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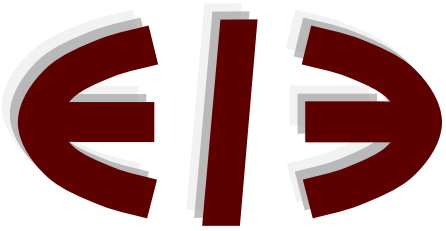

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# Land Markets in Europe: Institutions and Market Outcomes[1]

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**Abstract:** In this chapter, we review land market institutions in the European Union (EU) and their potential impact on land markets. We first review *land tenure-/ownership regulations* and find that they vary heavily across EU Member States. Four types of tenure-/ownership measures are implemented in the EU: to protect the tenant, to protect the owner, to protect the (non-farm) land owner, and to prevent land fragmentation. We then examine EU land-related *environmental regulations* whose general objective is to address land market failures linked to externalities and the provision of public goods. Despite possibly reducing private benefits of land owners or users, environmental regulations may generate welfare gains to society by improving the environmental services on land. Finally, we investigate how *area-based subsidies* affect land prices. These subsidies are empirically found to be partially capitalized into land values, albeit at a lower rate than suggested by theory.

## 1 Introduction

Agricultural land markets in the European Union are subject to significant policy interventions. Land market exchanges and land allocation as input in production are far from taking place in a free market environment. Three types of land market interventions are present in the European Union: *tenure-/ownership regulations*, *environmental regulations*, and *area-based subsidies*. Tenure-/ownership regulations regulate land sales and rental transactions in terms of the right to use, control, and transfer land. Environmental regulations regulate land use by granting financial incentives or by imposing restrictions to farming activities with the aim of protecting and conserving land and the environment. The main part of the Common Agricultural Policy (CAP) support is allocated as land-based subsidies with the aim of supporting farmers' income and promoting sustainable development of rural areas.

Land market interventions vary considerably across the EU Member States, reflecting the variation in the quality and abundance of land as well as the differences in historical, societal and political developments. The implementation of *tenure-/ownership* regulations is not necessarily driven by efficiency gains for society but by political economy factors, largely determined by wealth redistributive effects among market participants (Swinnen 2002; Ciaian et al. 2010; Swinnen, Van Herck and Vranken 2014b). The primary motivation of the introduction of *environmental regulations* is to address market failures linked to production of public goods and externalities by agricultural sector. *Area-based subsidies* are implemented to address income disparity between agriculture and other sectors of the economy, prevent depopulation of rural areas, and incentivize farmers to protect the environment (Swinnen 2015). The critics of the CAP argue that the political economy factors play a significant role in the design, implementation and evolution of the CAP (Swinnen 2015). One reason is that farmers are, in general, a well-organized lobby group excreting pressure on politicians for support, whereas politicians gain their political support by providing subsidies.

[1] The authors are solely responsible for the content of the paper. The views expressed are purely those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission.

Policy interventions can have severe implications on land market outcomes. First, land market interventions alter the costs and benefits of land market participants. For example, land price interventions affect the income that land owners receive when selling or renting land. The CAP subsidies increase land returns to farmers. Second, land market interventions regulate which activities can be carried out on land. For example, environmental restrictions regulate the intensity of land use in agricultural production. Third, they determine which market participants have access to land and under what conditions. For example, pre-emption right provisions give preferential access to land to certain groups while other groups (e.g., foreigners) may get restricted access. Forth, they impact the outcome of land sales and rental market transactions. For example, long-term tenure contracts reduce the number of rental market transactions.

## 2 Agricultural land markets in the European Union

The farmland sales markets are relatively thin in the European Union. The share of the area of annually transacted agricultural land in the total utilized agriculture area (UAA) ranges between 0.1 percent in Slovakia to 8 percent in Lithuania (Table 1). The transacted area tends to be stable over time in Old Member States (OMS).[2] In New Member States (NMS),[3] the available evidence suggests an increase in the transacted area over time, probably induced by structural changes in agriculture due to the transition process and the EU enlargement (Ciaian et al. 2012).

Land sales price developments show greater dynamics. Overall, an upward trend in price development tends to prevail in land sales across EU Member States in the period 1995–2009 (Figure 1). The observed price increase can be explained by the food price increase, a shift to a land-based subsidy system in the European Union, and productivity growth (Ciaian and Kancs 2012; Michalek et al. 2014).

The levels of agricultural land sales prices vary strongly within the European Union. Figure 1 compares the level of sales prices among EU Member States in 1995, 2002, and 2009. The strongest difference in the price level is between OMS and NMS. On average, land prices in OMS are several times higher than in NMS and these price differences tend to persist over time. The lowest land price is recorded in Lithuania followed by Latvia, Bulgaria, and Slovakia. In contrast, the Netherlands reports the highest land prices in the EU. Land prices are also high in Denmark and Luxemburg, in particular in 2009. From the reported NMS, the Czech Republic has the highest land prices. Nevertheless, if compared to the Netherlands for 2009, the Czech prices are lower by a factor of 20. Sweden and France have more comparable price levels to NMS, though the gap is still substantial, more than 50 percent higher if compared to the Czech prices.

In most EU Member States the land rental market seems to be more important than the sales market as a large share of the agricultural area; though a strong variation among Member States exists (Figure 2). In the OMS, the share of rented land in 2012 ranged between 19 percent in Ireland and 87 percent in France, while in the NMS it ranged between 26 percent in Poland and 95 percent in Slovakia (Table 2, Figure 2).

[2] OMS refers to Austria, Belgium, Denmark, Germany, Greece, Finland, France, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain and Sweden, and the United Kingdom.

[3] NMS refers to eight Member states from Central and Eastern Europe which joined the EU in 2004: the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia.

During the period 2004–2012 land renting decreased in roughly one half of Member States, but increased in the other half. However, the increases in land renting tend to be larger (mostly varying between 3 and 18 percent) than the decreases (varying between -1 and -5 percent). Particularly strong expansion of land renting (more than 10 percent) occurred in Greece, Slovenia, Italy, Latvia, and Sweden. Countries with the most significant decrease in land renting (more than -5 percent) include Portugal and the Czech Republic (Table 2).

Rental price heterogeneity between Member States is less accentuated than land sales prices. Nevertheless, the cross-country variance has grown over time and has been driven mainly by NMS (from 1000 percent between the lowest and highest countries in 2000 to over 4200 percent in 2012). Although rental prices are in general higher in OMS, several OMS (e.g., Portugal, Spain, the UK) report comparable levels to NMS. Rental prices varied in 2012 from €20 per hectare in Latvia to €869 per hectare in the Netherlands. However, in most Member States the land rental prices were in the range between €150 per hectare and €300 per hectare in 2012 (Table 3). With the exception of Greece and the UK, rental prices increased in the period 2004–2012. The rental price increase is significantly higher in NMS than in OMS, which was likely induced by productivity growth and the introduction of the CAP subsidies after the EU accession of NMS (Ciaian and Kancs 2012; Swinnen et al. 2013).

**3 Tenure-/ownership regulations**

There is great diversity of tenure-/ownership regulations in the European Union. They span from strictly regulated to largely liberal markets. According to land regulation indicators reported by Swinnen et al. (2014a), France and Hungary have the most stringent land market interventions in the EU. These two countries strictly regulate both sales and rental markets. The least regulated land markets have Sweden, Germany, Finland, the UK, Greece, and Ireland. Several countries—such as Belgium, Italy, the Netherlands, Portugal, Poland, and Slovenia—implement a moderate level of land market regulations. Typically, these countries regulate one side of the land market: either the sales or the rental market. For example, in Belgium, where about 70 percent of land is rented, most regulations concern the land rental market. Another example is Poland, where most of the land is owned by farmers. Therefore, there is relatively little protection of tenants but important sales market regulations protecting family farms that operate on owned land (Table 4) (Swinnen et al. 2014a, 2014b; Ciaian et al. 2010).

There are various explanations why a particular land tenure-/ownership regulation or institution emerged in different countries. According to Swinnen (2002) and Swinnen et al. (2014b), changes in tenure-/ownership regulations in Europe were not necessarily efficiency-driven, meaning they did not emerge because they were more efficient than the existing alternatives. Swinnen (2002) and Swinnen et al. (2014b) argue that mainly political economy factors determine land institutional choices in the European Union. Changes in land tenure-/ownership imply redistribution of wealth among different market participants, in particular between landowners and tenants (or between domestic and foreign owners). These wealth distributional aspects have likely affected the emergence of a particular path depending on the power balance between different land market groups present at a given point of time (de Janvry, 1981; Baland and Platteau 1998; 2002; Swinnen et al. 2014b).

According to Swinnen (2002) and Swinnen et al. (2014b), tenure-/ownership market regulations in OMS can largely be explained by the economic and political changes that took place in the late nineteenth and early twentieth century. Historically, European countries were dominated by large and rich landlords renting land to small and poor tenants. Large landlords

controlled both the economic and the political power in the eighteenth and nineteenth century. The industrialization and democratization in the subsequent period increased the participation of workers, small farmers, and tenants in the political process through voting, thus reducing the political power of landlords. This political process resulted in adoption of regulations giving tenants (and landless workers and small farmers) more access to land either through enhancement of tenancy regulations or supporting land purchases. The improved access to land through tenancy was implemented in countries such as Belgium, France, and the Netherlands. These countries gradually introduced regulations throughout the twentieth century aiming at improving the rental conditions for tenants, for example, better conditions in case of contract termination, automatic rights for rental contract renewal, and pre-emptive right options. Other countries, like Ireland and Denmark, followed the second approach by introducing measures to help the tenant to become the owner of land through government subsidies to buy the land (stimulating the demand for land) or through increased land and inheritance taxes (stimulating the supply of land as it induced landlords to sell (part of) their estate). These two separate patterns of institutional change largely explain the present tenure-/ownership regulations existing in the land markets in OMS (Swinnen 2002, and Swinnen et al. 2014b).

In NMS, the current land tenure-/ownership regulations are heavily affected by the communist regime before the fall of the iron curtain and the subsequent land reforms and privatization processes as well as the EU accession. In these countries, the power strangles between landlords and tenants was less pronounced. The primary political battle was on the type of land privatization to be implemented after the collapse of the communist regime. The choice was between allocating the land to former (pre-collectivization) owners or to farm labor. The choice of the privatization strategy determined the structure of the land ownership and the importance of tenancy (Kancs and Ciaian 2010). However, overall, sales and rental markets (with some exceptions) remained relatively liberal. The key land regulation introduced in the land market in NMS was aiming at restricting foreigners' access to land acquisitions. This was introduced as a result of the accession of NMS to the European Union. The accession was expected to drive competition for land from OMS where land is considerably more expensive.

Table 4 summarizes the diversity of land tenure-/ownership regulations in different EU Member States. Following Swinnen et al. (2014a), we distinguish four categories of specific tenure-/ownership regulations (i) measures to protect the tenant; (ii) measures to protect the owner (cultivator); (iii) measures to protect the (non-farm) land owner; and (iv) measures to prevent land fragmentation.

*Rental market regulations*

Rental market measures regulate both rental prices and contractual arrangements. The regulations are stronger in OMS than in NMS. In several EU Member States, governments impose price restrictions on rental markets for agricultural land. These restrictions take the form of a maximum or a minimum rental price. The maximum price aims to reduce pressure on farmers rental costs, whereas the minimum rental price protects the rental income of landowners. For example, in Belgium and the Netherlands, there is a maximum rent. In France, there is a combination of a minimum and a maximum rent. However, in most Member States, there are no rental price restrictions. The maximum price restriction may induce illegal (grey) market as farmers may be willing to pay more than the maximum regulated amount by offering additional unofficial payments in the presence of competitive pressures. Indications of this practice can be found, for example, in Belgium, France and the Netherlands (Ciaian et al. 2012b; Thomson et al. 2014).

Regulation of rental contract duration is relatively common across Member States. For example, in Belgium and France, it is at least 9 years; in the Netherlands, at least 6 years; and in Spain at least 5 years. Moreover, in several countries (e.g., Belgium, France) even the renewal/inheritance of rental contracts is regulated. For example, in Belgium, there are several types of (long-term) tenancy contracts. First, there is a 'traditional' tenancy contract with a duration of at least 9 years. Second, it is possible to have a contract for 18 years or more. Third, there is also a 'career contract,' whose duration is equal to the duration of the expected career of the farmer. Contracts of 9 and 18 years are automatically prolonged by successive periods of 9 years, whereas a career contract ends automatically when the tenant turns 65. In contrast, Ireland does not regulate the contract duration, while Denmark, Hungary, and Poland specify maximum lease durations without an automatic right of renewal (Swinnen et al. 2014a; Ciaian et al. 2012b; Thomson et al. 2014).

The duration of rental contracts for agricultural land gives an indication of rental market flexibility for farmers to adjust their production to changes in the external environment. Therefore, long-term rental contracts allow less adjustment to external changes than short-term contracts. On the other hand, short-term contracts offer tenants less security, which reduces investment incentives for farmers.

In most countries, rental markets are free and unrestricted in relation to regulations on the quantity of land rented. In general, there are no constraints on the amount of land that is transacted (except in Hungary) and transactions do not need to be approved by a government agency (except in France, Germany, and the Netherlands) (Ciaian et al. 2012b).

*Sales market regulations*

In general, sales markets for agricultural land are less vulnerable to regulations than rental markets. Only in France, some regions in Germany, and some NMS (e.g., Hungary, Slovakia) there are strict sales market regulations. In France and Germany, there are special agencies that deals with agricultural land sales. In France, regional organizations (SAFERs) effectively control the local land markets through their power to buy, sell, and rent out agricultural land.[4] Effectively, they ensure that land is only owned by active farmers. The SAFERs also control the level of farm restructuring and growth by requiring farmers to get authorization for farm expansion (Latruffe et al. 2013).

The most widespread sales market regulation is the pre-emptive right provision to certain land market participants. Regulations in Member States vary with respect to who has the pre-emptive right to land acquisition such as tenants, neighbors, or co-owners. The most common priority group of buyers are tenants followed by co-owners and neighboring farms. The motives behind granting the preferential treatment vary across Member States and include facilitating the access to land to certain groups of buyers or an attempt to prevent excessive land fragmentation.

[4] In addition to having a pre-emptive right, SAFER also participates in the negotiation process between the buyer and the seller of agricultural land. If the parties cannot reach a mutual agreement on a certain price, SAFER can propose another buyer or another price that is more in line with the observed market price. In some cases, SAFER can even decide to exercise its pre-emptive right and acquire agricultural land to sell to another buyer or to rent out when this better fits SAFER's mission objectives. Even if an agreement has been established between a buyer and a seller, SAFER can intervene and exercise its pre-emptive right, for example when agricultural land is sold at a price that is considered too low and SAFER suspects that it is being purchased for speculative reasons (Ciaian et al. 2012a).

Different countries have a form of land taxation: either ownership (property), transaction (e.g., capital gains tax for sales, registration tax for purchases), or inheritance tax. The tax system varies strongly across countries and usually agricultural land is favored in comparison to other property types by providing some form of favorable treatment. For example, such a special treatments are provided in Finland, Lithuania, and Poland (Ciaian et al. 2012a; UN-HABITAT 2013).

To reduce competitive pressures from non-agricultural sector, some countries require a new buyer to provide a proof of competence in the agricultural sector through experience or education (e.g., Austria, Denmark, Lithuania, Poland, Slovakia), or impose a legal obligation to ensure that the land is cultivated after the purchase (e.g., Hungary, Lithuania).

Other types of sales restrictions protect local or domestic buyers by requiring either local or country residence of the buyer. In Austria, new owners of agricultural land are required to reside close to the land plot. In Denmark, for an area smaller than 30 hectares, buyers need to have permanent residence rights in the country. Also Slovakia and Lithuania have residence requirements.

According to the EU accession treaties, NMS could impose up to a ten-year (12 years in Poland) transitional ban on agricultural land acquisitions by foreign individuals and legal persons (companies) from the EU Member States (European Commission 2014a). These restrictions were introduced as transitional measures to allow land markets to gradually adjust to competitive pressures rising from the single EU market. The primary reason for the transitional restrictions was the existence of substantial differences in agricultural land prices between OMS and NMS. As shown in Figure 1, prior to the EU accession, land prices in OMS where several times higher than in NMS. Note that, these price differences were not eliminated over the transitional period and still persist. As a result, the fear among the farming community of potentially strong competition coming from OMS remained in NMS after the expiration of the transitional period in 2014 (2016 in Poland).

As a response to pressures from farmers, NMS introduced new regulations attempting to indirectly restrict land purchases by foreigners. Although the new regulations do not directly target foreigners (as this would be illegal under the EU treaties), the motivation behind their introduction was the expiration of transitional retractions. The new measures target predominantly sales markets by restricting the purchase of agricultural land to different groups of individuals and by making land sales transactions administratively more cumbersome. That is, the most frequently adopted new measure in NMS is the pre-emptive buying right to farmers, neighbors, or domestic residents. However, if we compare the new adopted measure in NMS, such measures are present also in OMS. These measures add to the existing measures in NMS prior to the expiration of the transitional bans. The strongest prior restrictions existed in Poland and Hungary– two countries with strong political representation of small farmers and bordering with countries that have significantly higher land prices (Germany and Austria).

The most restrictive new lands sales measures were introduced in Slovakia, Lithuania, and in combination with exiting restrictions also in Poland. The new regulation in Slovakia gives the pre-emptive right to buy agricultural land to family relatives, co-owners, and farmers conducting their activity for at least three years in the cadastral zone where the offered land is

located.[5] The second priority group includes farmers (individual farms, farm employees, or companies) with permanent residence (or headquarters) in Slovakia of at least ten years and conducting agricultural activity for at least three years.[6,7] Selling land to the second group of potential buyers requires an announcement of the offer (free of charge) for at least 15 days in the online registry of agricultural land offers administered by the Ministry of Agriculture and on a public board in the village where the land is located. If none of the pre-emption right holders express their interest in acquiring the land plot within a six-month period, it can then be sold to any buyer (not necessarily working in agriculture) from the European Union. The complex conditions under which agricultural land can be sold imply that individuals without permanent residence in Slovakia practically cannot buy land in the country (Drabik and Rajčániová 2014). These new measures make Slovakia, in addition to France and Hungary, one of the most protected land sales markets in the European Union.

In Lithuania, according to a new measure, any new buyer must have at least three years of experience (in the last ten years) in agricultural production, qualification in agriculture, and obtain a government permission to buy agricultural land. The new owner also needs to conduct agricultural activity on the purchased land for at least five years after the purchase agreement and maintain a pre-defined minimum income level per hectare (defined by the Ministry of Agriculture). Further, an owner cannot own more than 500 ha of agricultural land in total (FestForest 2014).

In anticipation of the expiration of transitional restrictions in 2016, Poland adopted new measures in 2015 with the aim of restricting land purchases by foreigners. The existing regulations in Poland require the land to be used for agriculture, buyers have qualification in agriculture, and an owner does not own more than 300 hectares of agricultural land.

Note that not all NMS introduced as restrictive sales regulations as Lithuania, Poland, or Slovakia. For example, new measures in Romania give the pre-emptive buying rights to farmers, neighbors, and co-owners. However, there is no residence requirement implying that foreigners are not excluded from the sales market. The regulation treats foreign and domestic buyers fairly equally in Romania. Compared to other EU Member States, Romania remains one of the countries with the most liberal sales market. In Romania, where a significant share of land is owned by farmers, renting is less important, which may partially explain the adoption of a rather liberal sales market regulation.

## 4 Environmental regulations

Various public goods and (positive or negative) externalities (e.g., landscape features, biodiversity and the environment) are linked to agricultural production. Often markets are inefficient in delivering their optimal production level (Cooper et al. 2009). The market failure has motivated the European Union to introduce policies targeting the provision of agricultural public goods and externalities. Currently, several EU-level measures target these objectives and are linked to the agricultural land cultivation. The most important EU-wide

[5] It should be noted that farmers in Slovakia rent as much as 90 percent of land which makes them more vulnerable to foreign land acquisitions.

[6] Young farmers (for both groups) are exempted from the requirement of conducting agricultural activity for at least three years before the transaction.

[7] Further, the second group is distinguished by whether farmers conduct their agricultural activity in the neighboring village with respect to the sold land or in other location. The former farmers have the priority over the latter type of farmers in acquiring the land.

environmental instruments include: agri-environmental payments, Less Favored Area (LFA) payments, Natura 2000 network, and the Nitrates Directive.

First, under the CAP there are various support instruments targeted at motivating farmers to adopt sustainable management practices on land to prevent land abandonment. The two most important instruments include agri-environmental payments and LFA payments granted under the Rural Development Programme. Agri-environmental payments are offered on a voluntary basis for the provision of environmental management services. They are granted for a range of farm activities aimed at improving the environment on the farm. They cover additional costs and foregone farm income resulting from the adoption of environmental management practices. Agri-environmental payments affect particularly farm input use, because they are conditional on the adoption of environmentally friendly production practices, such as fertilizer reduction, organic farming, intensification of livestock, conversion of arable land to grassland, rotation measures, and support of biodiversity (EC, 2005). LFA payments support farmers located in less productive regions by granting a per hectare payment. The aim of this support is to prevent land abandonment in places where natural conditions (e.g., difficult climatic conditions, mountainous regions, low soil quality) make land cultivation less attractive.

Other EU-wide environmental regulations targeted at land use include the Natura 2000 network and Nitrates Directive. The Natura 2000 is an EU-wide network of nature protection measures (implemented as part of the Birds and Habitats Directives) and aims to preserve the survival of European Union's most valuable and threatened species and habitats. It includes two types of areas: Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). SACs cover areas that provide rare and vulnerable animals, plants and habitats increased protection, while SPAs includes areas that are important for rare and vulnerable birds that use them for breeding, feeding, wintering, or migration. Around 10 percent of the EU agricultural area is under Natura 2000. However, Natura 2000 also covers other areas (e.g., costal area) designated as vulnerable from a natural and ecological point of view. Conservation measures are required to be applied on these areas in order to maintain or restore the natural habitats and/or the populations of the species for which the sites are designated. Conservation measures are financially supported both by national and EU-level funding (e.g., LIFE-Nature instrument). It should be mentioned that agricultural production is not excluded from the Natura 2000 areas. However, agricultural production taking place in these areas are subject to strict regulations in line with conservation requirements. In cases when the land ownership structure and use rights are contrary to the conservation objectives of Natura 2000, land is purchased in public domain or by recognized non-governmental organizations (European Commission 2014b; Kettunen et al. 2014).

The Nitrates Directive regulates the fertilizer and manure use in agriculture in order to reduce nitrates pollution in ground and surface waters. Countries designate nitrate-vulnerable zones that could pollute waters from high applications of manure and fertilizers on land. However, a number of countries (e.g., Austria, Denmark, Finland, Germany, Ireland, Lithuania, Luxembourg, Malta, the Netherlands, and Slovenia) include their whole territory in these zones (European Commission 2015).

The Nitrates Directive legally regulates annual farm application of manure and fertilizers on land by imposing upper limits per hectare. Further, countries define codes of good practice for farmers, to be implemented on a voluntary basis in all territory, and specific practices compulsory for farmers located in nitrate-vulnerable zones. For example, these practices regulate the periods of prohibition of the application of certain types of fertilizer, manure

storage methods, spreading methods and crop rotation in certain zones (e.g., on steep slopes; frozen or snow-covered ground, near water courses) and other land management measures (European Commission 2015). A number of Member States have decided to impose stricter regulations than required by the Nitrates Directive, particularly in countries with intensive livestock production. For example, in Belgium, Denmark, and the Netherlands livestock manure nitrogen limits are stricter than those defined in the Nitrates Directive; fertilizer application standards vary depending on crop and soil types as well (Le Goffe 2013). Overall, the Nitrates Directive affects the use rights of land as it requires adoption of specific good farming practices (application of manure and fertilizers).

Given that environmental regulations affect land management and its use, they alter the functioning of land markets in the European Union. In particular, they affect land allocation and the benefits and costs of land owners and users. Environmental regulations are also expected to generate welfare benefits to the society in general, as they are designed to increase the provision of public goods or to reduce negative externalities on land. However, public welfare benefits are not necessarily internalized by land owner/users. Environmental regulations are associated with additional costs, forgone income, or produced public benefits. To partially or fully compensate for the costs, the regulations are typically implemented in combination with subsidies (e.g., agri-environmental payments).

Nilsson and Johansson (2013) find for Sweden, and Kilian et al. (2012) for Germany that agro-environmental payments are negatively correlated with land prices. This suggests that environmental constraints linked to these measures impose additional costs for farmers. It is also possible that the land receiving agri-environmental support has less favorable natural conditions for agricultural production, which is ultimately reflected in lower land prices. This hypothesis is indirectly supported by Ciaian et al. (2015), whose estimates show that agri-environmental and LFA payments are fully translated in higher farm income, suggesting that these payments may exercise minimal impact on other factors such as land prices. The estimates of Mary (2013) show that LFA payments have negative and significant impact on farm productivity of French crop farms, whereas agri-environmental payments are found to have no impact on productivity. Mary's (2013) findings suggest that an increase in LFA payments by 100 euros would decrease farm productivity by 0.016 percent.

The environmental regulations may not always reduce land values or land productivity. For example, the limitations imposed by Nitrates Directive on manure application on land may actually boost land competition as farmers need to spread manure on a larger surface in zones with a nitrogen surplus in order to comply with requirements. The resulting higher demand for agricultural land would result in higher land prices. This positive price effect of Nitrates Directive is confirmed by Latruffe et al. (2013) for Brittany in France and Vukina and Wossink (2000) for the Netherlands. Also LFA payments are found to increase land prices as they increase land returns for less productive land and thus stimulate competition on land markets (Patton et al. 2008; Kilian et al. 2012). For Natura 2000, although valuation estimates vary widely across studies, the evidence tends to show that these areas generate public welfare benefits to society and that societal benefits often significantly exceed private benefits (Hoyos et al. 2012).

## 5 Area-based subsidies

The emphasis of the CAP before 1992 was on encouraging agricultural productivity, maintaining a stable supply of affordable food for consumers and ensuring a viable agricultural sector. The support to farmers was implemented predominantly through a price

support system that guaranteed high prices to farmers. The early CAP had a major impact on agricultural product markets, leading to large distortions and high budgetary costs. To address these issues, important changes were made to the CAP starting from 1992. To reduce the market imbalances, domestic prices were reduced and the income loss to farmers was redressed through coupled compensatory direct payments. The subsequent reforms implemented in 2003, 2005, and 2013 shifted the main part of the CAP support towards area-based payments, which are decoupled from agricultural production but linked to land. In order to receive decoupled payments, farmers were required to implement minimal environmental practices (cross-compliance and 'greening' measures).

Two types of area payments are implemented in the European Union: the Single Area Payment Scheme (SAPS) and the Single Payment Scheme (SPS) (Table 5). A key difference between the SAPS and the SPS is the area eligible for the payment. Under the SAPS, the entire area that framers use can receive a payment per hectare. Under the SPS, the farmer is entitled to a yearly payment depending on the number of payment entitlements the farmer possesses. The number of entitlements is based on the reference (historical) area of the farm. To receive the SPS, farmers need to match each entitlement with one hectare of land. Thus, the SPS is linked to land because, in the absence of eligible land, farms cannot activate (cash in) their entitlements. Farms can expand or decrease their stock of entitlements by buying or selling entitlements on the market from other farms.

Another key difference between the SAPS and the SPS is the value of the per hectare payment. Under the SAPS, all farms in a given Member State (or region within a Member State) receive an equal per hectare payment. Under the SPS, the payment value can differ between farms in a given region. This depends on the type of the SPS model a Member State implemented under the 2003 CAP reform, that is, historical, regional, or hybrid model. Under the historical model, the SPS is farm-specific (and thus heterogeneous) and equals the support the farm received in the reference period. Under the regional model, an equal per-hectare payment is granted to all farms in a given Member State (or region within a Member State). The hybrid model is a combination of the historical and regional models.[8]

An important implication of the SAPS and the SPS for land markets is that they increase returns to land. The two types of payments do not oblige farms to produce on land. Land only needs to be maintained in good agricultural conditions and minimal environmental requirements need to be respected. As a result, the SAPS and SPS subsidies tend to increase competition for land as a market participants seek to acquire more land (either through rental or purchase) to benefit from subsidies. In well-functioning markets, the enhanced competition will be reflected (capitalized) in higher land values (rental and sales prices) and thereby benefit mainly landowners instead of farmers who are actual subsidy addressees. Depending on competition on land markets, type of the implemented SPS model and other factors, the size of capitalization differs between the SAPS and the SPS as well as between different SPS models.

To illustrate the differences in the area-based payment, we show the effects graphically using a stylized land rental model of Ciaian et al. (2014), which is shown in Figure 3. For the sake of graphical tractability, we assume that (i) the entire land is owned by "landowners," who rent the land to "farms," (ii) there are two identical regions except for the land supply, and (iii) entitlements are allocated to farms (in accordance with EU rules).

[8] Conceptually, the SAPS corresponds to the regional SPS model with an infinite stock of entitlements.

The horizontal axis shows the quantity of land, $A$, the vertical axis measures the rental price, $r$, and the SAPS/SPS subsidy, $t$. The aggregate land demand without subsidies 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.

As a starting point, we consider the SAPS. Under the SAPS, the entire land is eligible for support and payment value is uniform across all farms. We denote the hectare value of the SAPS by $t^r$. The SAPS shifts land demand upward from $DD$ to $D_rD_r$. Farms' willingness to pay for land increases by the SAPS value, $t^r$. The land market equilibrium shifts from ($A_1$, $r_1$) to ($A_{1r}$, $r_{1r}$) in region 1 and from ($A_2$, $r_2$) to ($A_{2r}$, $r_{2r}$) in region 2. Land use and land rent increase by $A_{1r}^* - A_1^*$ ($A_{2r}^* - A_2^*$) and by $r_{1r}^* - r_1^*$ ($r_{2r}^* - r_2^*$), respectively, in region 1 (region 2). Competition for land drives up land rental prices and thus the SAPS gets capitalized into land rents. The capitalization level is equivalent in both regions. The capitalization is higher when the supply of land is less elastic. In the extreme case, with fixed land supply (not shown in Figure 3), the SAPS may become fully capitalized into land prices, that is, all subsidies will go to landowners because land rents increase proportionally to the SAPS (Ciaian and Kancs 2012).

The capitalization effect of the SPS is more complex as the amount of subsidies that farms receive depends on the number of entitlements they possess. The two key determinants of the SPS capitalization are (i) the size of entitlements relative to the total land area and (ii) the heterogeneity of the SPS payment (i.e., the type of the SPS model) (Courleux et al. 2008; Ciaian et al. 2008, 2010, 2014; Kilian and Salhofer 2008; Ciaian et al. 2016).

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 than the eligible area ("surplus"), then the SPS leads to a land price increase. However, if there are fewer entitlements than the eligible area ("deficit"), then the SPS does not increase land prices. This is shown in Figure 3 for the regional SPS model. For comparison, we assume a SPS rate of $t^r$, that is, the same value as in the case of the SAPS. However, under the SPS, the stock of entitlements determines the maximum amount of land that can receive payments. We assume a total amount of entitlements $A_E^T$. The land demand with the regional SPS model is given by the bold (kinked) line $D_rD$. 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 the entitlement, $t^r$. This holds until all entitlements are exhausted, that is, 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.

The effects of the SPS on the land market are very different in the two regions. In region 1, where entitlements are in surplus compared to the total land area ($A_1^* < A_E^T$), the SPS gets capitalized into land rents. That is, the equilibrium changes from ($A_1$, $r_1$) without support to ($A_{1r}$, $r_{1r}$) with the regional SPS model. The effect is the same as in the case of the SAPS. However, the effect is different in region 2 were entitlement are in deficit relative to land ($A_2^* > A_E^T$). The equilibrium ($A_2$, $r_2$) is not altered by the SPS. The SPS has a zero-distortive marginal effect on farm rental decisions. This implies zero capitalization of the SPS in region 2.

The main intuition behind these results is that, in the presence of surplus entitlements, farms will not be able to activate all their entitlements with the current area of land. Profit maximizing farms will compete for additional land, seeking to activate their unused entitlements. Competing farms will overbid the market price for land until it equals the marginal profitability and the entitlement value. As a result, the SPS will be capitalized into land rents. The effect of competitive pressure in the case of deficit entitlement is the reverse. If land is in surplus relative to entitlements, farmers will compete for entitlements to benefit from the SPS. The SPS will benefit the entitlement owners, but will not be reflected in higher land rental prices. The same intuition holds for all SPS models. However, in reality the SPS capitalization is expected to be smaller in countries implementing the historical model than in countries implementing regional or hybrid models because fewer entitlements relative to total area were allocated under the former than under the latter (Ciaian et al. 2008, 2010, 2014).

When the SPS is capitalized into land values, the share of payments that is capitalized into land rents decreases in the payment heterogeneity. That is, the subsidy capitalization is higher under the regional SPS model than under the historical or hybrid models. We illustrate this effect in Figure 3 by comparing regional and historical models. We assume the same regional model as above. For the historical model, we consider two types of entitlements. 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, that is, $A_E^1 + A_E^2 = A_E^T$ where $t^1 > t^2$. This implies a land demand function such as represented by the (double kinked) curve $D_hD$. Relative to a no-support regime, the historical SPS model shifts land demand by $t^1$ up to $A_E^1$, where all high value entitlements are activated. In the interval from $A_E^1$ to $A_E^T$ (where $A_E^T - A_E^1 = A_E^2$) it is higher by $t^2$, and it is the same after all entitlements are activated at $A_E^T$ ($= A_E^1 + A_E^2$).

To compare the effects of the different models (regional SPS, historical SPS and SAPS), we keep the total amount (value) of the SPS entitlements constant. Above we have shown that under the regional model, the equilibrium was ($A_{1r}^*$, $r_{1r}^*$) in region 1 – where the entitlements were in surplus relative land. Under the historical SPS model, the equilibrium in region 1 is ($A_{1h}^*$, $r_{1h}^*$). Hence, land use increases and land rents go up in both models though less under the historical than under the regional SPS model (and the SAPS). This implies lower capitalization under the historical than under the regional SPS model (and the SAPS).

The intuition behind these results is that as farms with high value entitlements compete with farms with low value entitlements, farms owning high value entitlements can afford to pay higher rents, but will only bid up the rent to the maximum that the low value entitlements can (no longer) afford. Therefore, the low value entitlements will determine the SPS capitalization at the margin. This implies that the SPS capitalization decreases in the heterogeneity of the SPS levels. Thus, the capitalization of the SPS in land prices will be stronger under the regional SPS model than under the historical SPS model. The capitalization rate under the hybrid model is between the regional and historical SPS models (Ciaian et al. 2008, 2010, 2014).

In region 2, there is no effect of the SPS with both regional and historical SPS models because of the deficit entitlements relative to the total area. The SPS had no impact on the land market—the equilibrium remains unchanged at ($A_2^*$, $r_2^*$). Hence the SPS does not lead to capitalization of subsidies in region 2, irrespective of the SPS model.

Overall, the capitalization of the SAPS is expected to dominate the capitalization of the SPS as there are no entitlements (all agricultural area is eligible) and the per-hectare payments are uniform across farms under the SAPS. The impact of the SPS on land capitalization is expected to be the largest for the regional model, followed by the hybrid model, while the historical model is associated with the smallest capitalization rate. This is because under the regional model entitlements are more abundant relative to the total land area and the SPS is homogenous across farms. The opposite is true for the historical model: fewer entitlements were allocated relative to total land and the payment value varies across farms. The hybrid model is an intermediary case as it is similar to the regional model with respect to the entitlement stock, while payments are heterogeneous across farms but less than under the historical model.

*Empirical evidence*

There are a growing number of studies empirically estimating the capitalization of EU land-based subsidies. The results of these studies are summarized in Table 6. The studies can be grouped into two broad categories: land sales price studies and land rent studies.[9] Most studies focus on land rental prices since data on land rents are more widely available. Land sales price studies usually estimate the capitalization elasticity representing the percentage change in land price per 1 percent increase in subsidies, whereas rental studies typically estimate capitalization rate measuring the share of subsidy capitalized into land rents.

Two studies, using very different datasets, have estimated the impact of the SAPS on land rents in the NMS. Ciaian and Kancs (2012) use a firm-level panel dataset of more than 10,000 farms in 7 NMS in 2004 and 2005. Van Herck et al. (2013) use country level-data on average land rents and the SAPS for 6 NMS over the period 1994–2009. Both studies find remarkably similar results: they find that between €0.15 and €0.32 per additional euro of the SAPS is capitalized in higher land rental prices. These estimates appear somewhat low given that theory suggests a considerably higher capitalization rate. One explanation for this small capitalization level could be the presence of land market rigidities (including regulations) that hamper the full adjustment of land sales and rental prices.

The estimates of the capitalization rates for the SPS vary more across studies. This is mainly because of different regional coverage by the studies which captures different SPS implementation models (Table 5). Michalek et al. (2014) estimate the capitalization of the SPS into land rents using farm-level data across OMS for the early period of the SPS implementation (2004 to 2007). They find a relatively low capitalization rate of only 6 to 10 percent. However, Michalek et al. (2014) also show that there is a significant variation in the SPS capitalization rate across OMS, among regions and among farms. Moreover, their estimates confirm the theoretical predictions on lower SPS capitalization in the historical compared to the hybrid model. O'Neill and Hanrahan (2013) estimate the short-run capitalization rate in the same magnitude for Ireland (historical model) as Michalek et al. (2014): between 7 and 25 percent. In the long-run the capitalization rate is larger between 21 percent and 53 percent. Guastella et al. (2014) find a statistically insignificant impact of the SPS on land rents in Italy, where the historical SPS model is implemented.

Nilsson and Johansson (2013) analyze the SPS impacts in Sweden, whereas Kilian et al. (2012), Feichtinger and Salhofer (2015b) and Klaiber et al. (2016) analyze the SPS impacts in

[9] The capitalization effect on land sale price is equivalent to the capitalization effect on rental prices if the sale prices follow the asset pricing formula where land price equals the sum of discounted future rental prices.

Bavaria (Germany) and find a comparably high capitalization rate. The former study finds that the elasticity of agricultural land sales price with respect to the SPS is 0.54 (i.e., a 1 percent increase in the SPS increases land sales price by 0.54 percent), whereas the latter three studies find that 35 to 94 percent of the SPS are capitalized into land rental prices. Both Sweden and Germany implement the hybrid model where the entitlements are more abundant relative to total land, which, according to the analysis depicted in Figure 3, is expected to cause a higher capitalization of the SPS. Similar to Michalek et al. (2014), the estimates of Klaiber et al. (2016) show that the gradual transition to harmonized payments (the regional SPS model) in Germany led to an increase of the capitalization rate from 37% in 2005 at the time of the SPS introduction when decoupled payments were most heterogeneous to 57% in 2012 when the payments were partially harmonized.

In contrast, Karlsson and Nilsson's (2014) estimates suggest no impact of the SPS on land sales prices in Sweden (hybrid model). This contradicts the findings of Nilsson and Johansson (2013). Both studies use the same data from the Swedish Mapping, Cadastral and Land Registration Authority for the period January 2007 to December 2008. The two studies differ in the methodology they employ. Karlsson and Nilsson (2014) use a spatial multilevel model that accounts for spatial spillover effects and interdependencies, while Nilsson and Johansson (2013) apply asset-pricing model where land price is determined by the expected returns from its current and potential future uses. These differences in methodology imply that when controlling for interdependencies between local and regional factors and spatial spillover effects between neighboring farms, the SPS becomes unimportant in determining land sales prices. Similarly, Feichtinger and Salhofer (2015b) control for spatial spillover effects and interdependencies and find lower capitalization elasticity for sales prices in Bavaria in Germany (0.20–0.28) than Nilsson and Johansson (2013).

In general, with some exceptions, the estimated capitalization of the SPS appears to be more in line with the theoretical predictions than in the case of the SAPS. However, the estimated capitalization rates for both types of payments could be underestimated due to the presence of various tenancy regulations. In particular, long duration rental contacts and maximum rental price interventions applied in several countries can prevent full price adjustments or cause sluggish adjustment of land rents to subsidies, implying that the effect may not be full and immediate. Studies that focus specifically on short-term or new contracts find considerably higher capitalization rates. For example, Patton et al. (2008) in their analysis of Northern Ireland only include farms with rental contracts of one year or less, and exclude all longer-term rental contracts. They find that the capitalization of land-based subsidies is more than 100 percent. Also Kilian et al. (2012) find that the SPS capitalization effect is significantly higher for newly signed rental contracts in Bavaria (Germany). Further, Latruffe et al. (2013) find that land regulation linked to intervention of public authority (i.e., SAFER) in land markets reduces land sales prices in Brittany (France). This is because of the pre-emptive rights of SAFER which allows maintaining lower market prices by purchasing land if price is too high and sell it back at a lower price.

## 6 Conclusions

This chapter analyzes the government interventions in land markets in the European Union with a focus on three main areas: tenure-/ownership regulations, environmental regulations, and area-based payments. The analysis shows that agricultural land markets in the European Union are far from operating in a free market environment. It is generally acknowledged that the well-functioning land markets plays an important role in promoting economic development of rural areas, because it allows a more efficient use of land by facilitating

transfer of land from less to more productive farmers and structural adjustment of farming sector. As a result, the presence of land market interventions may have important implications by constraining these developments in general and land market structural adjustments in particular. However, not all interventions may be detrimental to society. For example, the regulations attempting to address market failures linked to provision of agricultural public goods and externalities may actually generate net welfare gains.

Unlike land subsidies or environmental regulations, tenure-/ownership regulations are generally not subject to joint EU policies, but remain essentially a national matter. This is one of the reasons why they tend to vary strongly across countries, as they reflect national political economy preferences. They include a wide range of measures targeting either sales or rental markets. Almost all EU Member States have in place some type of land market intervention. Rental markets tend to be under stronger regulation in OMS than NMS. However, there are some OMS (e.g., France) that have implemented complex regulatory systems which intervene in land markets. Generally, NMS have relatively liberal rental markets. However, sales transactions are subject to stricter rules in particular toward foreigners or non-residents aimed to protect domestic land markets against competitive pressures from OMS.

The European Union has put in place several regulations with the aim of addressing land market failures linked to provision of public goods and externalities. The most important EU-wide environmental instruments targeting land markets include: agri-environmental payments, LFA payments, Natura 2000 network, and the Nitrates Directive. While these instruments may reduce private benefits of owning or using land (e.g., by reducing land market price or productivity) due to imposed land use restrictions, they may generate substantial welfare gains to society by improving the environmental services on land such as landscape or biodiversity.

The EU land markets are also significantly affected by area-based subsidies—the SAPS and the SPS—granted under the CAP. The theoretical models suggest that land market outcomes would differ between the SAPS and the SPS. In a well-functioning land market, the SAPS should get incorporated into land values, thereby benefitting mainly landowners instead of famers. For the SPS, the theoretical analysis suggests that the subsidy capitalization may vary from a full to a zero rate, and that it decreases with the variation in the payments value among farms. The empirical findings tend to suggest a lower capitalization rate than predicted by theoretical models. This is especially the case for the SAPS for which empirical studies report a relatively low capitalization rate. One explanation for the smaller capitalization rate could be the presence of land market rigidities induced by land tenure-/ownership regulations that hamper the full adjustment of land sales and rental prices to external shocks.

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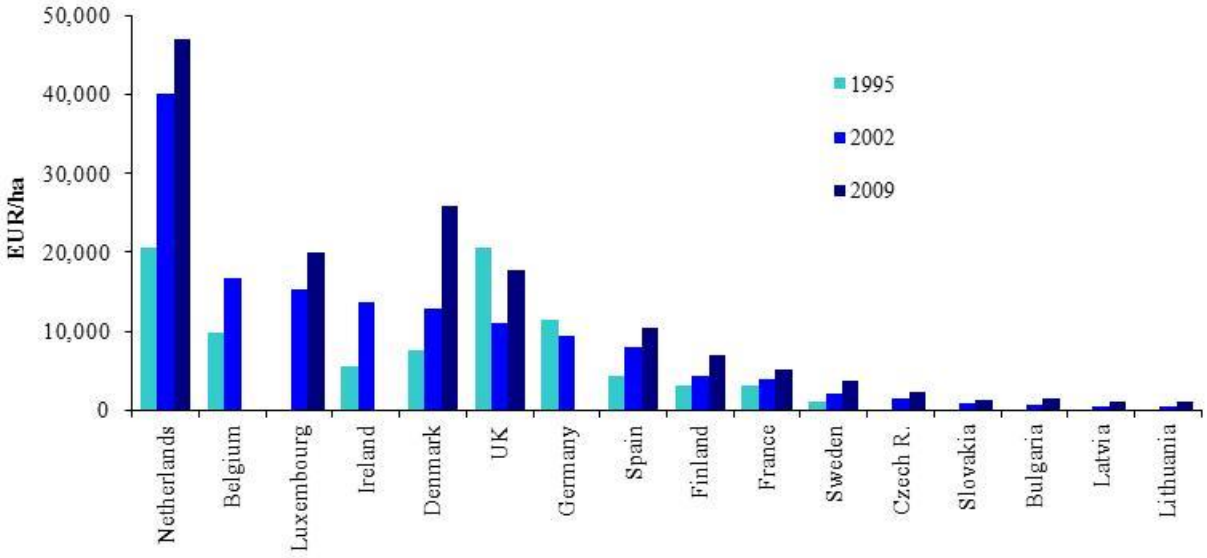
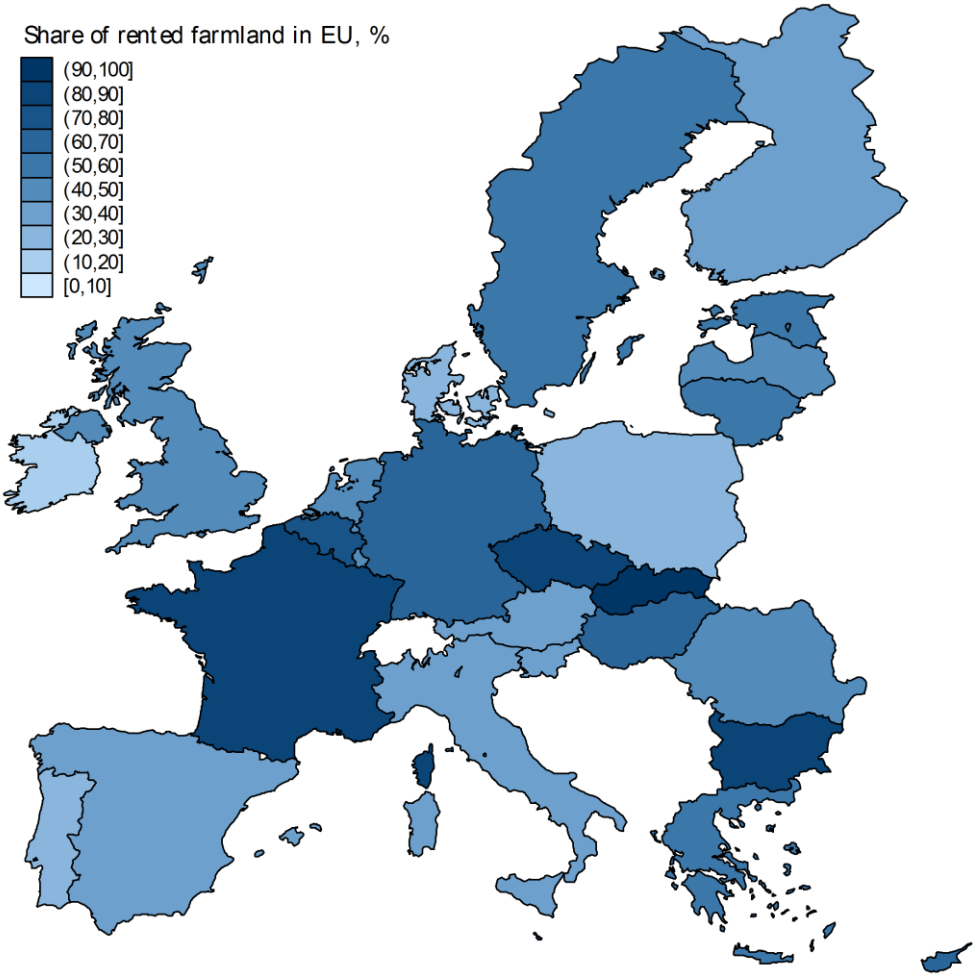
**Figure 1. Development in land prices in the European Union (EUR/ha)**




*Source*: Eurostat

Notes: All prices are for agricultural land except for Bulgaria and France where the arable price is reported. For the Netherlands and the UK the price for 1995 is the 1996 value; for Luxembourg the price for 2002 is the 2003 value; for the UK the price for 2009 is the 2008 value.

**Figure 2. Share of rented land as a percentage of the total utilized agricultural area (UAA), 2012**




*Source*: FADN

**Figure 3. The effect of the SAPS and SPS on land rents**

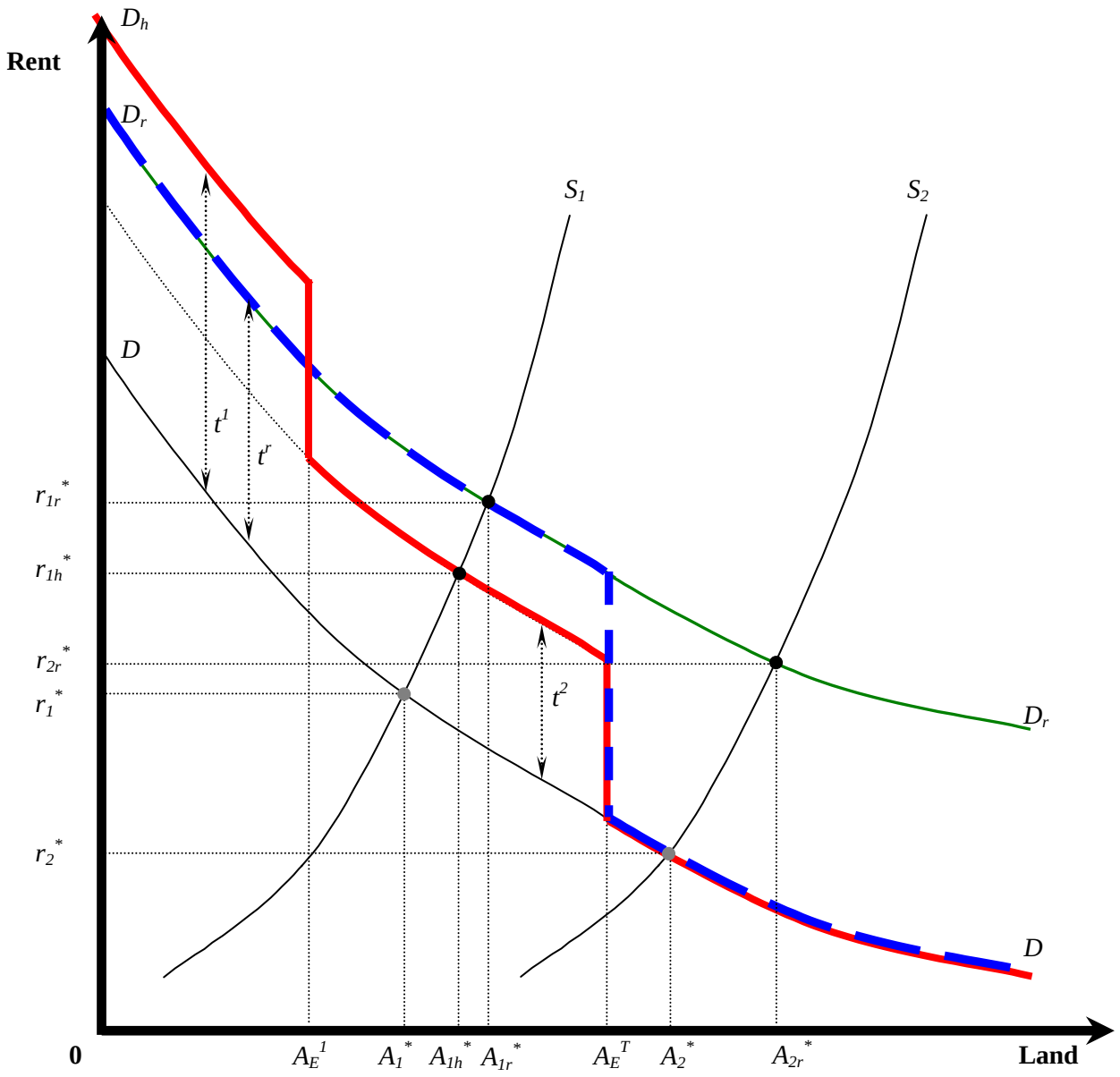


**Table 1. Agricultural land sales as a percentage of the total utilized agricultural area**

| | Old member states | |
|---|---|---|
| | **1998** | **2006** |
| Belgium | 1.63 | 1.28* |
| Finland | 1.79 | 2.72 |
| France | 1.03 | 0.99* |
| Germany | 0.58 | 0.58 |
| Greece | 0.41 | 0.35* |
| Ireland | 3.04 | 2.90 |
| Italy | 1.60 | 1.42* |
| Netherlands | 3.72 | 3.08 |
| Spain | 0.52 | 0.62 |
| Sweden | 0.63 | 0.62 |
| UK | 3.60 | 1.64* |
| | **New member states** | |
| | **1998–2001**** | **2005–2006**** |
| Bulgaria | 0.34 | 1.61 |
| Czech Republic | 2.8 | 3.30* |
| Estonia | n.a. | n.a. |
| Hungary | n.a. | 3.6 |
| Latvia | n.a. | n.a. |
| Lithuania | 1.9 | 8.4 |
| Poland | 1.71 | 1.77 |
| Romania | 0.2 | 0.43 |
| Slovakia | 0.1 | 0.14 |

* Data from 2004

**Bulgaria: data for 1999 and 2006; Czech Republic: data for 1998 and 2005; Estonia: data for 2005, transacted arable land as a percentage of UAA; Hungary: data for 2006; Lithuania: number of sales and gifts, data for 2000 and 2006; Poland: data for 1998 and 2005; Romania: data for 1999 and 2005; Slovakia: data for 2001 and 2005

*Sources*: Ciaian et al. (2010); Swinnen and Vranken (2009; 2010).

**Table 2. Land renting in the European Union**

| | 2000 | 2004 | 2012 | Change 2012/2000 | Change 2010/2004 |
|---|---|---|---|---|---|
| | *% of UAA* | | | *% change* | |
| Old Member States | | | | | |
| Belgium | 75 | 75 | 73 | -2.6 | -2.7 |
| Denmark | 25 | 29 | 29 | 15.5 | 0.0 |
| Germany | 70 | 70 | 67 | -3.6 | -4.4 |
| Greece | 36 | 42 | 52 | 42.6 | 22.9 |
| Spain | 32 | 31 | 37 | 16.1 | 17.1 |
| France | 81 | 84 | 88 | 8.6 | 3.9 |
| Ireland | 18 | 19 | 19 | 5.8 | 3.7 |
| Italy | 36 | 36 | 43 | 19.8 | 18.8 |
| Luxembourg | 48 | 49 | 54 | 12.3 | 8.9 |
| Netherlands | 39 | 41 | 41 | 5.9 | 0.7 |
| Austria | 26 | 30 | 28 | 6.8 | -4.9 |
| Portugal | 28 | 36 | 27 | -4.3 | -25.9 |
| Finland | 32 | 34 | 34 | 5.8 | -0.4 |
| Sweden | 40 | 48 | 54 | 36.2 | 11.8 |
| UK | 39 | 40 | 44 | 10.4 | 7.7 |
| | | | | | |
| New Member States | | | | | |
| Bulgaria | n.a | n.a | 89 | n.a | n.a |
| Cyprus | n.a | 66 | 67 | n.a | 2.0 |
| Czech R. | n.a | 91 | 83 | n.a | -8.9 |
| Estonia | n.a | 61 | 62 | n.a | 2.2 |
| Hungary | n.a | 66 | 62 | n.a | -4.8 |
| Latvia | n.a | 41 | 48 | n.a | 17.8 |
| Lithuania | n.a | 52 | 54 | n.a | 3.6 |
| Malta | n.a | 84 | 82 | n.a | -2.1 |
| Poland | n.a | 27 | 27 | n.a | 0.0 |
| Romania | n.a | n.a | 57 | n.a | n.a |
| Slovakia | n.a | 97 | 95 | n.a | -1.6 |
| Slovenia | n.a | 29 | 35 | n.a | 20.1 |

*Source*: FADN

**Table 3. Rental prices in the European Union (EUR/ha)**

| | 2000 | 2004 | 2012 | Change 2012/2000 | Change 2012/2004 |
|---|---|---|---|---|---|
| | | *EUR/ha* | | *% change* | |
| Old Member States | | | | | |
| Belgium | 142 | 174 | 204 | 44.0 | 17.2 |
| Denmark | 88 | 130 | 191 | 117.9 | 47.4 |
| Germany | 144 | 152 | 168 | 16.7 | 10.5 |
| Greece | 105 | 123 | 111 | 5.3 | -10.0 |
| Spain | 29 | 34 | 44 | 52.0 | 28.5 |
| France | 124 | 131 | 150 | 21.3 | 14.9 |
| Ireland | 52 | 48 | 50 | -3.6 | 4.9 |
| Italy | 60 | 72 | 86 | 42.8 | 19.3 |
| Luxembourg | 91 | 97 | 117 | 28.3 | 20.3 |
| Netherlands | 276 | 319 | 359 | 30.4 | 12.8 |
| Austria | 50 | 57 | 64 | 28.9 | 12.7 |
| Portugal | 17 | 19 | 25 | 43.4 | 30.1 |
| Finland | 48 | 57 | 75 | 57.6 | 31.1 |
| Sweden | 66 | 68 | 119 | 80.9 | 74.7 |
| UK | 70 | 66 | 63 | -11.0 | -4.9 |
| | | | | | |
| New Member States | | | | | |
| Bulgaria | | | 146 | n.a | n.a |
| Cyprus | | 105 | 113 | n.a | 6.9 |
| Czech R. | | 25 | 59 | n.a | 136.3 |
| Estonia | | 3 | 15 | n.a | 338.0 |
| Hungary | | 35 | 77 | n.a | 119.1 |
| Lithuania | | 8 | 21 | n.a | 175.0 |
| Latvia | | 4 | 10 | n.a | 126.7 |
| Malta | | 89 | 88 | n.a | -1.1 |
| Poland | | 10 | 18 | n.a | 91.3 |
| Romania | | | 55 | n.a | n.a |
| Slovakia | | 23 | 39 | n.a | 69.1 |
| Slovenia | | 11 | 34 | n.a | 211.8 |

*Source*: FADN

**Table 4. Tenure-/ownership regulations in the European Union**

| Type of regulation | Countries |
|---|---|
| *Measures to protect the tenant* | |
| Maximum rental prices | Austria, Belgium, France, the Netherlands |
| Minimum rental contract duration | Austria, Belgium, France, Italy, the Netherlands, Portugal, Slovakia, Slovenia, the UK (Scotland) |
| Automatic rental contract renewal | Belgium, the Czech Republic, France, Germany, Italy, the Netherlands, Portugal, Spain, Sweden, Slovakia, Slovenia |
| Conditions for rental contract termination | Belgium, France, the Netherlands |
| Pre-emptive buying right of the tenant | Belgium, France, Italy, Portugal, Sweden, Hungary, Latvia, Lithuania, the Netherlands, Romania, Slovakia, Slovenia, the UK (Scotland) |
| *Measures to protect the owner-cultivator* | |
| Requirements for the (new) landowner (e.g., residence, qualification, conduct of agricultural activity) | Austria, Denmark, Spain, Hungary, Lithuania, Poland, Slovakia |
| (Maximum) sales price regulations | Austria, France, Poland |
| Pre-emptive right-for neighboring farmers | France, Italy, Portugal, Hungary, Latvia, Lithuania, Romania, Slovakia, Slovenia |
| Maximum transacted / Owned area | Denmark, France, Hungary, Lithuania, Poland |
| *Measures to protect the (non-farm) land owner* | |
| Maximum duration of rental contract | Denmark, Finland, Sweden, Hungary, Poland, Slovakia, the UK (Scotland) |
| Minimum rental prices | Austria, the Czech Republic, France, the Netherlands |
| *Measures to prevent land fragmentation* | |
| Regulations on pre-emptive buying rights of the co-owner | Italy, Portugal, the Czech Republic, Hungary, Lithuania, Poland, Romania, Slovakia, Slovenia |
| Minimum plot size | Germany, Bulgaria, Estonia, Lithuania, and Slovakia |

*Sources*: Swinnen, Van Herck and Vranken (2014a); Drabik and Rajčániová (2014); FestForest (2014); Thomson, Moxey and Butler (2014)

**Table 5. The SAPS and SPS implementation by Member States under the 2003 CAP reform**

| Model SPS / SAPS | Member State (start date) |
|---|---|
| SPS historical | Austria (2005), Belgium (2005), France (2006), Greece (2006), Ireland (2005), Italy (2005), Netherlands (2006), Portugal (2005), Spain (2006), the UK (Wales and Scotland) |
| SPS regional | Malta (2007), Slovenia (2007) |
| SPS hybrid | Denmark (2005), Finland (2006), Germany (2005), Luxemburg (2005), Sweden (2005), the UK (N. Ireland, 2005), the UK (England 2005) |
| SAPS | Bulgaria (2007), Czech R. (2004), Estonia (2004), Cyprus (2004), Latvia (2004), Lithuania (2004), Hungary (2004), Poland (2004), Romania (2007), Slovakia (2004) |

Notes: Start year of implementation in the parentheses
*Source*: European Commission.

## Table 6. Empirical evidence of area-based payment capitalization into land values

| Study | Type of area CAP subsidy (Country) | Percentage change in land sales price per 1 percent increase in subsidies | Share of subsidy capitalized into land rents) (%) |
|---|---|---|---|
| Michalek, Ciaian and Kancs (2014) | SPS (EU, OMS) | | 6-10 |
| Kilian *et al.* (2012) | SPS, hybrid (Germany, Bavaria) | | 44-94 |
| Feichtinger and Salhofer (2015a) | SPS, hybrid (Germany, Bavaria) | | 35 |
| Klaiber, Salhofer and Thompson (2016) | SPS, hybrid (Germany, Bavaria) | | 0.37-0.57 |
| Guastella et al. (2014) | SPS, historical (Italy) | | 0 |
| O'Neill and Hanrahan (2013) | SPS, historical (Ireland) | | Short-run: 7-25<br>Long-run: 21-53 |
| Ciaian and Kancs (2012) | SAPS (EU, NMS) | | 19 |
| Van Herck and Vranken (2013) | SAPS (EU, NMS) | | 15-32 |
| Nilsson and Johansson (2013) | SPS, hybrid (Sweden) | 0.54 | |
| Karlsson and Nilsson (2014) | SPS, hybrid (Sweden) | 0.00 | |
| Feichtinger and Salhofer (2015b) | SPS, hybrid (Germany, Bavaria) | 0.20-0.28 | |