands and arable lands. The "hybrid model" essentially allows a combination of the historical and regional approaches. All but two of the new MSs (Malta and Slovenia) operate under the SAPS, with uniform payments across all eligible land in the country. The results for this scenario are compared to the 2004 base year.

The second counterfactual scenario implements uniform per-ha rates on the national level. This step is modelled with the HC package with uniform per-ha rates, which are then compared to the results for the HC scenario. In fact, the HC scenario already incorporates uniform per-ha payments for some farming types. In countries that chose the historical implementation of the SPS, each farm type already receives uniform rates for arable lands and grasslands, and the same is true for entire regions in countries implementing the regional model. If countries choose the dynamic hybrid models, this will ultimately lead to a regional flat rate. In the EU-15, cereals and oilseeds are already subject to uniform premiums under the Agenda 2000 package. Therefore, the change to the HC scenario is mostly the reallocation of payments between farm types and, in some instances, between arable lands and grasslands.

To obtain the full farm premium, a farmer must not only possess one ha of land in good agricultural and environmental condition but also a (tradable) payment right.

Figure 1. Effects of SPS on land markets



Source: own calculations

The above graphic depicts the impact on land rent, and it helps illustrate the reactions to changes in the SPS. For simplicity, we did not graphically capture changes in other premium schemes. At the starting point t_0 and without a premium, the amount of land under agricultural cultivation is determined by the intersection of the marginal returns in agriculture to land (*mr)* and the land supply from other sectors. The SPS, as a subsidy to land use in agriculture, shifts the *mr* curve upward according to the size of the subsidy. Without further restrictions, agricultural land use would be expanded to a new intersection between the two curves. However, because of the introduction of the entitlements, such an expansion does not occur, as the old and the new *mr* curves are identical beyond the

entitlement point, where the subsidy cannot be claimed. Accordingly, immediately after its introduction, the subsidy is capitalised into the premium rights. However, urbanisation and other factors shift the land supply curve over time to the left. Depending on the slope of the land supply curve and the speed and size of the shift, the economic rent on the entitlements will be eroded over time until the new intersection between the *mr* and the land supply curves is to the left of the original entitlements. At that point (t_1), the subsidy will be fully capitalised in the land rent. Because the land supply curves are rather steep in many countries, according to our parameterisation, and a continuous decline in agricultural land cover can be observed in almost any EU member state, as we assume in our 2020 baseline (i.e., more than fifteen years after the introduction of the MTR), capitalisation only occurs on land and not on payment rights. This interpretation is also supported by the actual legislative text, which states that entitlements that are not claimed for two consecutive years will be withdrawn.

The reader should be aware that the above reasoning assumes that SFP is fully capitalized into land. It thus assumes that farmers either own the land or that lease markets have fully adjusted over the medium-term underlying the comparative-static analysis. An overview of the baseline and the two counterfactual scenarios is included in table 1. The scenarios take modulation (i.e., the annual reduction of direct payments by fixed rates) into consideration. However, redistribution of the money to finance rural development measures is not modelled because of the lack of sufficient budget data at the regional level in CAPRI.

Table 1. Overview of the baseline and scenarios

Scenario name	Comparison point	Scenario characteristics
Base year 2004		▪ Agenda 2000 policy package without set-asides
Health-Check (HC)	Base year 2004	▪ SFP implemented differently in different MSs (SAPS in all but two new MSs and historical or regional implementation or hybrid systems in the other MSs) ▪ Abolishment of dairy quotas and reduction in sugar quotas, as introduced in the HC policy package ▪ Partial decoupling only allowed for suckler cows and sheep and goats ▪ No specific payments for protein crops ▪ Final implementation rates in new MSs (abolishing national complementary payments)
HC with uniform country per-ha rate (HC-UNI)	Health-Check (HC)	▪ HC policy package as above ▪ All decoupled payments paid as a uniform per-ha rate for each MS ▪ Payments equally distributed over different land types

Source: own calculations

5 Results

The results show that decoupling affects production via land allocation and herd sizes, and it leads to considerable changes in income distribution among the farming community. Decoupling also has an impact on supply quantities, market prices and trade. Moving from the HC with individual implementation schemes at the MS level to a full regionalisation of payments (HC-UNI) reveals distributional effects. While the aggregate agricultural income change in the EU is comparatively small under this scenario, the income changes for single types of farming can be significant. Detailed results of the HC scenario are provided in section 5.1. The HC-UNI scenario is analysed in section 5.2.

5.1 HC Scenario

5.1.1 Income Distribution

In the plant sector, decoupling has implications for land allocation between different crop types and income redistribution between farm types. Table 2 provides an overview of the effects of decoupling on income, acreage, herd sizes, yields and supply quantities for different farming activities. Income is calculated as gross value added plus subsidies.

Considering that cereals and oilseeds have already been drawing uniform premiums in the EU-15 under the Agenda 2000 package, the comparatively moderate increases in income for cereals and oilseeds (+17.5% and +29.4%, respectively) at the EU average mainly stem from the introduction of the SPS in the form of the SAPS with the exceptions of Slovenia and Malta.

In contrast, the per-ha income for fodder areas increases by 505.5%. For those MSs that have implemented uniform per-ha rates for arable lands and grasslands under the HC scenario, fodder areas gain a comparative advantage over cash crop production, with the latter traditionally accounting for a large share of arable land, especially in the EU-15.

Table 2. Income, acreages / herd sizes, yields and supply per activity in the HC scenario

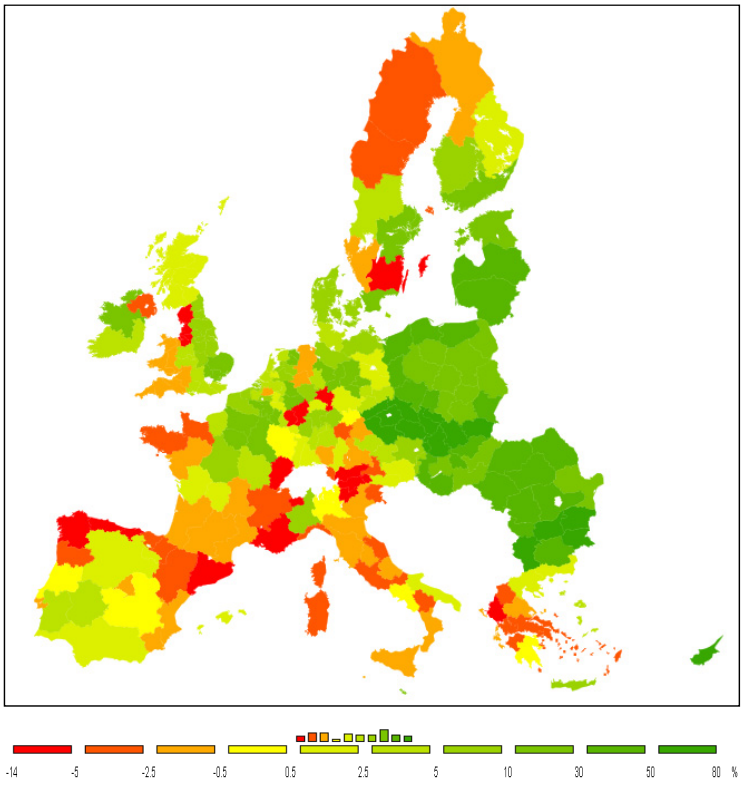
	Agenda No Set aside (2004)					Scenario HC (2004)					Scenario HC UNI (2004)				
	Income	Area / Herd Size	Yield	Supply	Prices	Income	Area / Herd Size	Yield	Supply	Prices	Income	Area / Herd Size	Yield	Supply	Prices
	€ ha or head	1 000 ha/head	kg/ha or head	tones	€/t	% to Agenda No Set Aside					% to HC				
Cereals	306	61 039	4 916	300 072	103	17,5	-8,4	2,9	-5,8	5,3	-5,1	-0,6	0,2	-0,4	0,5
Oilseeds	270	9 213	2 393	220 48	200	29,4	-4,6	0,6	-4,0	6,2	-6,1	-0,5	0,1	-0,4	0,8
Other arable crops	1 191	9 227	22 436	207 028	72	37,7	-9,9	-3,3	-12,9	29,2	-1,3	-0,5	0,3	-0,2	-0,1
Vegetables	4 072	14 949	10 645	159 133	483	3,2	-2,2	1,8	-0,5	1,2	0,0	-0,4	0,3	-0,1	0,2
Fodder activities	25	84 700	21 702	1 838 124	9	505,5	11,4	-7,0	3,5	-0,2	15,3	-1,4	0,9	-0,5	0,0
Fallow land	63	11 774				141,8	-8,4				1,1	-1,4			
Utilized agricultural area		190 902					1,0					-1,0			
All cattle activities	386	96 259	89	8 607		-17,0	-0,8	-0,4	-1,2		0,1	-0,2	0,0	-0,2	
Beef meat activities	157	29 581	358	10 594	2 768	-22,3	-4,6	-0,3	-4,8	2,0	0,1	-0,3	0,0	-0,3	0,2
Pig fattening	35	239 282	87	20 934	1 303	-0,3	-0,3	0,0	-0,3	1,0	-0,1	0,0	0,0	0,0	0,1
Sheep and Goat fattening	31	57 466	14	795	4 389	-13,6	-3,5	0,7	-2,8	4,1	-0,3	-0,1	0,1	-0,1	0,1
Poultry fattening*	467	5 640	1 847	10 420	1 208	-1,1	-0,6	0,0	-0,6	1,1	-0,3	-0,1	0,0	-0,1	0,1
Cow and buffalo milk					281					-9,4					0,1

* in 1 000
Source: own calculations

In the animal sector, the income for all activities is decreasing. Overall support for ruminants drops considerably. This trend is especially true for those countries where coupled support to beef cattle was maintained throughout the MTR (e.g., Sweden, Denmark, the Netherlands, Austria, Spain and Portugal). As a result, cattle, especially beef meat production, experience drops in income of 17% and 22.3%, respectively.

The regional distribution of income change compared with the Agenda No Set-Aside is presented in figure 2. In the EU-15, the regional distribution of income losses mainly correlates with the intensity of ruminant production. Hence, regions in the northwest of Spain, northern Portugal, the northern and middle regions of Italy and in France, particularly in the Bretagne, Aquitaine, Midi-Pyrenees and Rhone-Alps areas, lose income. Less-intensive ruminant production regions with a regional SPS, such as Schwaben and Niederbayern in Germany, encounter income increases because of increases in premiums for fodder and other arable crops (e.g., sugar and potatoes). In the EU-10, positive income changes are realised because of the SAPS payment increase.

Figure 2. Percentage income change in the HC Scenario compared with the Agenda No Set-aside (2004)



Source: own calculations

5.1.2 Land Allocation and Herd Sizes

Income redistribution affects the allocation of land between the respective farming activities in the plant sector. The simulation results show a sizable expansion of fodder areas in the EU-15 and most new MSs (the exceptions are Bulgaria, Romania, Czech Republic and Poland), leading to an average increase of 11.4%, whereas the areas allocated to cereal farming

and oilseeds drop, on average, by 8.4% and 4.6%, respectively. As the protein-specific payment is abolished under the HC scenario, protein crop areas (i.e., pulses) drop significantly by 23.1%.

The greatest relative change in land allocation can be observed for durum wheat, which, under the Agenda 2000 package, received considerably higher premiums compared with other cereals. Areas of durum wheat cultivation are simulated to drop by 44.3%, thus accounting for 34% of the total reduction in cereal area.[2]

In the animal sector, production activities and, consequently, herd sizes are also influenced by the decoupling of premiums. As a result of reduced support under the HC scenario, herd sizes are somewhat reduced, and the largest reduction is found in beef meat production (-4.6%). However, counterbalancing this development is the removal of dairy quotas under the HC, which leads to a small increase in herd sizes (+2.7%) in the dairy cow sector. This change, in turn, puts pressure on suckler cow herds (-6%) via a higher availability of calves. However, it should be noted that a few MSs (i.e. France, Spain, Greece and Austria) chose the option within the HC policy package to exempt suckler cow production from decoupling. Therefore, the reduction in suckler cow herds is concentrated in those MSs that have fully decoupled suckler cow premiums. In cases where coupled support is maintained, there is a shift inside the cattle chain towards calf fattening.

5.1.3 Market Supply, Prices and Trade

Market supply and, thus, market prices are also affected by the shift from the Agenda 2000 package to the HC, although the latter to only a moderate extent. The combination of a significant increase in fodder area and reduced ruminant herd sizes in the animal sector has implications for fodder yields and fodder supply (e.g., grass, hay, silage, silage maize and fodder root crops). Yields for fodder activities drop by 7%; thus, total fodder production (measured in dry matter) increases by only 3.5% despite the considerable increase in income per ha. Because the protein-specific payment is abolished under the HC scenario, the increases in energy and protein supply in fodder activities are even less than overall supply increase. The supply of silage maize is reduced, whereas the production of grass (silage) and hay increases. The greatest increase (29.3%) can be observed for extensively managed grasslands, whereas intensively managed grasslands are reduced by 5.5%. Generally, the overall decrease in arable land (4.8%) and the redistribution to other land types leads to output reductions and price increases. For example, the decreased supply of cereals and oilseeds, especially the sharp drop in durum wheat production, leads to an increase in prices for both product groups by 5.7%.

Beef prices and prices for sheep and goat meat increase by 2% and 4.1%, respectively, compared with the Agenda 2000 package because of decreases in output of 1.22% and 3.1%, respectively. A small increase in pork and poultry prices is mainly explained by higher feed costs. However, the abolishment of dairy quotas, along with the increase in dairy cow herd sizes, leads to a higher supply of milk (+2.9%) and a price decrease of 9.4%. The trade impacts of decoupling result from the above price effects. The EU-27 reduces its exports and increases its imports in almost all markets. The net trade in cereals drops by 290% and the net trade in meat by 9%. The reduction in net cereal imports is dampened by reduced feed demand (-3.8%).

5.2 HC-UNI Scenario

Compared with the HC scenario, the introduction of equal per-ha rates for all types of agricultural land use in all farm types, country-wide, transforms SFP into an SAPS implementation in all the MSs.

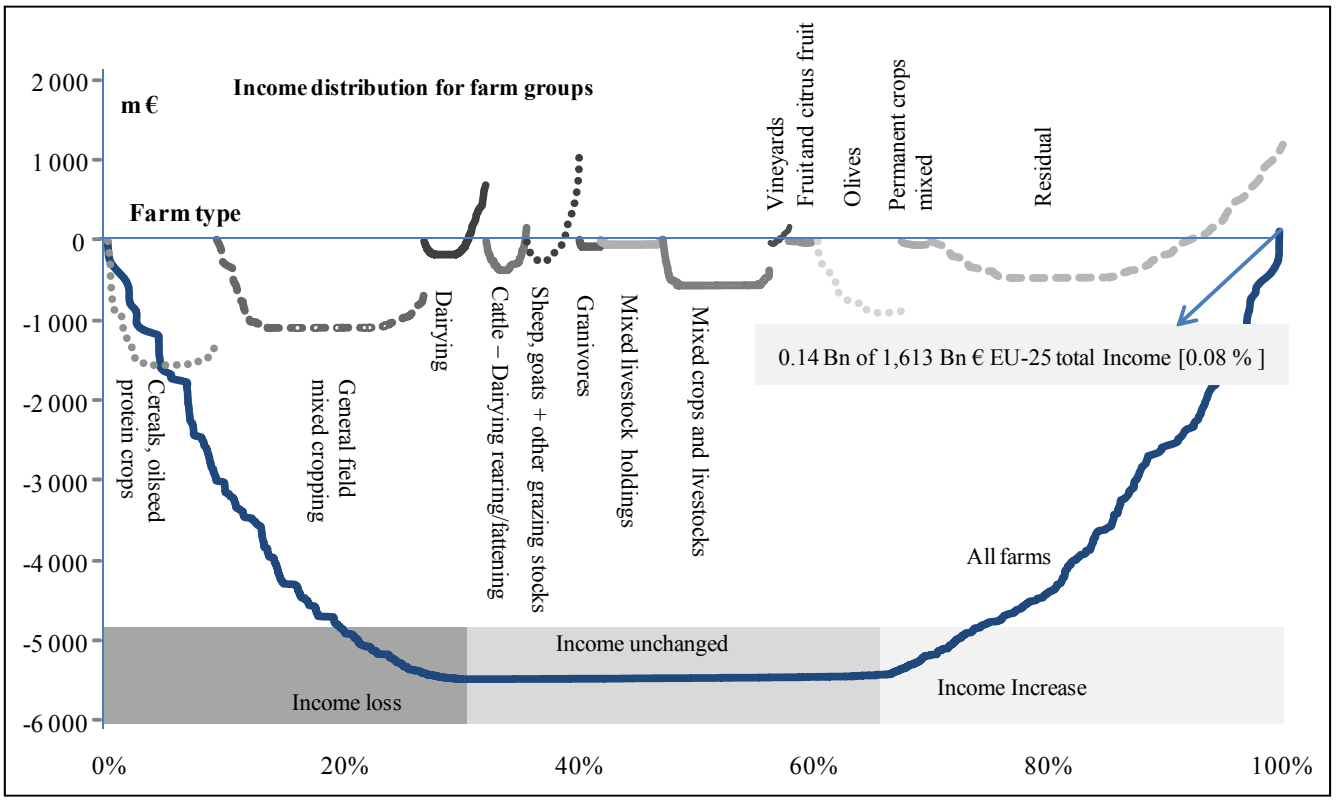
5.2.1 Income Distribution

The HC-UNI scenario reveals that in the EU-27 yield, supply and price changes are very small and generally less than +/-1%. It also shows that the redistribution of premium will primarily have an impact on the income distribution inside the EU's agricultural sector. Accordingly, we analyse the income distribution at the level of farm groups by specialisation (farm types). Figure 3 depicts changes in income in the EU-25[3]. Absolute changes are compared to the HC (2004) scenario.

[2] This effect may be overestimated, because CAPRI does not distinguish between soft and durum wheat varieties in the market model; thus, the price increase in durum wheat might not be sufficiently high. In reality, there should be some buffering effect from the market via an increase in durum wheat prices over soft wheat prices.

[3] As mentioned above, Bulgaria and Rumania are not included because of a lack of farm-type data.

Figure 3. Distribution of absolute income changes in the EU-25 by farm specialisation (year 2004)



Source: own calculations

The horizontal axis represents all farms. For a better interpretation they are scaled to 100% which is equal to 10.2 million farms in the EU-25. For the aggregate farming community (overarching curve) and for each single farm type (small curves), the curves show the accumulated respective income change weighted by the number of farms in each specialisation. Negative slopes indicate income losses, whereas positive slopes denote increases in income. A flat curve means that the income stays constant. In figure 3, this is indicated with shaded areas around the *all farms* curve. The end point of each curve indicates the total income change.

For the sum of all farms in the EU-25, the income plus premiums slightly increases by 0.14 billion € (depicted as the distance between the end point of the *all farms* curve and 0). This increase is caused by the moderate price rise due to reduced output, which is the result of a shift of support from productive to marginal areas. Income changes for single farm types, however, can be very high, which mainly results from premium redistribution. Price changes have only a moderate impact. Overall, 30% of all farm groups lose income. For 35%, the change is moderate, but for the remaining 35%, an income increase is predicted. As can be observed from the income distribution lines in figure 3, grazing livestock farm types (dairy, cattle, sheep and goats, as well as the residual farm types) experience a pronounced income increase, which is mainly due to increasing grassland premiums. In contrast, field cropping farm types (cereals, oilseed and protein crops, general field cropping and mixed cropping and mixed crop livestock) lose income.

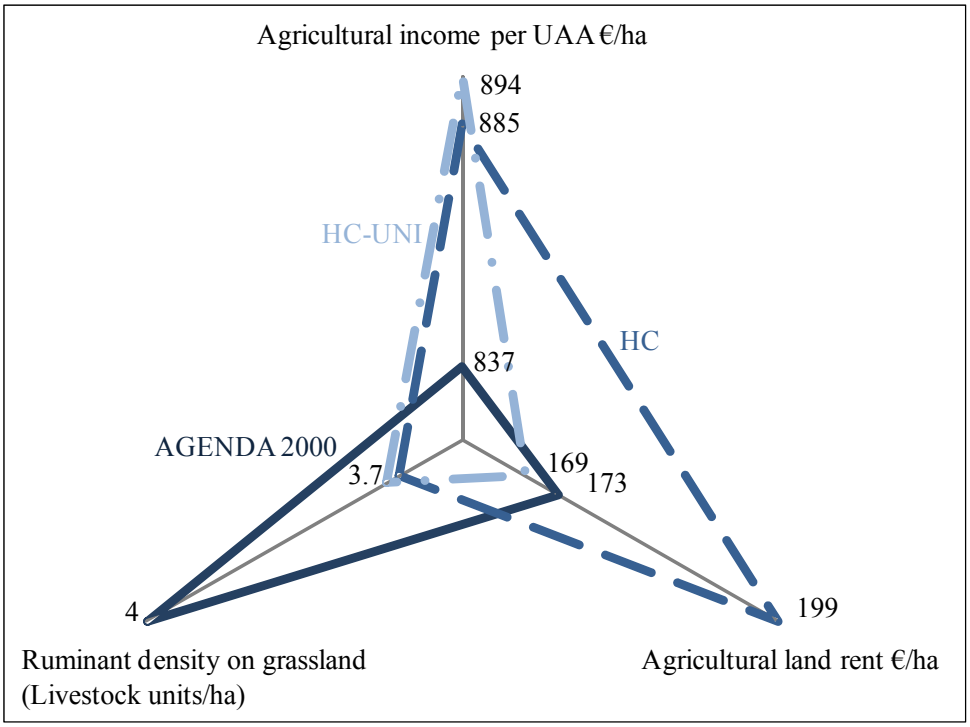
5.2.2 Land Allocation

Compared with the HC scenario, the effect of moving to uniform per ha rates on land allocation is relatively minor, with only a slight drop in land use (between 0.1% and 0.5%) for all types of farming activities. This result reflects that some old MSs have already applied flat rates at the regional or farm-type level and that the vast majority of agricultural land in the new MS was already receiving premiums from the SAPS under the HC scenario (as indicated by the horizontal parts of the curves in figure 3).

The uniform MS rates lead to adjustments in flat rates at the regional or farm-type level, depending on the implementation chosen by the different MSs. However, the changes in land allocation in CAPRI are mostly limited to the reaction on the land supply curve of those regions losing premiums and to slight substitution effects where premiums had been differentiated by arable lands and grasslands. The regions where the premiums increase are bounded by the entitlements.

Because historical and regional SFP rates are linked to the amounts of coupled payments and other types of support paid under the Agenda 2000 package, the SFP rates reflect to a larger extent the productivity of the regions and their specialisation. For example, regions with high historical cereal yields and larger ruminant stocking densities also show higher SFP rates. Hence, uniform premiums at the country level tend to decrease support in more productive regions and increase support in marginal regions.

Figure 4. Summary of impacts on assorted variables in the EU-27: a comparison of the 2003 reform, Health Check, and Agenda 2000 base scenarios (year 2004)*



* The impacts of each variable are normalised to the same scale, varying from zero to one. This normalisation is achieved by dividing the impact in each scenario by the difference between the maximum and minimum values of the three scenarios.
Source: own calculations

5.3 Summary of Impacts

The spider graph below in figure 4 provides an overview of the three policy options analysed. The graph combines their impacts on income, ruminant density on grasslands and land rents. The Agenda 2000 policy package – characterised by the highest level of coupled support – shows the lowest impact on agricultural income per ha (836 €/ha) and the highest stocking density (4 LSU/ha). The indicators, therefore, clearly show the effect of coupled payments, which boost production but lead to lower agricultural income because of lower output prices and by maintaining inefficient production compared with more decoupled support. The HC, which includes dairy market liberalisation, has the lowest ruminant stocking densities (3.7 LSU/ha) but generates the highest land rents (200 €/ha). In turn, the HC-UNI scenario leads to the highest agricultural incomes (894 €/ha).

6 Conclusion

This article analysed the effects of the HC policy package and the subsequent introduction of uniform per-ha rates at the MS level. The results simulated by CAPRI based on the combination of 1,823 farm types and regional models with a global market model should be interpreted as medium-term adjustments of the EU's agricultural sector to the policy changes. The results show moderate effects of decoupling and other elements of the HC reform on production. Major changes occur in some relatively small sectors, such as durum wheat and protein crops, which received differentiated payments under Agenda 2000. The results suggest that the introduction of the SPS, especially the conversion of coupled support to ruminants into per-ha payments, generally subsidises land use in agriculture, especially fodder production.

The results of the scenarios clearly depend on the structural and behavioural characteristics of CAPRI

and the way the policies are represented. The specific advantage of CAPRI is the high disaggregation by farm types in the NUTS II regions and the detailed list of agricultural production activities, which allows for the highly accurate simulation of changes from coupled to decoupled support and the representation of different implementations of the SPS by the different MSs. At the same time, the global market model integrates price feedback into the analysis. The estimated impacts of changing the payment system depend on how the different types of payments are represented in CAPRI. Payments defined on a per-ha basis, including the SPS, drive crop allocation, along with revenues and variable costs. Increasing the uniform rate paid to all cropping activities, including idling land, only impacts the shadow price of land, as entitlements to premiums are explicitly modelled and prevent claiming support for additional hectares. Reducing the rate, however, might lead to less agricultural land cover according to the land supply curve embedded in the farm-type models. To what extent the simulated changes in the shadow price of land impact the capitalisation of land and farm household income cannot be answered using CAPRI, which does not simulate agricultural land markets and uses the agricultural gross value added as the income indicator. Also, elements such as effects on the risk or wealth of (de)coupled premiums are not included in our analysis, and transfers of premium entitlements are not modelled. It is important to consider these limitations when interpreting our results.

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Appendix

Table 3. Overview of SPS implementation in the HC scenario

	HC		
Countries	**Regional SPS**	**Historical SPS**	**Hybrid premium farm**
EU-15			
Belgium		x	
Denmark	x	x	x
Germany	x		
Austria		x	
Netherlands		x	
France		x	
Portugal		x	
Spain		x	
Greece		x	
Italy		x	
Ireland		x	
Finland	x	x	x
Sweden	x	x	x
United Kingdom	x	x	x

	HC	
Countries	**SAPS**	**Regional SPS**
EU-10		
Czech Republic	x	
Estonia	x	
Hungary	x	
Lithuania	x	
Latvia	x	
Poland	x	
Slovenia		x
Slovak Republic	x	
Cyprus	x	
Malta		x

Source: own calculations