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# **The Impact of the 2013 Reform of the Common Agricultural Policy on Land Capitalization in the EU**

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# The Impact of the 2013 Reform of the Common Agricultural Policy on Land Capitalization in the EU<sup>1</sup>

Pavel Ciaian, d'Artis Kancs and Johan Swinnen

## Abstract

Decoupled direct payments were introduced in the EU in form of the Single Payment Scheme (SPS) in 2005. The 2013 CAP reform changed both the implementation of the SPS and its budget. This is the first paper that analyzes the possible effects of the 2013 CAP reform on the EU land markets; in particular the capitalization of the SPS in land rental values. Our results suggest that the implementation elements of the 2013 CAP reform will largely determine the impact of the SPS on land markets. In particular, the reference period for entitlement allocation, regionalization, payment differentiation and budgetary changes. Our analysis also implies that a number of relatively minor policy changes could have substantial impacts on land markets.

**Key words:** Capitalization, decoupled subsidies, CAP reform, land market, land prices.

**JEL:** H22, L11, Q11, Q12, Q15, Q18, P32, R12.

## 1. Introduction

In 2013 the Common Agricultural Policy (CAP) underwent substantial reforms changing both the implementation and its payment level (European Commission 2013). The objective of this study is to analyze the possible effects of the 2013 CAP reform on the EU land markets. We aim to assess how different elements of the reform may alter the Single Payment Scheme (SPS) capitalization compared to the pre-reform period. Whereas some reform elements, such as the shift from historical to the regional SPS, will likely induce harmonization of payments across EU Member States and across farms, other reform elements, such as the reduction of the SPS to large farms, will likely increase the differentiation in per hectare payments. The impact on land markets will differ substantially between the two types of reform elements. Other important reform elements analyzed in this paper are the 'CAP greening', the reference period for entitlement allocation, and the definition of farm eligibility for the SPS.

The capitalization of agricultural subsidies has been studied extensively in the literature with the aim to identify their potential leakage to landowners. Previous studies have analyzed how these effects differ among policies (Alston and James, 2002; de Gorter and Meilke, 1989; Dewbre, Anton and Thompson, 2001; Gardner 1983; Guyomard, Mouel and Gohin, 2004), how the results change if one includes more agents along the vertical chain (Desquillet and Guyomard, 2002; Sheldon, Pick, and McCorriston, 2001), imperfect competition (McCorriston and Sheldon, 1991; Salhofer and Schmid, 2004), imperfections in factor markets (Ciaian and Swinnen, 2006; 2009), or transaction costs and constraints in the implementation of the policies (de Gorter, 1992; Vatn, 2001).

Early studies focused on policies, which were coupled to production decisions, e.g. the price intervention or production quotas. After the decoupling of policy support in the late 1990s in the US and 2003 in the EU, more recent studies have analyzed the impact of decoupled subsidies (e.g. Chau and de Gorter 2005; de Gorter 2007; Goodwin and Mishra, 2006; Hennessy, 1998; Serra *et al.* 2005; Sckokai and Moro, 2006). However, only few studies have analyzed the SPS (e.g. Ciaian, Kancs and Swinnen 2008; Courleux, *et al.* 2008; Kilian and Salhofer 2008; Gocht *et al.* 2013).

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There are no studies yet that systematically analyze the impact of the 2013 CAP reform on the SPS capitalization. This study attempts to fill this gap. The SPS capitalization has important policy implications for the EU, where farmland renting is widespread (53% of farmland is rented in the EU).

## 2. Single Payment Scheme in the EU

The SPS was introduced by the 2003 CAP reform, and was implemented starting from 2005 and runs until 2013. The SPS replaced coupled subsidies which included crop area payments and animal payments. Under the SPS, entitlements are allocated as a fixed set of payments per farm. Farms are entitled to yearly payments, depending on the number of the SPS entitlements and the eligible land they possess. In the first year of the SPS implementation, each farm was allocated a fixed amount of the SPS entitlements. Farms can activate the entitlements and receive the SPS if they are *accompanied* by an equal amount of eligible land. This implies that the SPS is indirectly linked to land because, in the absence of land, farms cannot activate (cash in) the SPS entitlements. However, the SPS is not linked to a specific land area – the SPS entitlements can be activated by any eligible farmland in the region. Furthermore, farms can expand or decrease their stock of entitlements by buying or selling entitlements on the market from other farms.

When implementing the SPS, MS could choose between three different SPS implementation models: the *historical* model, the *regional* model, and the *hybrid* model. The key difference between the three models is in the unit value of entitlements: under the historical and hybrid models, the value of entitlement varies between farms (stronger in the former than in the latter), whereas under the regional SPS model, all farms in a region have entitlements with the same unit value.

Farm eligibility to the SPS is subject to cross-compliance. Each farm that receives the SPS must comply with the Statutory Management Requirements, and maintain land in Good Agricultural and Environmental Condition.

### 2.1 SPS reform (2013)

The agreement on the reform was reached in 2013. The reform will change both the implementation conditions of the SPS and its budget (European Commission 2013). The new changes introduced by the reform will be implemented starting from 2015 and they are summarized as follows:

- I. The SPS budget for specific MS will change for two reasons: the overall budget will be reduced and there will be a harmonization of payments across MS. The reform will reduce the gap between the SPS value per hectare across MS by reducing high value SPS, and increasing low value SPS.
- II. Harmonization of the SPS within MS implementing the historical SPS model. The reforms imply a shift towards the regional SPS model, which implies a harmonization of the SPS across farms (i.e. towards a flat-rate SPS value) at MS (or regional) level.
- III. The reform also includes several changes in the SPS, which may increase differentiation in per hectare payments: (i) Certain farm types, such as young farmers and farms located in disadvantaged areas, may receive additional payments that supplement the SPS; (ii) A progressive reduction of the SPS per farm and capping of the total SPS value at a maximum per farm; (iii) A higher value of the SPS for the first 30 hectares (or up to the average farm size if higher than 30 hectares) and a lower entitlement value for the rest of area. Each of these elements of the reform may increase differentiation of per hectare SPS value across and within MS and regions in the EU.
- IV. Stronger linkage of the SPS to “agricultural practices beneficial to the climate and environment” (so called '*CAP greening*').
- V. Reference period for entitlement allocation. With implementation of the 2013 CAP reform, the MS can choose either to maintain old entitlements or to allocate new entitlements.
- VI. Improved criteria for farm eligibility for the SPS. The policy objective is to identify active farmers, while avoiding, among others that non-farming landowners can apply for entitlements.

### 3. Theoretical framework

Previous theoretical studies have investigated, among others, the impact the SPS introduction by the 2003 CAP reform on land capitalization (Ciaian and Swinnen 2006; Courleux, et al. 2008; Ciaian, Kancs and Swinnen 2008; Kilian and Salhofer 2008, Ciaian, Kancs and Swinnen 2010). These studies use a theoretical model to identify the share of the SPS that remains with farmers and the share that is leaked to other market agents, e.g. to what extent the SPS is capitalized in land values. These studies show that the SPS implication details are highly important in determining the actual capitalization of SPS into land values and their main findings are summarized below.

- The capitalization of the SPS depends strongly on the ratio of the eligible area to the total number of entitlements. If there are more entitlements (“surplus”) than the eligible area, then the SPS leads to a land price increase (“is capitalized in land prices”). However, if there are less entitlements (“deficit”) than eligible land, then the SPS does not increase land prices (“not capitalized in land values”).
- The share of the SPS that is capitalized is higher for small than for large payments.
- Capitalization of the SPS in land prices will be stronger under the regional SPS model than under the historical SPS model.
- Capitalization of the SPS in land prices will be affected by tradability of entitlements under some conditions.
- Capitalization of the SPS in land prices is higher when the supply of land is less elastic (i.e. when it is difficult to use more land).
- Capitalization of the SPS in land prices might be lower with cross-compliance.
- Capitalization of the SPS in land prices is lower when land prices are regulated.
- Capitalization of the SPS in land prices is higher when the SPS reduces credit constraints.
- (Changes in) capitalization of the SPS in land prices is more gradual with long term rental contracts.

#### 3.1 Theoretical model

Building on previous models of the 2003 reform CAP (Ciaian, Kancs and Swinnen, 2008; Courleux et al, 2008; and Kilian and Salhofer, 2008), we set up a simple theoretical model for analyzing the 2013 CAP reform. Following Ciaian, Kancs and Swinnen (2008) and Courleux et al (2008), we assume that: (i) output and variable input equilibrium prices are exogenous; (ii) the possibility for an increase or decrease in the total land use, i.e. upward sloping land supply; (iii) the entire land is owned by “landowners”, who rent the land to “farms”; (iv) there are two regions, which are equal in all respects except for the land supply; (v) there are two types of entitlements; (vi) entitlements are allocated to farms (this assumption is relaxed later); and (vii) entitlements are fully tradable within regions, but non-tradable between regions.

The land market is illustrated in Figure 1. The horizontal axis shows the quantity of land,  $A$ , the vertical axis measures the rental price,  $r$ , and the SPS payment,  $t$ . The aggregate land demand without SPS is given by the downward sloping curve  $DD$ . Land supply in region 1 is given by curve  $S_1$ , and land supply in region 2 is given by curve  $S_2$ . The land market equilibriums in the zero support regime, are  $(A_1^*, r_1^*)$  and  $(A_2^*, r_2^*)$  in region 1 and region 2, respectively. Although, the productivity is the same for all farms (i.e. land demand is the same in region 1 and region 2), there is less land used in equilibrium in region 1 than in region 2 due to lower land supply. The stock of type 1 entitlements,  $A_E^1$ , has unit face value  $t^1$ , and the stock of type 2 entitlements,  $A_E^2$ , has face value  $t^2$ . The aggregate stock of entitlements,  $A_E^T$ , is the sum of the two types, i.e.  $A_E^1 + A_E^2 = A_E^T$ .

First, assume that both types of entitlements have *equal face value*,  $t^r = t^1 = t^2$  (as in the regional SPS model). The land demand with entitlement face value  $t^r$  can be represented by the kinked curve  $D_rD$ . Relative to a no-support regime, the land demand with the SPS shifts upward from  $DD$  to  $D_rD$ . Given that farms need land to activate their entitlements and cash-in the SPS, farms' willingness to pay for land increases by the value of entitlement,  $t^r$ . This holds until all entitlements are exhausted, i.e. up to  $A_E^T$ . After this point, land demand is the same with and without the SPS, as there are no unused entitlements available. Comparing the two regions in Figure 1, this implies that

relative to land use without the SPS, region 1 has surplus entitlements, because the equilibrium land use in a zero support regime is lower than the total stock of entitlements,  $A_1^* < A_E^T$ . In contrast, region 2 has deficit entitlements, because the equilibrium land use in a zero support regime is larger than the total stock of entitlements,  $A_2^* > A_E^T$ . The land market equilibriums with the SPS are at  $(A_{1r}^*, r_{1r}^*)$  and  $(A_2^*, r_2^*)$  in region 1 and in region 2, respectively. Note that the land market equilibrium in region 2 with deficit entitlements is the same with and without the SPS. Neither the equilibrium land use nor the rental price are affected by the SPS. The SPS has a zero-distortive marginal effect on farm rental decisions in this region.

*Differentiation in the face value* of entitlements changes the shape of land demand curve. Assume that entitlement face values are  $t^1 > t^2$  (as in the hybrid and historical SPS models). The land demand with  $t^1$  and  $t^2$  is given by the bold double kinked curve  $D_h D$ .<sup>2</sup> Given that we assume full tradability of entitlements,<sup>3</sup> farms will first use the high-value entitlements, and then the low value entitlements. In region 1, where entitlements are in surplus, the equilibrium is given by  $(A_{1h}^*, r_{1h}^*)$  with differentiated entitlements  $t^1$  and  $t^2$ . In region 2, the equilibrium is the same as in the case without policy support and is given by  $(A_2^*, r_2^*)$ .

## 4. Capitalization effects of the 2013 CAP reform

### 4.1 Changes in the SPS budget (Reform I)

As explained in section 2.2, there will be a decline in the EU budget for the SPS and, within the reduced overall budget, a reallocation of the SPS budget between MS. This means that (a) in MS with a high SPS value per hectare the total SPS budget will decline, and (b) in the MS with a low SPS value per hectare the total SPS budget may increase or decrease depending on which effect (overall budget decline versus reallocation) will dominate. Overall, the budget change will have a differentiated impact across MS, depending on whether the country will receive more or less from the SPS and weather entitlements are in deficit or in surplus.

As a starting point, consider the flat-rate entitlements  $t^r$  in Figure 2. The demand is given by  $D_r D$  and the equilibriums are  $(A_{1r}, r_{1r})$  in region 1 and  $(A_2, r_2^*)$  in region 2 (for entitlements  $t^r$ , Figure 2 is identical to Figure 1).

In region 1 with surplus entitlements, landowners will be predominantly affected by the SPS budgetary changes. Consider the SPS budget increase which extends the entitlement value from  $t^r$  to  $t^{rh}$ , where  $t^{rh} > t^r$ . The impact on land markets is reflected in an upward shift of land demand to  $D_{rh} D$ . The land market equilibrium shifts as well to  $(A_{1rh}, r_{1rh})$ . Land use and land rent increase by  $A_{1rh}^* - A_{1r}^*$  and by  $r_{1rh}^* - r_{1r}^*$ , respectively. Relative to the equilibrium with entitlements  $t^r$ , landowners gain area  $EFG$ , farmers gain area  $V$ , and the deadweight loss is given by area  $HMR$ . Due to inelastic land supply, the largest share of additional SPS budget (area  $CGH$ ) is leaked to landowners through higher rental prices, i.e. area  $EFG$  is larger than area  $V$ . Although, more payments are channeled to farmers in region 1, the main gainers are landowners.

Analogous effects can be derived for the case when payments are reduced. In Figure 2 this is the case for entitlements  $t^{rl}$ , where  $t^{rl} < t^r$ . Land demand shifts downward to  $D_{rl} D$  and the land market equilibrium shifts to  $(A_{1rl}, r_{1rl})$ . Relative to the equilibrium with entitlements  $t^r$ , land use and land rent decrease by  $A_{1rl}^* - A_{1r}^*$  and by  $r_{1rl}^* - r_{1r}^*$ , respectively. Landowners lose area  $JK$ , farmers lose area  $T$ , and the deadweight gain is represented by area  $LP$ . Again, due to inelastic land supply, the largest losses will likely bear landowners through depressed rental prices, i.e. area  $JK$  is larger than area  $T$ . Although, region 1 losses part of the SPS, the most heavily affected are landowners; farmers' cut in the support level is to a large extent offset by reduced rental costs.

In region 2 with deficit entitlements, an increase (to  $t^{rh}$ ) or decrease (to  $t^{rl}$ ) in the SPS

<sup>2</sup> Note that most MS implementing historical/hybrid model have entitlements with a continuum of face values. See Killian *et al.* (2012) for modelling of this situation. Our assumption of two entitlements is to simplify the exposition of the effects and it does not affect the general results.

<sup>3</sup> Full tradability of entitlements implies that we can disentangle the entitlements from specific hectare of land or specific entitlement holder (Ciaian, Kancs and Swinnen 2008, Courleux *et al* 2008 and Kilian and Salhofer 2008).

entitlements will not affect the equilibrium  $(A_2^*, r_2^*)$ . Land rents do not change, nor does land use. The change in the SPS is fully borne by entitlement holders (i.e. farms). The increase of entitlement value from  $t^r$  to  $t^h$  would generate a gain to farmers equal to area  $CGHI$ , whereas a cut in entitlement value to  $t^l$  would lead to a total farmers' loss given by area  $BFKLMO$ .

#### 4.2 Harmonization of the SPS across farms (Reform II)

The harmonization of the SPS within a country, when the historical model is replaced by a regional model for the SPS entitlement allocation, is likely to increase land rents (thus the capitalization of the SPS). The reason is that land rents (and capitalization of the SPS) are determined at the margin and demand for land will go up at the margin with harmonization.

This is illustrated in Figure 1. To compare the effects of different SPS models, we keep the total amount (value) of the SPS entitlements constant. Under the regional model, the equilibrium was  $(A_{1r}^*, r_{1r}^*)$  in region 1 – where the land was binding and which is the interesting case. Under the historical model the equilibrium in region 1 is  $(A_{1h}^*, r_{1h}^*)$ . Hence, shifting from the historical to the regional SPS model, land use will increase (by  $A_{1r}^* - A_{1h}^*$ ), as will land rents (by  $r_{1r}^* - r_{1h}^*$ ). Relative to the historical model, landowners gain area  $C$ , farmers lose area  $B$  (due to harmonization of payments), but gain area  $G$  (due to land use increase), while the deadweight loss is equal to area  $I$ . The SPS harmonization is thus beneficial to landowners, whereas farmers lose, as area  $B$  is likely to be larger than area  $G$  due to inelastic land supply. In region 2, there is no effect – the land market remains the same under the historical and the regional model:  $(A_2^*, r_2^*)$  is the land market equilibrium in region 2. Hence harmonization of payments between farms will not affect the land market in this situation.

#### 4.3 Differentiation of the SPS between farms (Reform III)

As explained in Section 2.2, the reform also includes several changes in the SPS, which may increase the differentiation in per hectare SPS, such as additional payments to young farmers, disadvantaged areas and the SPS which are lower beyond a certain farm size, etc. (see Reform 3 in section 2.2). Each of these reform elements effectively increases differentiation of per hectare SPS value.

The impact of these reforms can be analyzed in the framework we used to compare the historical and regional models – as illustrated by Figure 1. For a given (fixed) total amount (value) of the SPS, an increased differentiation will have a similar effect, as going from the regional to the historical model. By differentiating SPS per hectare one adds “kinks” to the land demand function. The result is that at the margin the demand will be lower than in the case of more harmonized payments. Hence, these reforms will likely reduce land rental prices and capitalization. Obviously this will be the case only in region 1 with surplus entitlements, where the SPS affects land markets. In region 2 with deficit entitlements, the capitalization effects (where farms absorb the entire SPS) are the same in both cases; with and without Reform III.

#### 4.4 'Greening' of the CAP (Reform IV)

The reformed CAP will increase the linkage of the SPS to “agricultural practices beneficial to the climate and environment” (so called '*CAP greening*'). The 'greening' imposes additional requirements to farms as an eligibility condition for receiving the SPS. Not respecting these requirements may lead to a reduction or a full loss of the SPS. Conceptually, the CAP 'greening' has similar implications for land markets as cross-compliance. The effect of greening on the land market is likely to be a decline in land rents. An increase in requirements will increase the costs for farmers, thus reduce profits from land use and hence reduce demand for land. This, in turn, will lead to a reduction in land use and a decline of land rents.

The CAP 'greening' requirements reduce land productivity, because they constrain farms with respect to the crop choice and the use of land. In the case of crop diversification requirement, farms may be required to relocate land between crops, if they do not cultivate the required number of different crops, and if the minimum and/or maximum thresholds are not respected, which implies that farms may plant a higher share of a less profitable crop to fulfill the crop diversification requirement. This leads to a reduction of land profitability, and hence in lower farm bids for land rent. The implications of the permanent grassland requirement are similar. If it would be optimal for farm to

convert grassland to other uses in the absence of the SPS, then the 'greening' requirement will constraint farm from doing so, causing a downward shift in land profitability. The ecological focus area requires withdrawing from production a share of farm area, which directly cuts return from each additional hectare.

Reform IV is illustrated in Figure 3. Denote the per hectare productivity reduction induced the 'greening' by  $c$ ; which is assumed to be constant. The productivity reduction  $c$  shifts the land demand curve with entitlement  $t^r$  downward from  $D_r D$  to  $D_c D_c$ . The equilibrium shifts from  $(A^* r^*)$  to  $(A_c^* r_c^*)$ . The 'greening' reduces land use, by  $A^* - A_c^*$ , and rental price, by  $r^* - r_c^*$ , relative to a situation without 'greening', deficit entitlements  $t^r$ , and zero support regime. Hence, the production reduction induced by 'greening' leads to a decrease in land rents. Relative to the SPS without 'greening', landowners loose from lower rent (area  $E$ ), farmers gain the full value of entitlements (area  $B$ ), but loose from the 'greening' (area  $F$ ), whereas the deadweight effects induced by land distortions result in a welfare loss given by area  $G$ . Hence, the reduced productivity due to 'greening' (area  $EFG$ ), are shared between farmers and landowners.

The total welfare effects of 'greening' may be underestimated in Figure 3, because we do not take into account their potential impact on provision of agricultural public goods and externalities. On the other hand, due to inelastic land supply, landowners will likely bear the largest share of losses induced by the 'greening'. The productivity reduction is directly linked to land use and hence act as a land tax. Third, in Figure 3 we assume constant productivity reduction, which in reality may change (increase or decrease) with land use. Further, heterogeneity in farms' production structure, specialization, geographical location and technology determines the actual impact of the CAP 'greening'. This implies, that the 'greening' impact can vary between the MS, regions and farms.

#### 4.5 Reference period for entitlement allocation (Reform V)

According to the 2013 CAP reform, either pre-reform entitlements may be maintained or new entitlements will be allocated to farms who apply for it in 2015. Additionally, farmers will be required to be beneficiaries of decoupled CAP payments before 2014 (European Commission 2013). The latter system corresponds to the second system of entitlement allocation in 2003, i.e. based on land use in the first year of the SPS application. The 2013 CAP reform has implications for the type of applicants that can obtain new entitlements, i.e. only those who had payments prior to 2014 can receive new entitlements. However, the 2013 CAP reform does not restrict the number of new entitlements that an applicant can obtain. Applicants can apply for a number of entitlements equal to their optimal land use (taking into consideration both the economic return from land and the entitlement value). This could have potentially important effects on the land market, depending on the existing capitalization.

The effects of the two systems of entitlement allocation are shown in Figure 4. Consider a situation before the implementation of the 2013 CAP reform with uniform entitlements  $t$ , implying that the land demand is given by  $D_r$  and the land market equilibriums are  $(A_{1r}^*, r_{1r}^*)$  and  $(A_2^*, r_2^*)$  in region 1 (represented by land supply curve  $S_1$ ) and region 2 (represented by land supply curve  $S_2$ ), respectively.

In a region with surplus entitlements in the pre-reform period (region 1 in Figure 4), the choice of the reference period may lead to a (small) reduction in land rents. The possibility to obtain new entitlements in the first year of the SPS implementation (in 2015 according to the reform) will incentivize farmers to obtain additional entitlements. The size of the increase in entitlements will depend on the availability of land because (as defined in the 2013 CAP reform) farms will be allocated new entitlements only if they are accompanied by an equal amount of eligible land. The 2013 CAP reform attempts to limit the increase of the number of entitlements. It stipulates that if the total claims for entitlements increase by more than 35% of the total eligible area in 2009, MS may limit the number of payment entitlements to be allocated in 2015 to either 135% or 145% of the total number of eligible hectares in 2009 (European Commission 2013). However, because with more entitlements and a fixed budget, the per unit entitlement will decline (to  $t^N$  in in Figure 4), and hence land rents will decline. The land rents and land use decline from  $r_{1r}^*$  to  $r_1^N$  and from  $A_{1r}^*$  to  $A_1^N$ ,



respectively.<sup>4</sup> Relative to the pre-reform situation (i.e. relative to  $(A_{1r}^*, r_{1r}^*)$ ), landowners lose area  $B$ , farmers lose area  $C$ , and the deadweight gains are represented by area  $D$ . This effect is likely very small (unless there would be a very large increase in entitlements, which appears unlikely). If the entitlement stock does not change significantly (e.g. due to the land availability constraint or other reasons) the land market effects will be virtually zero.

A larger change may occur in a region without the SPS capitalization (region 2 in Figure 4) because the amount of entitlements was less than the available land. An increase in entitlements could shift the ratio of entitlements/land to the point that the entitlement constraint is no longer binding and the SPS capitalization would increase. This is illustrated in Figure 4. The equilibrium land rents and land use increase from  $r_2^*$  to  $r_2^N$  and from  $A_2^*$  to  $A_2^N$ , respectively. A small increase in entitlements has a disproportional effect on land markets as rents increase strongly because of the competition for land which has intensified at the margin. Landowners are disproportionate gainers at the expense of farmers. Relative to the pre-reform situation (i.e. relative to  $(A_2^*, r_2^*)$ ), landowners gain area  $E$ , farmers gain area  $F$  (due to an increase in land use), but lose the subsidy given by area  $EFG$  (due to the SPS capitalization). The deadweight losses are represented by area  $G$ . Given that land supply is inelastic, the largest beneficiaries from the SPS are likely to be landowners.

#### 4.6 Eligibility for entitlements: farms vs. landowners (Reform VI)

According to the 2013 CAP reform, MS may allocate entitlements to farmers who apply for it in 2015 and may impose restriction that only those farmers are allocated entitlements who were SPS recipients prior to 2014 (European Commission 2013). This stipulation complicates the non-farming landowners' access to new entitlements, because it is not sufficient to own land in 2015; it also may require the receipt of the SPS prior to 2014. However, this stipulation will not prevent those non-farming landowners, who had SPS prior to 2014 to obtain new entitlements (e.g. in MS with hybrid model, those landowners who got hold on entitlements e.g. through a purchase).

From a policy perspective, the crucial question is whether it matters who initially owns/receives the entitlements, i.e. farmers versus landowners. The benefits of the SPS accrue only to those who receive the entitlements in the specific case when (a) the SPS are used, *and* (b) there is surplus land compared to the entitlements. This is the case of region 2 (represented by land supply curve  $S_2$ ) in Figure 1. In this case, whoever gets the SPS entitlements gets the full subsidies since there is no impact on the land markets (the SPS does not distort land markets at the margin in this case). This holds for either the regional or historical model. It holds both for farmers and for landowners, if they would receive the SPS entitlements.

However, in other situations it matters less (or not at all), whether farmers or landowners receive the entitlements – the effects in terms of land allocation and benefits for farmers and landowners are identical. That is when (a) SPS entitlements are in surplus and (b) there is trade in entitlements and (c) land markets work well, whether land owners or farmers own entitlements does not matter for the effects on incomes, land prices and land use. The reason is that in order to get the actual subsidies, one need to have both entitlements and the land being used/kept in good state. Hence *if surplus entitlements are given to farmers*, farmers will bid up the price of land to farm the land (and get prices for their products) and get direct payments. In this case the SPS lead to increased land rents and thus to gains for landowners. Farmers gain from the SPS but lose because of increased land rents. *If entitlements are given to landowners*, landowners want farmers to farm the land so they (the landowners) can collect the subsidies and the rents. In this case, they are willing to rent the land for lower land rents than their (market) opportunity costs since they will get extra revenue (the SPS) if the land is farmed. This will lead to lower land rents, and thus to gains for the farmers – despite the fact that they do not directly benefit from the SPS. Landowners gain from the SPS but lose because land rents decline.

This is illustrated by Figure 5. It compares the results when farmers are entitlement owners, with the situation when landowners receive the SPS entitlements. To keep the graphical analysis

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<sup>4</sup> Visually Figure 4 shows a large increase of entitlements (an increase from  $A_E^T$  to  $A_E^N$ ). However, this is only for illustrative purposes to reduce the complexity of the analysis. However, the results hold in general.

tractable, we use the scenario of a regional model (with flat-rate SPS as proposed by the 2013 CAP reform to replace the historical and hybrid models) with surplus entitlements. In Figure 5 when farmers are granted entitlements  $t$ , land demand is given by  $D_r D$ , and the land market equilibrium is  $(A_{lr}^*, r_{lr}^*)$  in a surplus entitlement region (region 1). If entitlements are granted to landowners (which are not farmers by assumption), then entitlements,  $t$ , do not affect the land demand (it stays at curve  $DD$ ) but shifts the land supply from curve  $S_l S_l$  to  $S_{lr} S_l$ . The new equilibrium is  $(A_{lr}^*, r_{ll}^*)$ . Compared to a situation when farmers are entitlement owners, land use is the same. Land rent is lower but the difference in rental rates is equal to the entitlement value,  $r_{lr}^* - r_{ll}^* = t$ . Hence, entitlement ownership does not affect the capitalization effects. In both cases (farmers owning entitlements and landowners owning entitlements), the SPS cause an increase in landowner incomes (area  $B$ ), an increase in farm incomes (area  $E$ ), and a deadweight loss (area  $F$ ).

## 5. Implications of the theoretical analysis on capitalization of the reformed SPS

Up to now we have analyzed the effects of each element of the SPS reform separately. However, the different reform elements can reinforce or offset each other. This section provides an overview of the combined effects, and discusses our results in light of empirical findings of previous studies. Consistent with the options available under the 2013 CAP reform, Table 1 presents the expected effects when the base for allocation of entitlements is the pre-reform period, and Table 2 when the base is the first year implementation of the 2013 CAP reform.

Columns in Table 1 and Table 2 summarize the theoretical impacts of the various reform elements discussed in section 4. Rows organize these effects by different SPS implementation models and columns 1-3 use characteristics of the 2013 CAP reform to classify different “prototypes”. More specifically, the prototypes are distinguished by the following elements: (i) the impact of payment harmonization on the MS budget for the SPS (column 1), (ii) the current stock of entitlements relative to the eligible area (column 2), and (iii) the current SPS model (column 3). The last column lists potential examples of countries which may fit the different models. Columns 5 and 6 summarize the expected impact of the 2013 CAP reform with respect to the SPS budget (both aspects of Reform I); column 7 the impact of the move to a flat-rate SPS (Reform II); column 8 the impact of differentiation of the SPS (Reform III); column 9 the impact of the CAP greening (Reform IV); column 10 the impact of the reference period for entitlement allocation (Reform V); and column 11 presents an estimate of the aggregate impact.

The results summarized in Table 1 and Table 2 refer to the SPS capitalization change in the post-reform period relative to the pre-reform period as a combined package; i.e. the individual effects of each reform element take into consideration the fact that other reform elements are also in place, meaning that we consider interaction between different reforms. A larger number of plus (minus) signs reported in the tables implies a higher expected increase (decrease) in the capitalization rate relative to its pre-reform level.

The first major observation arising from these tables is that the SPS capitalization rate will be affected by the 2013 CAP reform vis-à-vis the pre-reform period. Second, our findings suggest a significant variation between the prototypes, reflecting strong heterogeneity in the application of the SPS and reform elements across the EU. In fact, of the 18 identified prototypes, we expect that 13 may be actually implemented in different MS (column 12). Third, the capitalization effect of the reform can go in either direction (decrease or increase) depending on the implementation. The key determinant of the capitalization effect is the reference period for entitlement allocation (Ref. V) as the differences between Table 1 and Table 2 show. Fourth, the regionalization (Ref. II) and the reference period for entitlement allocation (Ref. V) have zero or positive impact on land rents, whereas the other three reform elements have zero or negative impact on land rents.

The effects summarized in Table 1 suggest that, if entitlements are maintained as they are now, then in most MS the overall impact on land prices will be zero or negative, and likely rather limited. In MS with deficit entitlements (prototypes 4-6, 10-12 and 16-18), the 2013 CAP reform will slightly reduce the SPS capitalization (Table 1), because the stock of entitlement will not change (i.e. it remains in deficit). Hence, none of the effects will affect the capitalization (except for the greening).

Theoretically, with deficit entitlements the SPS does not affect land markets at the margin, implying that the entitlement allocation system (Ref. V), the regionalization (Ref. II), the CAP budget cut (Ref. I), and differentiation of the SPS between farms (Ref. III) will not affect the SPS capitalization. On the other hand, the CAP greening (Ref. IV) applies to all agricultural area and will therefore reduce land prices, irrespective of the stock of entitlements and the entitlement allocation system. The empirical results of Michalek, Ciaian and Kancs (2014) confirm that cross-compliance costs associated with the SPS reduce land rents in the EU. Similarly, Johansson and Nilsson (2011) find for Sweden and Kilian et al. (2012) find for Germany that agro-environmental payments are negatively correlated with land prices, which suggests that the SPS is not sufficient to cover the additional costs associated with the CAP greening.

A comparison of Table 1 and Table 2 shows that the choice of the reference period for the SPS entitlement allocation (Reform V) does not matter for ‘surplus regions’ (the effects are the same in both tables) but may play an important role in ‘deficit regions’ (prototypes 4-6, 10-12 and 16-18). The entitlement allocation based on land use in the first year of the 2013 CAP reform (Table 2) may turn a region with deficit entitlements into surplus entitlements which may cause a significant increase in land rents due to the SPS capitalization. Combined with the move to the flat-rate (Ref. II), land values may increase - an increase which may not be fully offset by reduced pressure on land values due to the CAP budget cut (Ref. I), the differentiation of the SPS between farms (Ref. III) and the CAP greening (Ref. IV). Hence, in several MS (prototypes 4-6 and 16-18) land values may increase due to the 2013 CAP reform. These results are in line with the discussions and negotiations during the adoption process of the 2013 CAP reform, as a result of which the flexibility for entitlement allocation system was modified and extended.<sup>5</sup>

## 6. Conclusions

The objective of this paper is to analyze the impact of the 2013 CAP reform on the SPS capitalization in the EU. Our theoretical analysis confirms previous findings that the implementation details of the CAP reform will determine the SPS capitalization into land values. The effects will likely vary across farms, regions and Member States, depending on the pre- and post-reform implementation of the SPS. If the stock of entitlements is maintained at the level of the pre-reform period, then land values are expected to decrease in most MS and reduce policy gains for landowners. This will be driven in particular by the SPS budget cut, the CAP 'greening' and the SPS payment differentiation. However, if entitlements are allocated based on land use in the post-reform period, then landowners' policy gains are expected to increase in several MS due to higher land values. An important driver for this effect is the ratio of the SPS entitlements to the eligible area in the pre-reform period. The strongest increase in the SPS capitalization may occur in those MS, which had deficit entitlements in the pre-reform period, because, in theory, the SPS should not be capitalized into land values in the pre-reform period. In contrast, we expect that in the post-reform period the SPS will drive land values up due to the expansion of the entitlement stock leading to higher land values and lower policy gains for farmers. On the other hand, in MS with surplus entitlements in the pre-reform period, the SPS capitalization will likely decrease, if entitlements are allocated based on land use in the post-reform period. In these MS the SPS is likely capitalized into land rents already now, implying that the 2013 CAP reform may actually reduce land values, e.g. due to the SPS budget cut, the CAP 'greening' and the SPS payment differentiation.

Despite the comprehensiveness of the analysis, one should interpret the results reported in this paper with care, as there are several factors that do not allow predicting the capitalization effects with the necessary accuracy. For example, in reality, the size of the effects will depend on the actual

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<sup>5</sup> The initial proposal of the European Commission tabled in 2011 envisaged the entitlement allocation based on the land use in the first year of the reform (as considered in Table 2). On the other hand, the final political agreement on the reform extended the options to MS by allowing certain MS to maintain the existing entitlements allocated prior to 2014 (as considered in Table 1) as well as it allows MS to limit the number of SPS entitlements to be allocated in 2015 to either 135% or 145% of the total number of eligible hectares if the total entitlement claims increase by more than 35% of the total eligible area in 2009.

application and enforcement of different reforms, as MS have certain flexibility for reform implementation. The effects will also depend on perception of landowners and farmers about the continuation of the SPS in medium term. The SPS may be subject to future reform which may adjust both the implementation rules as well as the level of the payment. Further, the effects reported in this paper provide theoretically expected effects of the reform derived from our analysis. To obtain an actual estimate, one needs to conduct empirical estimations when the data will become available, which is a promising area for future research. The analysis presented in this section provides the expected direction of change of particular reform elements, as well as, based on empirical evidence, the expected magnitude of the effects in the EU.

## 7. Acknowledgements

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## 8. References

- Barnard, C.H., Whittaker, G., Westenbarger, D., Ahearn, M. (1997). Evidence of capitalization of direct government payments into U.S. cropland values. *American Journal of Agricultural Economics*, 79(5): 1642-1650.
- Breustedt G. and H. Habermann (2011). "The Incidence of EU Per-Hectare Payments on Farmland Rental Rates: A Spatial Econometric Analysis of German Farm-Level Data." *Journal of Agricultural Economics* 62(1): 225–243.
- Bureau J.C. (2013) "How much greening will the 'greening' of direct payments actually bring?" 2013 Second Congress of the Italian Association of Agricultural and Applied Economics (AIEAA), June 6-7, 2013, Parma, Italy
- Bureau J.C. and H.P. Witzke (2010). The Single Payment Scheme after 2013: New Approach-New Targets. Report prepared for the European Parliament, <http://capreform.eu/wp-content/uploads/2010/05/EST31208.pdf>
- Chau, N. H. and H. de Gorter. 2005. "Disentangling the Consequences of Direct Payment Schemes in Agriculture on Fixed Costs, Exit Decisions, and Output." *American Journal of Agricultural Economics*. 87: 1174-1181.
- Ciaian, P. and D. Kancs (2012). "The Capitalisation of Area Payments into Farmland Rents: Theory and Evidence from the New EU Member States." *Canadian Journal of Agricultural Economics* 60 (4): 517–540.
- Ciaian, P. and J.F.M. Swinnen (2009). "Credit market imperfections and the distribution of policy rents." *American Journal of Agricultural Economics* 91(4): 1124-1139
- Ciaian, P., D. Kancs, and J.F.M. Swinnen. 2008. "Static and Dynamic Distributional Effects of Decoupled Payments: Single Farm Payments in the European Union." LICOS Discussion Paper 207/2008, LICOS, Leuven.
- Ciaian, P., D. Kancs and J.F.M. Swinnen (2010). *EU Land Markets and the Common Agricultural Policy*. CEPS, Brussels.
- Courleux, F., H. Guyomard, F. Levert and L. Piet. 2008. How the EU Single Farm Payment should be Modelled: Lump-sum Transfers, Area Payments or... what else? Working Paper SMART – LERECO N°08-01. Rennes: INRA.
- Desquilbet, M. and H. Guyomard. 2002. "Taxes and Subsidies in Vertically Related Markets." *American Journal of Agricultural Economics* 84(4): 1033-1041.
- de Gorter, H. 2007. "The potential Benefits to Developing Countries from Domestic Support Reductions in Development Countries." In Morrison, J. and Sarris, A. (eds.) *WTO Rules for Agriculture compatible with development* Rome: FAO.
- de Gorter, H. and K. D. Meilke. 1989. "Efficiency of Alternative Policies for the EC's Common Agricultural Policy." *American Journal of Agricultural Economics* 71: 592-603.
- Dewbre, J., J. Anton and W. Thompson. 2001. "The Transfer Efficiency and Trade Effects of Direct Payments." *American Journal of Agricultural Economics* 83(5): 1204-14.
- European Commission (2013). CAP Reform – An Explanation of the Main Elements. European Commission, 25.10.2013.
- Gardner, B. 1983. "Efficient Redistribution through Commodity Markets." *American Journal of Agricultural Economics* 65(2): 225-234.
- Gocht, A., W. Britz, P. Ciaian and S. Gomez y Paloma (2013) "Farm Type Effects of an EU-wide Direct Payment Harmonisation." *Journal of Agricultural Economics* 64(1): 1-32.
- Goodwin, B. K. and A. K. Mishra. 2006. "Are "Decoupled" Farm Program Payments Really Decoupled? An Empirical Evaluation." *American Journal of Agricultural Economics* 88: 73-89.
- Guastella G., D. Moro, P. Sckokai and M. Veneziani (2013). "The Capitalization of Area Payment into Land Rental Prices: Evidence from Italy." International Agricultural Trade Research Consortium (IATRC) Symposium, June 2-4, 2013, Seville, Spain.
- Guyomard, H., C. Le Mouël and A. Gohin. 2004. Impacts of Alternative Agricultural Income Support Schemes on Multiple Policy Goals. *European Review of Agricultural Economics* 31(2): 125-148.

- Hennessy, D.A. 1998. "The Production Effects of Agricultural Income Support Policies Under Uncertainty." *American Journal of Agricultural Economics* 80 pp. 46-57.
- Johansson, S. and P. Nilsson (2012). "Location determinants of agricultural land prices." *Jahrbuch für Regionalwissenschaft* 33: 1–21.
- Kilian, S. and Salhofer, K. (2008). "Single Payments of the CAP: Where Do the Rents Go?" *Agricultural Economics Review*, 9(2): 96-106.
- Kilian, S., Antón, J., Salhofer, K., Röder, N (2012) Impacts of 2003 CAP reform on land rental prices and capitalization. *Land use policy*, 29(4): 789-797.
- Kirwan, B. 2009. The Incidence of U.S. Agricultural Subsidies on Farmland Rental Rates. *Journal of Political Economy* 117(1): 138-164.
- McCorrison, S. and I. M. Sheldon. 1991. "Government Intervention in Imperfectly Competitive Agricultural Input Markets." *American Journal of Agricultural Economics* 73: 621-632.
- Michalek J., P. Ciaian and D. Kancs and (2014). "Capitalization of the Single Payment Scheme into Land Value: Generalized Propensity Score Evidence from EU." *Land Economics*, Forthcoming.
- Patton, M., P. Kostov, S.A. McErlean and J. Moss 2008. "Assessing the Influence of Direct Payments on the Rental Value of Agricultural Land." *Food Policy* 33(5): 397-405.
- Ridier, A., Kephaliacos, C. and F. Carpy-Goulard (2008). "Cross Compliance of CAP First Pillar Measures: A Transaction Costs Assessment." 2008 EAAE Congress, August 26-29, 2008, Ghent, Belgium.
- Salhofer, K. and E. Schmid. 2004. "Distributive Leakages of Agricultural Support: Some Empirical Evidence." *Agricultural Economics* 30(1): 51-63.
- Skokai, P. and D. Moro. 2006. "Modeling the Reforms of the Common Agricultural Policy for Arable Crops under Uncertainty." *American Journal of Agricultural Economics* 88(1): 43–56.
- Roberts, M.J., B. Kirwan and J. Hopkins. (2003). "The Incidence of Government Program Payments on Land Rents: The Challenges of Identification." *American Journal of Agricultural Economics* 85: 762-769.
- Serra, T., D. Zilberman, B.K. Goodwin, and A.M. Featherstone. 2005. "Decoupling Farm Policies: How Does this Affect Production?" AAEA Annual Meeting, Providence, Rhode Island, July 24-27, 2005.
- Sheldon, I. M., D. H. Pick, and S. McCorrison. 2001. "Export Subsidies and Profit-Shifting in Vertical Markets." *Journal of Agricultural and Resource Economics* 26(1):125-141.
- Weersink, A. S. Clark, C.G. Turvey and R. Sarker (1999). "The Effect of Agricultural Policy on Farmland Values." *Land Economics* 75(3): 425-439.

**Figure 1. The effect of the SPS with surplus and deficit entitlements**

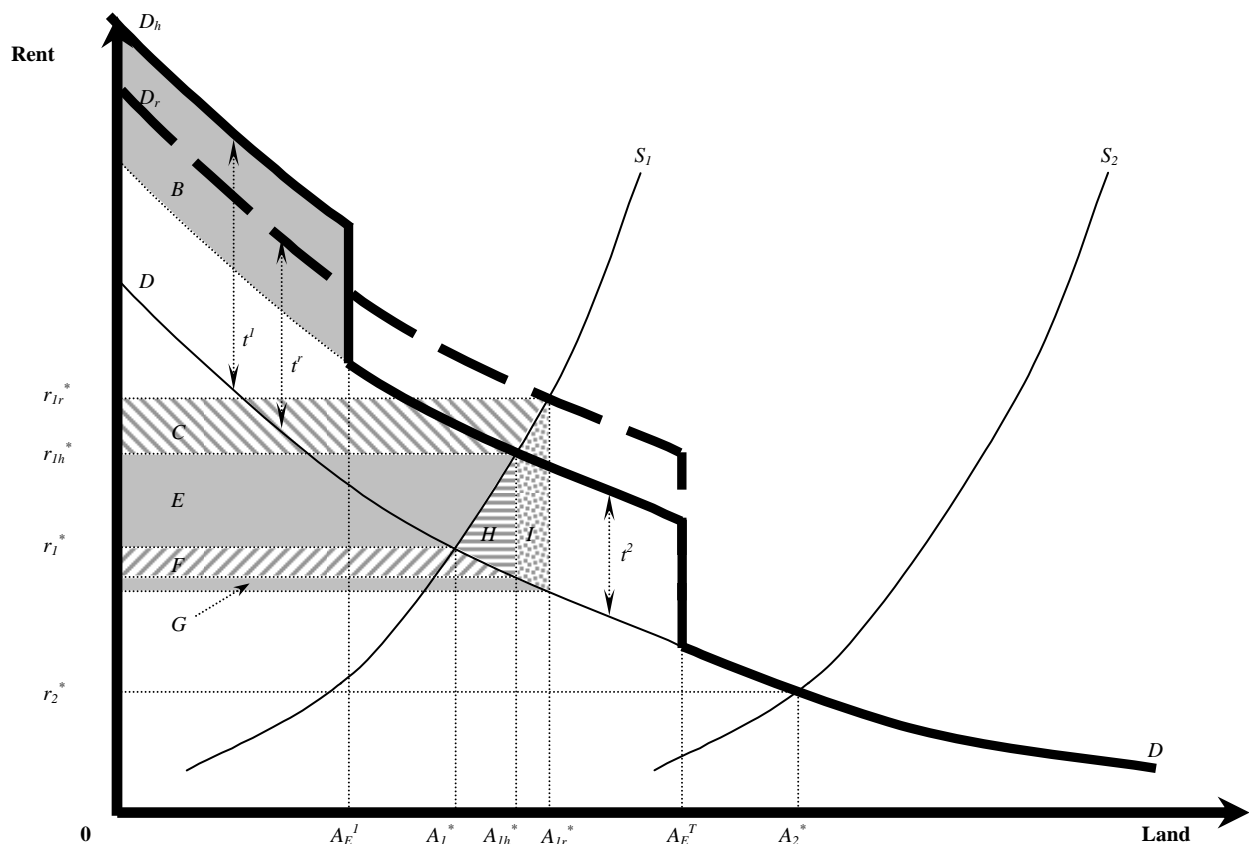


Figure 2. The effect of the SPS harmonization between MS

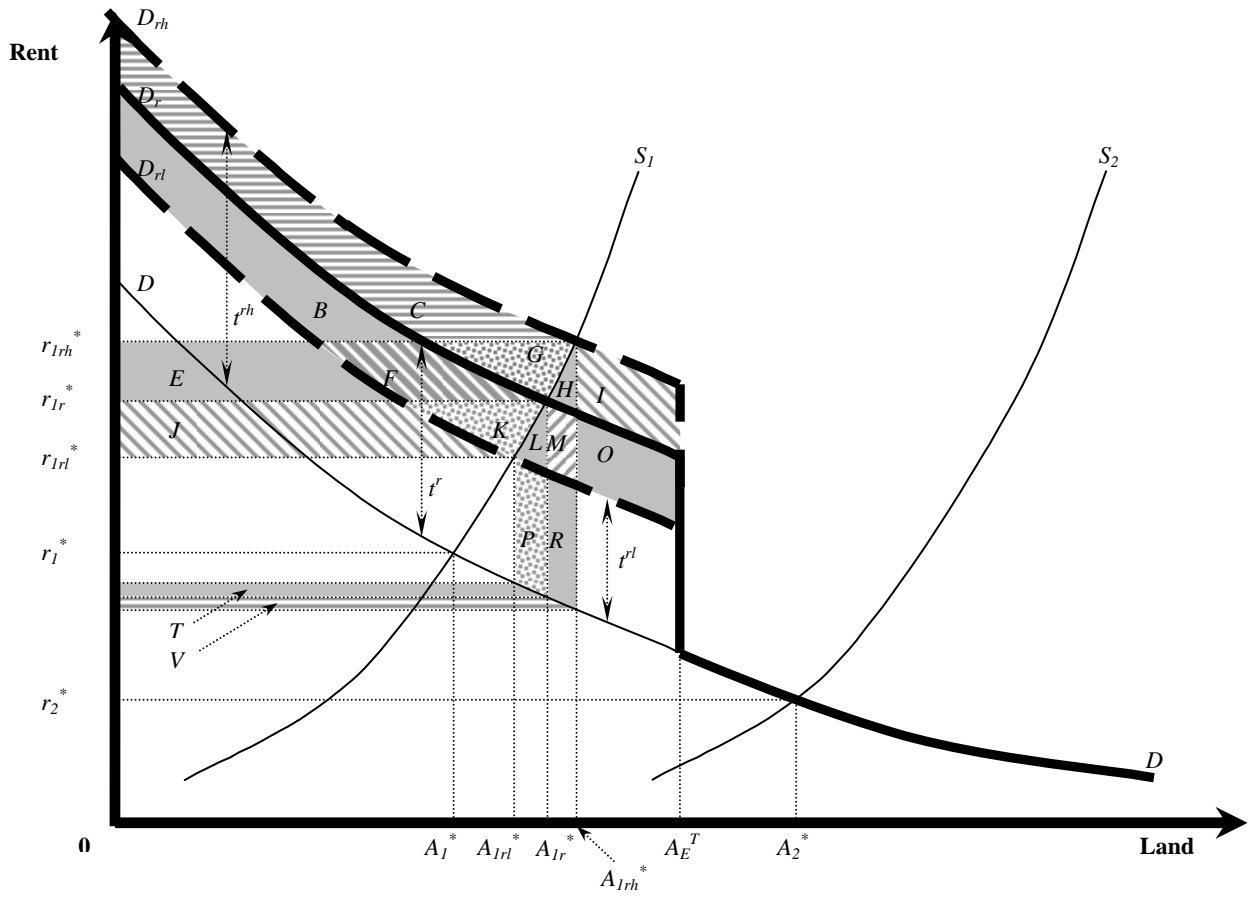


Figure 3. The effect of CAP 'greening'

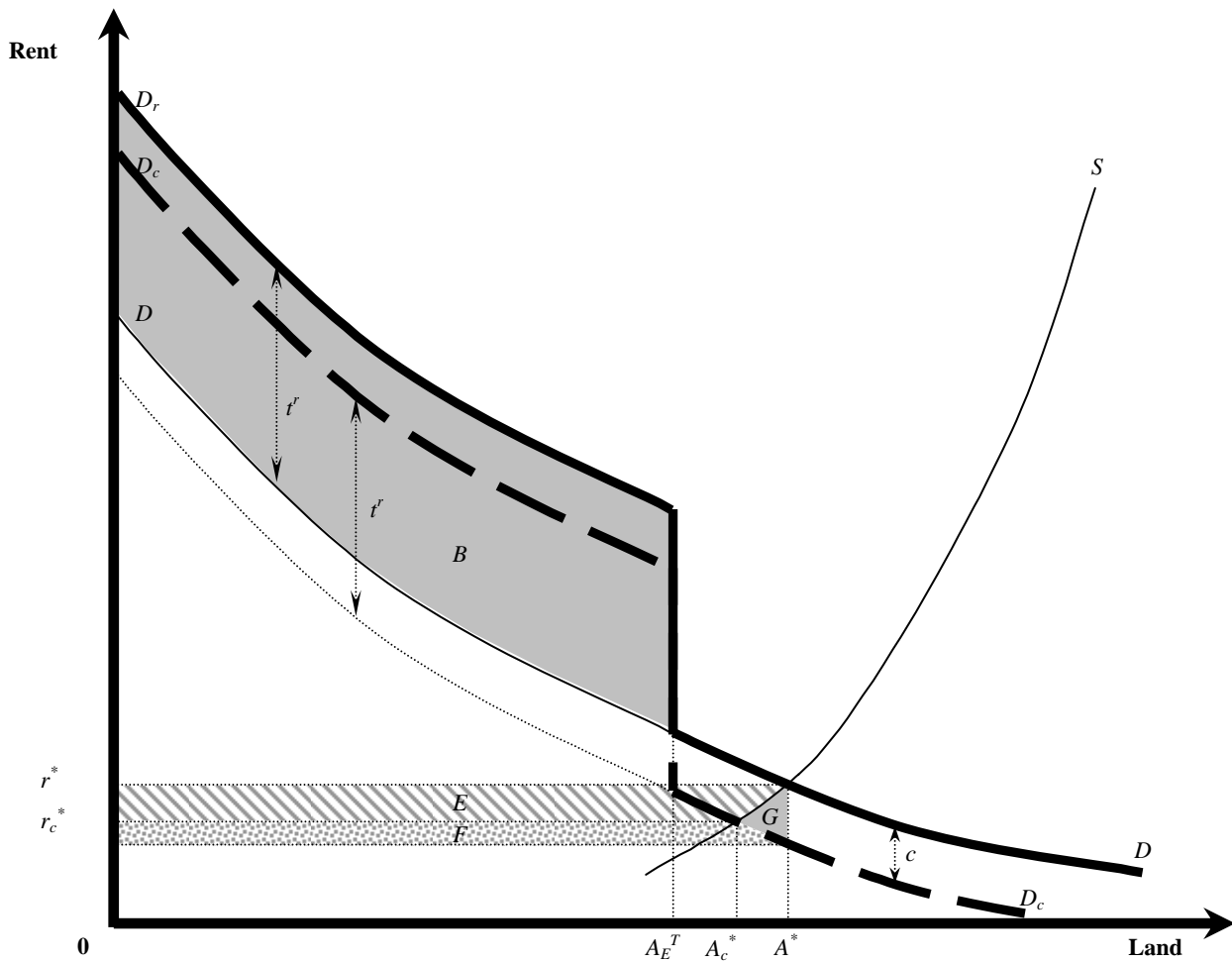


Figure 4. The effect of the reference period

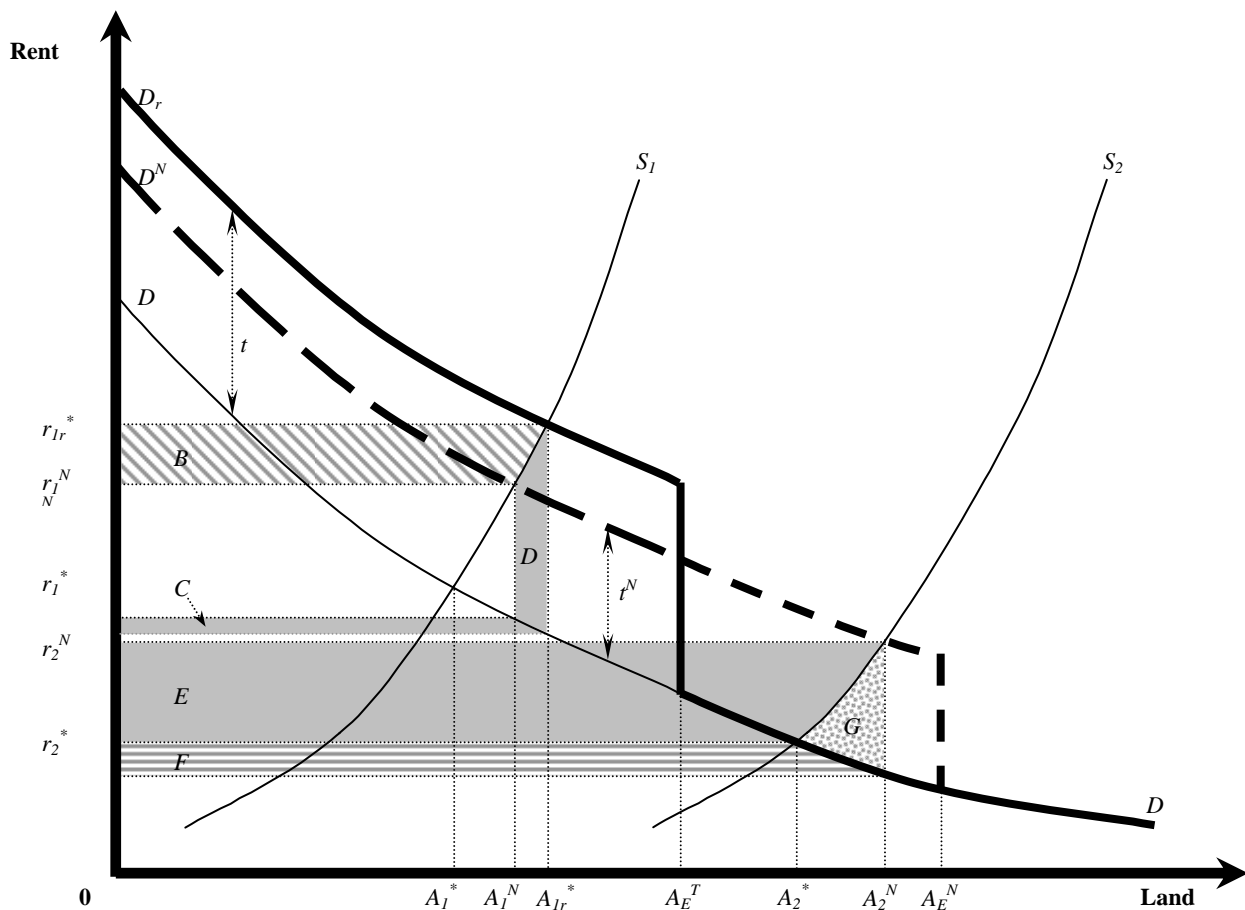
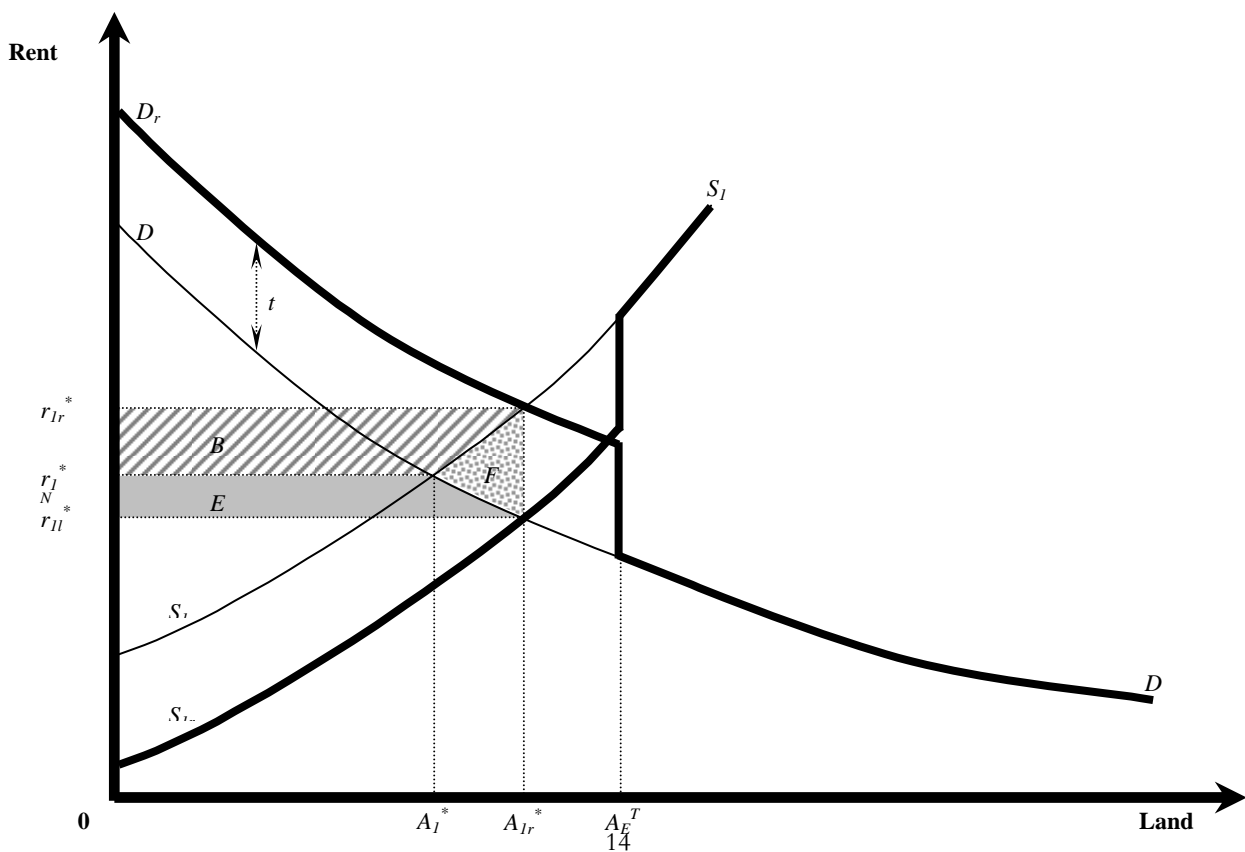


Figure 5. The effect of the landowners' entitlement ownership



**Table 1: Expected impact of the 2013 CAP reform on land values when entitlements are maintained at the level of pre-reform period**

MS level effect of harmonization on SPS budget	Stock of entitlements relative to land use (current)	Type of the SPS model (current)	Prototype	Harmonization between MS (Ref. I)	SPS budget cuts (Ref. I)	Regionalization (Ref. II)	Differentiation (Ref. III)	CAP 'greening' (Ref. IV)	Reference period (pre-reform entitlement stock) (Ref. V)	Total (net) expected impact	Examples of MS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
No effect on total SPS	Surplus	Historical	<b>1</b>	0	–	+++	–	–	0	0	IE
		Hybrid	<b>2</b>	0	–	++	–	–	0	–	FI, SE
		Regional, SAPS	<b>3</b>	0	–	0	–	–	0	– – –	BG, CZ, HU, PL
	Deficit	Historical	<b>4</b>	0	0	0	0	–	0	–	ES, AT, UK-ST, UK-WL
		Hybrid	<b>5</b>	0	0	0	0	–	0	–	UK-EN, UK-NI
		Regional	<b>6</b>	0	0	0	0	–	0	–	
Reduction in total SPS	Surplus	Historical	<b>7</b>	–	–	+++	–	–	0	–	GR
		Hybrid	<b>8</b>	–	–	++	–	–	0	– –	DE, DK
		Regional, SAPS	<b>9</b>	–	–	0	–	–	0	– – – –	CY
	Deficit	Historical	<b>10</b>	0	0	0	0	–	0	–	BE, FR, NL, IT
		Hybrid	<b>11</b>	0	0	0	0	–	0	–	LU
		Regional	<b>12</b>	0	0	0	0	–	0	–	MT, SI
Increase in total SPS	Surplus	Historical	<b>13</b>	+	–	+++	–	–	0	+	
		Hybrid	<b>14</b>	+	–	++	–	–	0	0	
		Regional, SAPS	<b>15</b>	+	–	0	–	–	0	– –	EE, LT, LV, SK, RO
	Deficit	Historical	<b>16</b>	0	0	0	0	–	0	–	PT
		Hybrid	<b>17</b>	0	0	0	0	–	0	–	
		Regional	<b>18</b>	0	0	0	0	–	0	–	

Notes:

'+' ('–') stands for an increase (decrease) in the SPS capitalization rate; a larger number of plus (minus) signs implies a higher expected increase (decrease) in the capitalization rate.

'0' stands for no change in the SPS capitalization rate.

Country codes: Belgium (BE), Bulgaria (BG), France (FR), Austria (AT), Italy (IT), Poland (PL), Czech Republic (CZ) Cyprus (CY), Portugal (PT), Denmark (DK), Latvia (LV), Romania (RO), Germany (DE), Lithuania (LT), Slovenia (SI), Estonia (EE), Luxembourg (LU), Slovakia (SK), Ireland (IE), Hungary (HU), Finland (FI), Greece (GR), Malta (MT), Sweden (SE), Spain (ES), Netherlands (NL), United Kingdom (UK), England (EN), N. Ireland (NI), Scotland (ST), Wales (WL).

*Assumptions on MS categorization:* MS with activated entitlements equal or higher (lower) than 98% of UAA where assumed to have surplus (deficit) entitlements; The new MS implementing the Single Area Payment Scheme (SAPS) are categorized under the regional SPS model. The SAPS is a standard area subsidy paid per hectare of land without entitlements, all land is eligible and all farms receive a uniform payment. Conceptually, this payment corresponds to the regional SPS model with infinite stock of entitlements. For more detailed theoretical analysis on the SAPS and its deference compared to the SPS see Ciaian and Swinnen (2006) and Courleux et al. (2008). The MS categorization in column 1 is based on European Commission (2011b, p. 60).



**Table 2: Expected impact of the 2013 CAP reform on land values with entitlement allocation based on land use in the post-reform period**

MS level effect of harmonization on SPS budget	Stock of entitlements relative to land use (current)	Type of the SPS model (current)	Prototype	Harmonization between MS (Ref. I)	SPS budget cuts (Ref. I)	Regionalization (Ref. II)	Differentiation (Ref. III)	CAP 'greening' (Ref. IV)	Reference period (entitlement allocation based on the first year of reform implementation) (Ref. V)	Total (net) expected impact	Examples of MS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
No effect on total SPS	Surplus	Historical	<b>1</b>	0	-	+++	-	-	0	0	IE
		Hybrid	<b>2</b>	0	-	++	-	-	0	-	FI, SE
		Regional, SAPS	<b>3</b>	0	-	0	-	-	0	---	BG, CZ, HU, PL
	Deficit	Historical	<b>4</b>	0	-	+++	-	-	+	+	ES, AT, UK-ST, UK-WL
		Hybrid	<b>5</b>	0	-	++	-	-	++	+	UK-EN, UK-NI
		Regional	<b>6</b>	0	-	0	-	-	++++	+	
Reduction in total SPS	Surplus	Historical	<b>7</b>	-	-	+++	-	-	0	-	GR
		Hybrid	<b>8</b>	-	-	++	-	-	0	--	DE, DK
		Regional, SAPS	<b>9</b>	-	-	0	-	-	0	----	CY
	Deficit	Historical	<b>10</b>	-	-	+++	-	-	+	0	BE, FR, NL, IT
		Hybrid	<b>11</b>	-	-	++	-	-	++	0	LU
		Regional	<b>12</b>	-	-	0	-	-	++++	0	MT, SI
Increase in total SPS	Surplus	Historical	<b>13</b>	+	-	+++	-	-	0	+	
		Hybrid	<b>14</b>	+	-	++	-	-	0	0	
		Regional, SAPS	<b>15</b>	+	-	0	-	-	0	---	EE, LT, LV, SK, RO
	Deficit	Historical	<b>16</b>	+	-	+++	-	-	+	++	PT
		Hybrid	<b>17</b>	+	-	++	-	-	++	++	
		Regional	<b>18</b>	+	-	0	-	-	++++	++	

Notes:  
 '+' ('-') stands for an increase (decrease) in the SPS capitalization rate; a larger number of plus (minus) signs implies a higher expected increase (decrease) in the capitalization rate.  
 '0' stands for no change in the SPS capitalization rate.  
 Country codes: Belgium (BE), Bulgaria (BG), France (FR), Austria (AT), Italy (IT), Poland (PL), Czech Republic (CZ) Cyprus (CY), Portugal(PT), Denmark (DK), Latvia (LV), Romania (RO), Germany (DE), Lithuania (LT), Slovenia (SI), Estonia (EE), Luxembourg (LU), Slovakia (SK), Ireland (IE), Hungary (HU), Finland (FI), Greece (GR), Malta (MT), Sweden (SE), Spain (ES), Netherlands (NL), United Kingdom (UK), England (EN), N. Ireland (NI), Scotland (ST), Wales (WL).  
 Assumptions on MS categorization: MS with activated entitlements equal or higher (lower) than 98% of UAA where assumed to have surplus (deficit) entitlements; The new MS implementing the Single Area Payment Scheme (SAPS) are categorized under the regional SPS model. The SAPS is a standard area subsidy paid per hectare of land without entitlements, all land is eligible and all farms receive a uniform payment. Conceptually, this payment corresponds to the regional SPS model with infinite stock of entitlements. For more detailed theoretical analysis on the SAPS and its deference compared to the SPS see Ciaian and Swinnen (2006) and Courleux et al. (2008). The MS categorization in column 1 is based on European Commission (2011b, p. 60).