Study on the Functioning of Land Markets in the EU Member States under the Influence of Measures Applied under the Common Agricultural Policy

Final Report

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ABBREVIATIONS

AC	Autonomous Communities
AES	Agro-Environmental Scheme
AMTA	Agricultural Market Transition Assistance
AWU	Annual Working Unit
CAP	Common Agricultural Policy
CMO	Common Market Organisation
COP	Cereals, Oilseeds and Proteinseeds
DG AGRI	Directorate-General for Agriculture and Rural Development
EC	European Commission
ESU	European Size Unit
EU	European Union
EUSC	EU study countries
FADN	Farm Accountancy Data Network
FAIR	Federal Agricultural Improvement and Reform Act
FAS	Farm Advisory System
GAEC	Good Agricultural and Environmental Condition
GDP	Gross Domestic Product
Ha	Hectares
IACS	Integrated Administration and Control System
INEA	National Institute of Agricultural Economics
LDP	Loan Deficiency Payment
LFA	Less Favoured Area
MLA	Marketing Loss Assistance
NUTS	Nomenclature of Territorial Units for Statistics

PFC	Production Flexibility Contract
RDP	Rural Development Policy
SMR	Statutory Management Requirements
SAFER	“Sociétés d’Aménagement Foncier et d’Etablissement Rural (Private bodies under the State control regulating the agricultural land market)
SPS	Single Payment Scheme
UAA	Utilised Agricultural Area
ZID	Zentrale InVeKos Datenbank

EXECUTIVE SUMMARY

The **background** to this study is the establishment of the Single Payment Scheme (SPS), providing decoupled support to farmers, which was the central element of the 2003 CAP reform. The Member States of the EU-15 had to implement the SPS at the latest by 2007. The Member States had some flexibility concerning the model of implementation. Member States could opt to apply payment entitlements based on historical individual reference amounts (the "historical model"), or alternatively, payment entitlements calculated as averages of the historical reference amounts of the region concerned (the "regional model") or a mix of the two approaches, either static or dynamic (the "hybrid model").

Economic theory, as well as empirical findings, suggest that the way in which agricultural support is provided has an influence on land markets, because payments capitalise to some degree into land values, affecting both the sale and rental price of land. This would also have effects on the transfer efficiency of support, on structural change, etc. However, the type of agricultural support is not the only factor influencing land markets. Profitability of production, user competition (driven by environmental concerns and demographic changes), ownership and production structures and the institutional setting of land markets are other factors that need to be taken into account. Many of these conditions differ greatly between and within the EU Member States.

The overall **objective** of the study is to investigate whether and to which degree the different means of implementation of the SPS have affected: (i) capitalisation of support into land values (sales and rental prices); (ii) the distribution of this capitalisation to the different owners; (iii) the effect of the SPS, in combination with the institutional setting of land markets, on structural change in agriculture; and (iv) the reaction of land markets and asset values to changes in policy. In contrast to previous simulation exercises, the main focus of this study is to provide an empirical underpinning of policy influences on the land market.

To guide our analysis, the empirical and theoretical **literature** in this field was analysed in detail and a **theoretical framework** was developed to study the impact of direct payments and the SPS on land market values under different conditions. The insights from this literature review and from theoretical analysis are used in the interpretation of the empirical findings in this report. The detailed literature review and the extensive theoretical framework are in the appendix of the main report.

The empirical analysis in this study is based on a combination of **data** sources. In particular, we combine insights from comparative data analyses based on data from Eurostat and the Farm Accountancy Data Network (FADN) with data analyses and information collected in a series of country studies and (sub-country) regional studies. More specifically, as part of the overall study, **11 country studies** and **18 regional studies** were undertaken. An important criterion in the selection of countries and regions is the coverage of different implementation models of the SPS. The countries covered are Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Spain, Sweden, and the UK. For France, Germany, Italy, Spain and the UK, two or more regional studies were implemented.

The results presented in this report are subject to certain **analytical limitations**. First, data on land values and transactions are scarce in the period since the SPS was implemented. The short time span since the implementation of the SPS, combined with the varying quality of the available data, do not allow econometric analyses. Second, although we have systematically verified our data sources and our findings draw on several sources of information, the qualitative analysis in the present study does not allow us to assess confidence intervals nor does it allow us to perform sensitivity analyses or to check the statistical robustness of the results. Third, land regulations and long-term contracts may delay the capitalisation of the SPS in land values beyond what can currently be observed in data. Fourth, global food markets have experienced major changes over the past years. This complicates the identification of the SPS impact on agricultural land markets. For these reasons the results in this report should be interpreted keeping these limitations in mind.

Despite these limitations, the report presents interesting **hypotheses** and **preliminary evidence** on land market developments in the EU study countries (EUSC) and the effects of the SPS. To analyse the role of the SPS in influencing land values and the operation of land markets, the study addressed the following **themes**: land market development, drivers of land values, the effects of changes in SPS on land values, the distribution of direct payments and the effects on structural change.

Land market developments in the EUSC

The size of rental market transactions differs strongly among the EUSC. The farms in Belgium, France, Northern Ireland and Germany are the top renters (more than 65% of used land). In Sweden farms rent approximately 50% of the used agricultural land. In contrast, in Ireland land renting is the lowest (17%). In the rest of the countries covered by this study, farms rent between 34% and 43% of used land. The share of rented farmland in total utilised agricultural area (UAA) is increasing in most of the EUSC.

Agricultural land prices differ strongly across the EUSC. In the peak years the land price difference between the most expensive regions and the least expensive region is large. It ranges from around 2,000 EUR/ha in parts of Sweden to over 40,000 EUR/ha in parts of the Netherlands. These figures imply that awarding the same amount of subsidy per hectare of agricultural land would have quite different impacts on land prices.

The variation in rental prices is somewhat lower than in purchase prices but for rental prices there are also large differences. The difference in rental prices between the lowest and highest country in 1992 was around 6 to 1 and more than 7 to 1 in 2006.

Changes in agricultural land prices over the past decade also differ greatly across the EUSC. Over the period from 1992 to the present, real farmland purchase prices have declined by around 25% in Greece, while they have increased by around 250% in

Ireland. Developments in rental prices were also very heterogeneous: since 1992 real rental prices declined by around 25% in Finland and increased by around 55% in Spain.

This cross-country heterogeneity in agricultural land markets suggests that farmers and landowners in these different land markets may be affected differently by (changes in) the Common Agricultural Policy.

Drivers of land values

Agricultural commodity prices and agricultural productivity, infrastructural expansion and urban pressures have important influences on land markets, but their relative importance differs between rental and purchase markets. First, agricultural commodity prices and productivity are significant drivers of agricultural land prices, but their effects seem to be stronger on rental markets than on purchase markets. Second, urban pressures, such as growing housing demand, are an important driver of agricultural land prices, particularly in densely populated EUSC (e.g. Belgium and the Netherlands) and faster growing economies (e.g. Ireland and Spain). The same applies to the role of infrastructural expansion in driving up land prices. The latter factor, in particular, affects purchase prices.

Land market regulations affect land prices and exchange; this is particularly the case for rental exchanges. Rental prices for agricultural land are more regulated by governments than are purchase prices. In one third of the EUSC, maximum rental prices are set by the government.

The duration of rental contracts is regulated in some EUSC and influences the rental market responsiveness to agricultural policy changes. The length of rental contracts is regulated by government in Belgium and France (minimum 9 years), the Netherlands (minimum 6) and Spain (minimum 5). In several EUSC (e.g. France), the renewal/inheritance of rental contracts is also regulated. In these countries, formal rental markets are stickier and the time lag is longer in adjusting to policy changes. The importance of land renting is typically higher in countries with strong rental market regulations, such as Belgium and France. Belgium and France have the highest minimum lengths of rental contracts (9 years) and have the highest share of rented area (77% and 75% in 2006, respectively) among all the EUSC.

Land taxes differ substantially across EUSC. Three types of tax regulations which affect market participants' decisions to sell, buy and own agricultural land have been studied: sales taxes, purchase taxes and ownership taxes. Land transaction tax rates are rather heterogeneous across the EUSC, ranging from 1% for low value land in the United Kingdom to 18% for high value farmland in Italy. Similarly, ownership taxes for agricultural land are highly heterogeneous across countries, ranging from a 0% tax rate on farmland in Finland to over 15% in the Southern EU countries.

Low taxes for ownership and transaction with farmland and entitlements do not constrain structural change, but expose farmland to non-agricultural investors. Low transaction taxes on farmland and SPS entitlements, facilitate structural change via the reallocation of agricultural land and entitlements from less productive to more productive farms (e.g. Germany). On the other hand, agricultural land markets in countries with low transaction taxes are more exposed to speculative farmland purchases (and sales) by non-agricultural investors (e.g. Finland). Differentiated farmland ownership taxes for farmers and non-farmers reduce the incentives for long-run speculative farmland purchases (and sales) by non-agricultural investors, but hinder structural change (e.g. Greece).

CAP subsidies have an impact on land values, but the impact varies importantly across countries and appears relatively modest compared to other factors, in particular where land prices are high. CAP subsidies appear to affect land purchase prices in the EUSC. However, their relative importance appears limited compared to other drivers. Generally, the lower the land price, the higher the impact of CAP policies on land prices (e.g. Nordic regions in Finland and Sweden). In countries such as the Netherlands and Ireland, which have very high or rapidly increasing land prices, factors other than CAP policies appear to be much more important.

Implementation of the SPS

The EU member states can choose between three SPS implementation models: the *historical model*, the *regional model* and the *hybrid model*. Under the historical model, the SPS payment is farm-specific and equals the support the farm received in the "reference" period. This is the most commonly implemented SPS model in the EUSC. Under the regional model, an equal per hectare payment is granted to all farms in the region.

Concerns about the redistribution of subsidies were by far the most important factor for EUSC that chose the historical SPS implementation model over the regional model. An important motivation for England, Finland and Germany in choosing the dynamic hybrid model instead of directly going for the regional model, was to smoothen the adjustment of the farming sector over some period of time.

Receipt of the full SPS support is conditioned on the fulfilment of cross-compliance requirements. More precisely, a farmer receiving SPS support must respect Statutory Management Requirements (SMR) and maintain land in Good Agricultural and Environmental Condition (GAEC).

None of the EUSC implemented the pure regional SPS model (see also the last section). The comparative insights are therefore based on contrasting the implications of the historical model with the hybrid model.

Entitlements: activation, trade and valuation

The share of non-activated entitlements in the total distributed entitlements is low. For most EUSC it is less than 3%. The value of non-activated entitlements tends to be lower than the value of activated entitlements. The main reasons for non-activating entitlements are non-availability of eligible area and administrative burdens.

The share of the activated entitlements tends to be somewhat larger in countries that implement the hybrid SPS model than in countries with the historical SPS model. We find that this might be due to specific criteria relating to the implementation of the hybrid model.

There is a significant variation in the face value of entitlements among and within the EUSC. This variation appears to be determined by the commodity structure, support in the reference period, the implementation SPS model and implementation details.

There is a significant variation among the EUSC in the entitlement trade restrictions. The EU regulations allow entitlements to be tradable but certain constraints are imposed by the EU. Member states have certain flexibility in introducing additional country-specific restrictions on entitlement tradability. Spain, Italy, and France have the greatest restrictions in entitlement trade.

Trade with entitlements is most often conducted directly between farmers. Market agents or farm organisations also play a role sometimes. Spain appears to have the most developed entitlement trading system, similar to an auction.

There is no informal trading in entitlements, except among family members. An informal entitlement market was not found in any of the EUSC, because in order to receive payments, entitlement holders need to be identifiable. However, unofficial “trade” may occur among members of the same family.

The entitlement market tends to be smaller in regions under the hybrid model compared to the historical model. Under the historical SPS model trade is likely to be driven by structural change. This is because entitlements were distributed based on the land use in 2000-2002, while the SPS was implemented in 2005-2007. With the hybrid SPS model entitlement trade is driven by a combination of decoupling and the fact that relatively more entitlements were allocated than with the historical model. Structural change is less important in the hybrid model as entitlements were distributed based on area used in the first year of the SPS application. Differences in the implementation details between the two SPS models may explain higher trade with the historical model than with the hybrid model. This is particularly evident in the short-run, which is investigated in this study.

Preliminary evidence suggests that trade in entitlements is also affected by the functioning of land markets, restrictions on the tradability of entitlements, the availability of an opportunity to consolidate entitlements, and the level of “naked” land.

Entitlements are most often traded with land. The evidence from EUSC shows that with few exceptions entitlements are traded with land.

The market value of entitlements is between 1 and 3 times the face value of the entitlements. Our data show that the market price for entitlement in most EUSC is between 1 and 3 times the annual face value of the entitlement. A simple calculation would indicate that with perfect markets and without uncertainty the entitlement price would be in the range of 4-5 times the face value if the SPS runs until 2013, or in the range of 10-20 if the SPS runs indefinitely.

Several factors may explain the observed gap in the entitlement price between theoretical expectations and empirical evidence: (i) uncertainty about the SPS future (e.g. modulation, health check, etc.); (ii) additional costs of SPS (e.g. administrative costs); (iii) taxes and fees imposed on transactions; and (iv) credit market imperfections. However, the low market price of the entitlements may also reflect the capitalisation of the SPS in farmland values.

Impact of the SPS implementation

Our theoretical framework and the empirical evidence in the literature suggest that the impact of the SPS on land markets should depend on several factors, including the SPS implementation model and implementation details, market imperfections, transaction costs, market structure, other implemented policies, etc.

On average, the impact on land markets of the change to the SPS appears to be weak and did not lead to lower capitalisation than under coupled policies, *though there is variation among the EUSC and regions.* Preliminary evidence presented in this report indicates that the average impact is limited. On average, we do not observe major declines in land prices with the shift to decoupled policies, which suggests that there are no major reductions in capitalisation of support.

The SPS introduction appears to have a stronger impact on land rents than on farmland purchase prices. The net impact of the SPS introduction on land values also depends on the capitalisation of the SPS rate and on the relative importance of SPS compared to other drivers of land values. The empirical evidence from this study suggests that the relative importance of SPS in determining farmland prices compared to other drivers of land values is higher for rents than for purchase prices.

Preliminary evidence suggests that the historical SPS implementation model leads to lower capitalisation of the SPS into land values than the regional and hybrid models. In countries with the hybrid SPS model, capitalisation appears to be driven by the low amount of "naked" land. In countries with the historical model the impact of SPS appears to be significantly weaker. Where SPS land capitalisation occurs the strongest driver tends to be structural changes combined with constrained entitlement trade (the strongest in Belgium). In countries such as Greece there is little activity on the land market and hence there is limited capitalisation of SPS. In Ireland the possibility to consolidate entitlements reduces the pressure of SPS on land markets and the SPS land capitalisation appears minimal.

We also find that instead of reducing capitalisation, the SPS introduction appears to increase capitalisation in the least productive countries. The SPS appears to put a floor on land values in less productive regions (e.g. in Sweden and parts of the UK). The clearest evidence of the SPS impact on land values appears in higher land values for less fertile lands (e.g. grassland). However, this could also be due to the redistribution that came with the hybrid model.

In countries with regulated rental prices, the SPS implementation seems to mostly affect unofficial markets. In these Member States there is little effect on official prices (since these are regulated) but where regulations lead to the existence of unofficial markets for agricultural land, the SPS tends to increase the unofficial market rental price (e.g. Belgium) and the size of the unofficial markets for agricultural land (e.g. Belgium, the Netherlands).

Distribution of SPS benefits

Landowners seem to benefit more from the hybrid SPS model than from the historical SPS implementation model. Landowners benefit more under the hybrid SPS model through two channels. The first channel is the capitalisation of the SPS into land values. This is mostly where low amounts of "naked" land drive land values up. The second channel is the implementation details of the hybrid model. Under the hybrid model the number of entitlements that farmers received is equal to the total eligible area in the first year of the SPS application. This allowed some non-farming landowners to obtain entitlements either by cancelling the existing rental contracts and hence applying themselves for entitlements; or by adjusting rental contracts that ensure that entitlements are returned to landowner after the expiry of the contracts; or by other similar arrangements.

The distribution of SPS rents to landowners appears to differ strongly among the EUSC. From our country studies, it appears that landowners tend to benefit most from SPS in Finland and Sweden (60-100% of the value of entitlement) while least in Greece and Ireland (0-10%). In the rest of the countries, the landowner benefits from the SPS are low to medium (10-60%).

The distribution of SPS also depends on whether landowners are also farmers, which differs by EUSC. As mentioned above, the importance of land renting varies significantly among the EUSC. The evidence in this report suggests that in EUSC such as Germany, Northern Ireland and Sweden, an important share of SPS benefits will be channelled to non-farming landowners. This also holds, but to a lesser extent, for the UK and Finland. In the rest of the EUSC a lower share of the SPS will go to non-farming landowners either because land renting is less important and/or because the capitalisation of the SPS into land values is small. In these countries farmers appear to gain the largest share of SPS.

Effects on structural change

It is too early to observe significant impacts of the SPS on structural change in agriculture. Structural change is a long-term process. For this reason, it is too early to assess the developments observed in 1-2 years since implementation of the SPS. Furthermore, substantial other structural changes which were unrelated to SPS occurred in agriculture in the last few years. Still, the decoupling of subsidies with the introduction of the SPS was identified by most country studies as an important factor affecting structural changes in agriculture.

The SPS seems to constrain farm exit and increase part-time farming. Evidence from several countries, e.g. Belgium, Finland, Sweden and the UK, suggests that the SPS constrains farm exit. The SPS also appears to increase part-time farming. This effect appears to be stronger in marginal areas. Part-time farming allows farmers to reduce non-profitable farm activities, while benefiting from the SPS. No significant difference can be identified between the hybrid and historical SPS models.

The impact of the SPS on hired labour appears small. There is insufficient evidence to identify SPS effects on other agricultural labour developments.

The hybrid SPS model has stimulated (formal) farm entry, unlike the historical model, and creates uncertainty in the rental markets. This is because under the hybrid model, the allocation of entitlements is based on land use at the time of introduction of the SPS and not on land use in the reference period. We find some evidence that landowners have started farming in order to get access to the entitlements. The long-term net impact of these rent-seeking activities on farm structures is unclear. However it has affected the distribution of SPS rents and the market in entitlements in different ways than with the historical model where such activities did not occur.

The introduction of the SPS reduced farm credit constraints, in particular for short-term credit. An interesting, and potentially important, side-effect of the SPS is on rural credit markets. Several country studies (e.g. France, Germany, Italy and Spain) confirm that the SPS affects farms' access to the credits. If farms receive the subsidies at the beginning of the season, they can use the SPS directly to pay for inputs. If farms receive SPS payments at the end of the season, the SPS subsidies can be used as collateral for bank credits. Due to uncertainty about the future of the SPS, it appears that the SPS has no impact on long-term credit. Lenders are not willing to provide longer-term loans by accepting future SPS payments as collateral.

Effects of changes in the SPS models on land values

None of the EUSC has implemented a pure regional model. Most of the EUSC have implemented the historical model and some have implemented the dynamic hybrid model which will gradually be replaced by the regional model.

The key characteristic of the regional model is that it equalises the face value of all entitlements. The effect of the shift to the regional model will be determined by three key features: (i) whether new entitlements will be allocated; (ii) the redistribution of subsidies between regions; and (iii) how landowners are treated with respect to access to the entitlements.

The regional model may lead to changes in the relative land prices between regions. The regional model redistributes subsidies between regions, which is expected to lead to higher prices in less productive regions and lower prices in more productive regions.

The effect is expected to be stronger in those regions that currently implement the historical model. Under the hybrid model a share of the payments were already redistributed.

Implementation details of the regional model will largely determine whether the shift to the regional model will increase the capitalisation of the SPS compared to the current SPS models. Among other things, this will depend on whether the number of entitlements will increase or will stay at the current level, and to what extent non-farming landowners' access to entitlements will be regulated and enforced.

However, if the size of the total allocated entitlements will not be affected by the policy changes, the upward pressure on land prices will continue to be stronger in those countries that currently implement the hybrid model.

Frictions between farmers and landowners are expected to increase with the shift to the regional model. The key factors that will determine the frictions are to what extent the access to entitlements of non-farming landowners is regulated and enforced, and to what extent the number of newly allocated entitlements (if any) depend on the current or past land use.

The change in models may have an impact on uncertainty and transparency of the entitlement market. If the shift to the regional model creates uncertainty among farmers it will constrain entitlement markets and may induce stronger land capitalisation. On the other hand, the shift to the regional model may increase the transparency on the entitlement market, as all entitlements will have the same face value.

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Submitted to the European Commission

Directorate-General for Agriculture and Rural Development

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1. INTRODUCTION

The establishment of the Single Payment Scheme (SPS), providing decoupled support to farmers, was the central element of the 2003 reform. The Member States of EU-15 had to implement the SPS by 2007, with some flexibility concerning the model of implementation.

Member States could opt to apply payment entitlements based on historical individual reference amounts (the "historical model"), payment entitlements calculated as averages of historical reference amounts of the region concerned (the "regional model") or a mix of the two approaches, either static or dynamic (the "hybrid model").

Economic theory, as well as empirical findings, suggests that the way in which agricultural support is provided has an influence on land markets, because payments capitalise to some degree into land values, affecting both the purchase and rental prices of land. This would have also side effects on the transfer efficiency of support, structural change, etc. Therefore, the study will investigate whether and to which degree the different ways of implementation of the SPS have led to a capitalisation in land values.

However, the type of agricultural support is not the only factor influencing land markets: Profitability of production, user competition (driven by environmental concerns and demographic changes), ownership and production structures and not least the institutional setting of land markets are among other factors that need to be taken into account when analysing land markets. Many of these conditions differ strongly between and within the EU Member States**.**

To guide the empirical analysis, the empirical and theoretical **literature** in this field was analysed in detail and a **theoretical framework** was developed on the impact of direct payments and SPS on land market values under different conditions. The insights from these review and theoretical exercises are used in the interpretation of the empirical findings in this report. The detailed literature review and the extensive theoretical framework are contained in the appendix to the main report.

The empirical analysis in this study is based on a combination of **data** sources. In particular, we combine insights from comparative data analysis based on data from Eurostat and the Farm Accountancy Data Network (FADN) with data analysis and information collected in a series of country studies and (sub-country) regional studies. More specifically, as part of the overall study, **11 country studies** and **18 regional studies** in total were conducted. An important criterion in the selection of countries and regions is the coverage of different implementation models of the SPS. The countries covered are Belgium (Flanders, Wallonia) Finland, France (Centre, Bretagne) Germany (Weser Ems in Lower Saxony; Sächsisches Lößgebiet "Saxonian Loess Area" in Saxony; South East Upper Bavaria in Bavaria), Greece, Ireland, Italy (Emilia Romagna; Puglia), the Netherlands, Spain (Andalusia; Aragon), Sweden, the UK (England; Northern Ireland; Scotland)

The results presented in this report are subject to certain **analytical limitations**. First, data on land values and transactions are scarce for the period when the SPS was implemented. The rather short time span since the implementation of the SPS, combined with the varying quality of the available data, prevents econometric analyses. Second, although we have systematically verified our data sources and our findings draw on several sources of information, the qualitative analysis in the present study does not allow us to assess confidence intervals nor does it allow us to perform sensitivity analysis or check the statistical robustness of the results presented. Third, land regulations and long-term contracts may delay the capitalisation of the SPS into land values beyond what can currently be observed in data. Fourth, global food markets have experienced major changes over the past two or three years, which complicate the identification of the SPS impact on agricultural land markets. For these reasons the results in this report should be interpreted keeping these limitations in mind.

Despite these limitations, the report presents some interesting **hypotheses** and **preliminary evidence** on land market developments in the EU and the effects of the SPS.

2. CONCEPTUAL FRAMEWORK

Since the main focus of the study is to examine what has happened to land markets since the introduction of the SPS, we need to understand the impact of policies generally before and after the introduction of the SPS. For this reason we look at effects of both coupled and decoupled subsidies.

2.1. The basic model

2.1.1. Coupled subsidies

For reasons of exposition, we start with a simple model of the agricultural sector, in which we consider two factors used to produce one agricultural good $Q = f(A,K)$. Land (*A*) and the composite of labour and capital (*K*) are combined in a constant return to scale production function. Output market clearing and input market clearing conditions determine the output and input prices. We begin with the assumption of constant elasticities of factor supply and the elasticity of demand.

The capitalisation of agricultural support payments into land values depends largely on the land supply, input substitution elasticities and whether subsidies are linked to land or not (for more details see appendix 2). The more inelastic land supply, the more subsidies are capitalised into land values. Everything else equal, subsidies linked to land (area payments) are more capitalised into land values than other coupled subsidies (Floyd 1965; Gardner 1983; and Alston and James, 2002).

If land supply is fixed then area payments are fully capitalised into land value. Coupled production subsidies are fully capitalised into land value if additionally to zero land supply elasticity either the supply elasticity of other inputs is perfectly elastic or if factor proportions are fixed. In other situations the benefits from coupled subsidies are shared between land and other production factors. If demand elasticity is not perfectly elastic, then consumers benefit as well from coupled subsidies. Theoretically, the agricultural policy's impact on land values may be very large (e.g. fully capturing the subsidies).

In empirical studies the land supply elasticity is usually found to be rather low, mostly due to natural constrains. For example, based on an extensive literature review Salhofer (2001) concludes that a plausible range of land supply elasticity for the EU is between 0.1 and 0.4. Similarly, Abler (2001) finds a plausible range between 0.2 and 0.6 for the US, Canada and Mexico.

Input substitution elasticities are a further crucial factor determining the distributional consequences of agricultural policies.[1] With area payments farms have an incentive to

[1] Substitution elasticity measures how easy it is to substitute one input for other in the farm production function.

substitute other inputs for land, which increases land demand and leads to capitalisation of subsidies into land values. A high elasticity of substitution between land and other inputs will induce a high impact of an area subsidy on land value, as high elasticity of substitution indicates strong substitutability between land and other farm inputs in the production process. Subsidies which are not targeted at land have the opposite effect. A high elasticity of substitution between land and other farm inputs reduces the impact of these subsidies on land value (Floyd 1965; Gardner 1983; and Alston and James 2002). Based on 32 studies, Salhofer (2001) reports average elasticities of substitution between land and labour of 0.5, between land and capital of 0.2, and between land and variable inputs of 1.4 for Europe. Similar values are reported in Abler (2001) for the US and Canada.

2.1.2. Decoupled subsidies

The capitalisation of decoupled subsidies depends on the nature of implementation, i.e. whether decoupled subsidies are decoupled from sectoral choice, from land or from both.

The SPS is decoupled from production but land is needed to be able to activate SPS entitlements. Capitalisation of the SPS into land values depends on the number of entitlements distributed to farmers relative to the total eligible area (Ciaian and Swinnen, 2008; Courleux, Guyomard, Levert, and Piet, 2008; Kilian and Salhofer, 2008).

If the number of entitlements is larger than the total eligible area, then the SPS is capitalised into land values. With fixed land supply, the SPS is fully capitalised into land values. Otherwise the capitalisation of the SPS is partial and it decreases as land supply elasticity increases. The capitalisation of the SPS also depends on the implemented SPS model.

However, if the number of entitlements is smaller than the total eligible area then the SPS is not capitalised into land values. The SPS benefits accrue to farmers. This result is general, it does not depend on the size of the land supply elasticity and the SPS model (for more details see appendix 3).

2.2. Insights from empirical studies

The empirical attempts to estimate the impact of agricultural support policies on land rents and land prices can be regrouped into two broad categories: land value/price studies and land rent studies. Whereas the former study policy impacts on farmland prices, the latter investigate the policy impact on the farmland rental rates. The main reason why authors use one approach instead of the other, is usually determined by the data: the availability of either land value (typically from regional datasets) or rental data (typically from farm-level surveys) generally determines the choice of the models.

It is important to point out that virtually all of the existing studies relate to North America (the US and Canada). To our knowledge, only three cover EU countries (Trail, 1980; Goodwin and Ortalo-Magné, 1992; Duvivier, Gaspart and de Frahan, 2005). Moreover, none of these measures the impact of the SPS (see Table 2).[2]

In comparison with the hypotheses of theoretical models, several conclusions follow from the empirical studies (for more details see appendix 2).

First, coupled agricultural support policies do increase land rents and land prices, albeit less than theory predicts. Land rents/prices do not appear to capture the full value of coupled subsidies, at least in the short to medium run, but they do capture a substantive share of subsidy payments (most studies report 20-80%). The reviewed literature on land value and land rental rate determination suggest that land prices and land rental rates are determined by a large number of factors, such as policy support, land use alternatives, competition on the land market, inflation etc., which may explain these discrepancies between theory and empirical evidence.

Second, decoupled policy payments do affect land rents and land prices.[3] One way to interpret these results is that in the real world there are no truly decoupled subsidies. All decoupled subsidies applied in the EU or the US impose certain restriction on farms or are accompanied by other measures[4]. Therefore, it is rather difficult to compare the empirically estimated impact of decoupled and coupled policies. Perhaps, the subsidy that most closely resembles the decoupled subsidy definition is the Production Flexibility Contract (PFC) Payments introduced in 1996 by the Federal Agricultural Improvement and Reform (FAIR) Act in the US. The act decoupled subsidies from contemporaneous production and removed all planting restrictions, including set-aside requirements. With the exception of certain fruits and vegetables, producers were given complete planting flexibility, while they still received subsidies based on their 1985 program yield and their 1995 acreage base.[5]

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[2] The large majority of empirical studies performed to date have estimated the present value of land as a function of government payments and other explanatory variables. The main reason for the relative dominance of land price studies is given by the data availability - usually regional data is more broadly available (typically used in land price studies) than farm-level data (typically used in land rent studies).

[3] The theoretical decoupled subsidy literature shows that fully decoupled agricultural support polices have no effect on land value, if markets are competitive and transaction costs are not prohibitive. It also shows that decoupled polices may affect land value only in the presence of some market imperfections.

[4] For example, in the case of the SPS, the payments have to be activated with land. In order to receive the decoupled subsidies, farmers must have a corresponding amount of land at their disposal. Hence, the total subsidies a farm can receive are constrained by the amount of subsidies received and land used in the reference period. However, the SPS is not conditional on cultivating the land. Thus, the SPS is still connected to land in some way although it is decoupled from contemporaneous production.

[5] Additionally to PFC payments, Marketing Loss Assistance (MLA) Payments are decoupled in US. MLA were introduced as part of “emergency assistance” provided to US agriculture in 1999. As part of an appropriations act signed into law in October 1998, $ 2.857 billion in additional payments were made to farmers to compensate them for the loss of markets for 1998 crops. Subsequent acts provided additional MLA payments of $ 5.5 billion for 1999 crops, $ 5.465 billion for 2000 crops, and $ 4.6 billion for 2001 crops.5 For the crops eligible for PFC payments, the MLA payments were proportional to the PFC payments made in that year, with a maximum payment per person of $ 19 888. Hence, the MLA

Third, landowners benefit from all support programs, both coupled and decoupled. All reviewed studies find that one additional unit of payment results in an increase of less than one land price unit. While these findings are not surprising in relation to decoupled subsidies, most of the empirical literature relates to coupled subsidies that would be expected to have most (if not all) of their final incidence on land. However, the reviewed studies have found a surprisingly small share of coupled subsidy benefits going to landowners.

Fourth, the difference between the estimated impact of coupled and decoupled subsidies is not statistically significant. Comparing the empirical results from different studies, we find evidence that coupled payments do not have a significantly different impact on land value from decoupled payments. For example Duvivier et al, 2005 find that the elasticity of Belgian land value with respect to partially coupled support (compensatory payments) is between 0.12 and 0.47. Kirwan (2005) estimates that the marginal effect of all government subsidies in the US on farmland rental rates is between 0.2 and 0.4. In contrast, Taylor and Brester (2005) find that the elasticity of land value with respect to market price support is between 0.16 and 0.32.

There are only a few studies, which compare how the subsidy capitalisation differs between decoupled and coupled subsidies (Goodwin et al., 2003; Lence and Mishra (2003). Goodwin et al. (2003) finds that, as predicted by the theory, coupled subsidies (LDP)[6] have a higher impact on land value than decoupled subsidies (PFC). The estimated marginal effect on land value is 6.6 for LDP and 4.9 for PFC. In contrast, the results of Lence and Mishra (2003) suggest that decoupled payments (PFC and MLA) have a stronger impact on rents than coupled subsidies (LDP). Moreover the coupled subsidies are found to decrease rents. These estimates suggest that rents increase by around 85 cents for each dollar paid per hectare under the PFC and MLA. In the case of LDP land rent is estimated to decrease by around 24 cents per each subsidy dollar.

2.3. SPS implementation and implications

From the previous analysis we can conclude that the "decoupled subsidies" may still have an important impact on land values and that the implementation details of the policy matter importantly in this respect.

Therefore we now discuss some of the SPS implementation details and we present a series of hypotheses on how these may affect the impact on EU land markets. Note that

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payments can be viewed to be supplementary or "top-up" PFC payments (OECD 2005). MLA payments have sometimes been referred to as "double AMTA" payments (Goodwin and Mishra 2002).

[6] The Federal Agriculture Improvement and Reform Act of 1996 (the 1996 FAIR Act) initiated a non-recourse marketing assistance loans and loan deficiency payments (LDP) program for 16 crops, including corn and soybeans. The purpose of this program was to provide producers a financial tool to help farmers market their crops throughout the year. The non-recourse loans allow farmers to store production and sell it when market conditions are favourable. The crop is employed as collateral for the loan. The loans are non-recourse in that the farmer has the option of repaying the loan by delivering the crop to the Commodity Credit Corporation at loan maturity.

the arguments in this section are based on the theoretical analysis only. In the following sections the theoretical hypothesis derived here will be compared to empirical evidence from selected MS.

2.3.1. Historical versus regional model

The regional model is expected to lead to stronger capitalisation than the historical model because, for a given land base, under the regional model more entitlements are allocated than under the historical model. Similar result holds for the hybrid model because the allocation of entitlements is based on the same principles as under the regional model.

At the same time, even if under both models (historical and regional) the number of entitlements exceeds the eligible area, the regional model still leads to stronger capitalisation of the SPS into land values than the historical model. This is because under the historical model the entitlement value differs between farms, which induces partial capitalisation of the SPS into land values as farms with low value entitlements cannot bid land values higher than their value of entitlement. Farms with higher value of entitlements benefit partially from the SPS. This is because when farms own more entitlements than the eligible area, they want to acquire additional land in order to be able to activate all entitlements. This increases competition for land and exerts upward pressure on land prices. However, farms with higher value entitlements do not have to fully use the value of entitlements to out compete farms with lower value entitlements. On the other hand, farms with lower value entitlements must fully use their entitlement value to maintain the amount of land or to minimise the land use losses. Hence, farms with a higher value of entitlements partially use the value of entitlements to compete for land, and hence benefit partially from the SPS. In contrast, the farms with lower value entitlements need to use the full value of entitlements in competing for land and thus do not benefit from SPS.

2.3.2. Entitlement tradability

Tradability matters under some conditions. If the eligible area is larger than the total number of entitlements, then with full tradability of entitlements there is no capitalisation of the SPS into land values. The less tradable entitlements are, the more capitalised the SPS becomes in land values. Low tradability of entitlements reduces the incentive of potential farmers to sell entitlements if they wish to do so because they cannot obtain the desired entitlement price. With low tradability, these farmers prefer to keep their entitlements and to use them to compete for land which exerts an upward pressure on land prices. If the eligible area is smaller than the total number of entitlements, the stronger is the capitalisation of the SPS into land values, the lower is market price for entitlements. With full capitalisation of the SPS, the market price for entitlements is zero.

2.3.3. New entrants' eligibility for entitlements

The capitalisation of the SPS depends on the level of new farm access to entitlements. The more eligible new farm are for entitlements, the stronger is the capitalisation of the

SPS into land values. If the newly entering farms are eligible for the SPS entitlements from the national reserve, then the SPS will be capitalised in land values. The eligibility of new farms for entitlements increases the competition for land. The capitalisation of the SPS into land values also depends on the value of entitlement of new farms relative to the value of pre-existing entitlements.

2.3.4. Conditional SPS payments

Depending on the nature of the conditions, farm gains from the SPS may be reduced. If the additional requirements imposed by the SPS were not present before implementation of the SPS and are not required for non-participating farms, then net benefits from the SPS may be squeezed by the implementation costs of the additional requirements. Conditional SPS payments may reduce farm benefits from the SPS, depending on the nature of the conditions, but they do not affect land capitalisation (which is equal to zero).

2.4. Static versus dynamic effects

The impact of the SPS is different in the short-run (static) relative to the long-run (dynamic) perspective (see appendix 3 for details).

Structural changes are likely to be stronger in the long-run than in the short-run. Structural changes may be a result of, for example, technological, institutional innovations, or vertical coordination. In the presence of imperfect rural credit markets the SPS itself may reduce farms' credit constraints and thereby have an impact on land markets (see Ciaian and Swinnen 2007). In combination with structural changes the SPS may be capitalised into land values and may affects restructuring of the agricultural sector. This however is conditional on whether entitlements are tradable or not.

At the same time, structural changes will induce trade of entitlements. Entitlement trade will be driven by the reallocation of land among farms. If the reallocated land was used to activate entitlements then an equivalent number of entitlements will be traded. However trade in entitlements will depend on the development of the entitlement market and entitlement trade restrictions.

In the short-run the SPS will likely have a limited impact on land markets and capitalisation of the SPS into land values because structural changes are expected to be small. This is the focus of the current study, as there are relatively few observations available since the implementation of the SPS.

However, there is a difference between the historical model and the regional (or hybrid) model. Depending on the country the SPS was implemented between 2005 and 2007, whereas the allocation of entitlements with historical SPS model was based on the eligible area farms operated in the reference period 2000-2002. Under the regional (or hybrid) model the allocation of entitlements was based on the total eligible area in the first year of the SPS application. As a result, if structural changes occurred between the period 2000-2002 and 2005-2007, then in the short-run one would expect a stronger impact of SPS on land markets with the historical model than with the regional (hybrid) model.

In the long-run the SPS will have a stronger impact on land markets under all three SPS implementation models. In combination with structural changes the SPS may be capitalised into land values and may affect the restructuring of the agricultural sector. The level of the capitalisation of the SPS and the impact on restructuring depends on the tradability of entitlements. The lower the tradability of entitlements, the more the SPS will be capitalised into land values and the more it will constrain restructuring. Historical and hybrid models may or may not have stronger effect on capitalisation and restructuring than the regional model.

2.5. Empirical considerations for measuring the impact of SPS

The appropriate empirical methodology obviously depends also on whether land rent or land price data, and whether regional or farm-level data are available.

From the statistical perspective, the most valuable data would be farm-specific time series. However, recognising the poor quality of the available policy and land market data as well as the current project constraints, it was impossible to collect a full range of data required for a formal econometric analysis within the present study.

Therefore, a more pragmatic approach, which allows us to combine both qualitative and quantitative information, is applied in the empirical analysis of the present study. For example, where the required statistical data is not available, the analysis draws on qualitative data (for more details see appendix 4 and 5).

At the same time, to measure the impact of the SPS on land values, one must identify all the drivers of land values. By ignoring other drivers the effect of SPS would be underestimated or overestimated, depending on the driver and the change of the driver. Therefore, we identify other key drivers of land values in the rest of this section (for more details see appendix 2).

Prices and agricultural productivity

Agricultural commodity prices, productivity and input prices are expected to strongly affect land values. Agricultural income is the main source of return from agricultural land. In competitive markets the price of agricultural land is determined by the amount of agricultural income which the land can generate.

In the last few years, agricultural commodity prices increased significantly. This development coincided with the introduction of the SPS, which complicates the identification of the pure SPS impact on land values.

Land use alternatives

Usually, land can be used not only in agriculture but also in other sectors of the economy. If there is such an opportunity, land value will reflect this potential alternative land use. In a competitive market land value reflects returns from the most profitable use of land. If the most profitable use of land is outside of agricultural (e.g. urban housing), then land value will be determined by the profitability of the urban housing sector. Similarly, if the non-agricultural use of land is expected to become the most profitable in the future then the current land price will reflect the sum of the discounted stream of rents from agriculture up to the time of conversion plus the discounted stream of expected rents from non-agricultural use from that time onward (Plantinga et al. 2002).

Market imperfections and transactions costs

In the presence of market imperfections, the realised policy impact might be different than predicted by theoretical models with perfect competition. Indeed, several studies find that decoupled payments affect farm behaviour in the presence of market imperfections differently than with perfect competition (e.g. Chau and de Gorter 2005; de Gorter 2007; Hennessy 1998).

Generally, land transaction costs related to land withdrawal from corporate farms in transition countries do not affect the general result that area payments increase land rents and benefit landowners instead of farmers (Ciaian and Swinnen 2006). However, transaction costs depress land prices both with and without area payments. Transaction costs and area payments have the opposite effect on land rents. Transaction costs reduce land rents, while area payments are capitalised into land rents. If the two effects are equally strong then they cancel each other out.

Also credit market imperfections may have important implications for the distribution of area payments (Ciaian and Swinnen 2007). In a model with land as a fixed factor and credit market imperfections, area payments increase land rents by more than subsidies. On aggregate, farms may actually loose rather than benefit from the subsidy. Only the most credit constrained farms will gain from the subsidy.

Land market institutions and regulations

The effect of subsidies on land value in competitive markets can be affected also by land market regulations. The most obvious regulation that will affect the land market is land price regulation by the government (e.g. fixed) and/or when long term rental contracts predominate (Latruffe and Le Mouël 2006). With fixed land prices and long term rental contracts, one will not observe capitalisation of subsidies into land values, at least not in the short-run.

Various formal and informal land market institutions will also affect the subsidy-land value relationship. For example, if a rent agreement is a pure ‘cash’ rent agreement, then the farm programme payments must go entirely to the farm operator; the landowner is not eligible to receive any payments. Otherwise, under a share rental arrangement, the same subsidy payments may have to be divided between the landowner and the tenant. With crop-sharing contracts the issue is more complicated if subsidies have to be shared in proportion to crop shares. If the terms of such leases are not adjusted, the landowner will not reap the full benefits. Thus, if subsidy payments increase unexpectedly in the presence of pre-existing leases, tenants holding cash rental arrangement will capture a significant share of the benefit from subsidies, whereas tenants holding share rental arrangement will share the benefits with their landowners.

Obviously, these regulations govern only the initial distribution of subsidy payments between landowners and tenants, which usually is different from the final incidence after markets have adjusted to the new equilibrium with subsidies. Other things equal, one would expect that the rates of cash rent would adjust to equivalence with the corresponding share rental rate, reflecting the subsidies and other determinants of income.

Social capital

Farmers are working and living not only in economic but also in a social and cultural system. Therefore, the actual actions of a farmer on markets are influenced by the intensity and kind of social relation of the parties involved in a transaction and by the societal norms and cultural context (Robinson and Flora, 2003). Studies for the US show that social capital is a pivotal factor for the land market influencing the type of transactions (e.g. Rainey et al., 2005), the price of the land (Robinson et al, 2002) and the partners involved in the transaction (Siles et al., 2000). Thus, the extent to which subsidies are incorporated into farmland values and therefore transferred from the farmer to the land owner depends also on the respective local cultural and social setting.

In many regions transactions of land occur mainly between relatives or friendly neighbours (Siles et al., 2000). This group receives a rebate on the land price ranging from 10% (Robinson et al., 2002) to 43% (Tsoodle et al., 2006) compared to total strangers. According to Tsoodle et al. (2006) the influence of social capital has increased over the last years. With respect to renting contracts social capital influences the form of the contract while the rental price is inversely correlated to the duration of the relation between land owner and tenant (Rainey et al, 2005).

Time scale and dynamics

The impact of both coupled and decoupled policies varies over time. For example, formal and informal land rental contracts imply that the transmission of changes in policy into rental prices and asset prices for land is not instantaneous. Sluggish adjustment of rental rates implies that the short- and intermediate-run incidence of policies will be different from the long-run outcome with complete adjustment. Moreover, even without contracting, land markets involve lags and dynamics, uncertainty and expectations. For example, rental arrangements are typically multiyear in their nature and often reflect long-term personal relationships, sometimes among members of the same family. Competitive pressures might not take full and immediate effect in such a setting (Gardner 2002).

Further, data on land rents and land value are often based on expert assessments rather than direct evidence from market transactions. These assessments are likely to understate the true movements in rental prices associated with year-to-year variations in income received from the market or from the transfers. Because contracts are established well in advance of market outcomes, they do not precisely correspond to the observed outcomes. For instance, land rents are set ex ante whereas subsidy payments can only be observed ex post.

All these factors imply that short-term movements in rental prices will be different (lower) from the long-term impact of permanent changes in subsidies.

Expectations about future policies

The capitalisation of subsidies into land values depends also on expectations about the future continuation of subsidies. If market participants do not expect that polices will continue in the future then the subsidy capitalisation into land values is limited. Full capitalisation of subsidies occurs only when the expectation of the market participants about the continuation of the policy is the same as the true duration of subsidies.

Another reason why decoupled subsidies may have different impacts on farm behaviour and particularly on land markets and land capitalisation of subsidies than theory predicts, is because future subsidies may be dependent on current farm decisions. Because future policies may be based on current production levels, farmers may take this factor into consideration, hence reacting differently to policies than expected (OECD, 2001).

2.6. Summary: Key hypotheses on the impact of CAP reform (move to SPS) on subsidy capitalisation into land values in the EU

The CAP reform mostly represents a shift from area payments and animal payments to the SPS. Hence, both coupled and decoupled payments need to be considered. The following hypotheses follow from the analysis and discussion in this section.

1. The impact of the pre-reform (before the shift to the SPS) CAP subsidies on land values depends on whether the payment concerned is related to area or to animals. Area based payments are partially capitalised in land values and it appears that they have a stronger impact on land values than animal based payments.

2. The impact of the SPS depends on the ratio between the eligible area and the total number of entitlements. If the number of entitlements is larger than the total eligible area then the SPS is capitalised into land values.

3. The regional (and hybrid) model is expected to lead to stronger capitalisation than the historical model because, for a given land base, under the regional model more entitlements are allocated under the regional model than under the historical model.

4. A shift from the coupled subsidy system to the SPS should reduce land values in the short-run. In the long run the effect on land values depends on the tradability of entitlements but one should expect lower capitalisation with the SPS than with the previous subsidy system.

5. If the SPS is capitalised into land values, then the effect of the SPS is expected to be greater for less fertile land. This is because previous subsidy system had a lesser affect on the price of less fertile land as the level of subsidies was linked to the productivity and hence less fertile land received less in subsidies. Under the SPS, less fertile land can be used to activate entitlements. At the same time, agricultural and non-agricultural drivers of land values are less important for less fertile land. This allows easier identification of the SPS impact on the value of less fertile land than on the value of more fertile land.

6. If the SPS gets capitalised in land values then the SPS may lead to changes in relative land prices for different land types and regional and hybrid models may also change the relative prices of land between regions. The first effect is due to the fact that the SPS entitlement can be activated on various land types hence the effect of the SPS is expected to be uniform over all eligible land. The second effect is due to the fact that regional and hybrid models may lead to a redistribution of subsidies between regions hence the SPS will increase land values in regions which obtain more subsides with SPS relative to the previous subsidy system.

7. The fallow land maintained under no or low agricultural management with the previous subsidy system could be re-cultivated or it could be brought into use respecting the GAEC with the SPS introduction if the pervious maintenance did not respect these conditions. Under the SPS, all land used by farm must be kept in GAEC in order to be entitled to the full amount of the SPS payment. The effect may be stronger under the regional and hybrid models than under the historical SPS model. This effect occurs only in the case when SPS stimulates land transactions (rental or land acquisition) and when it induces farmers to use for activation of entitlements fallow land previously not used in farming. Regional and hybrid models are expected to stronger stimulate land transactions than the historical model.

8. The decoupling which accompanied the introduction of the SPS may lead to structural changes in agriculture particularly in terms of production structure and input reallocation including land. These structural changes induced by decoupling may lead to land capitalisation of SPS in land values. However, the capitalisation of SPS into land values is conditional on the extent to which the entitlements are tradable.

9. At the same time, the decoupling per se may lead to higher land prices. Decoupling subsidies from production allows farms to better respond to market signals by e.g. adjusting farm production structure, which may increase farm profitability. Higher farm profits would increase competition for land and lead to higher land prices. This effect is independent of the SPS payments.

10. The SPS may facilitate an easier intergenerational transfer of land than the previous subsidy system. Under the decoupled SPS, the entitlements are not attached to specific land which allow exiting aged farmers to sell entitlements (if entitlements are tradable) or transfer benefit from the SPS through informal, within family, transactions, thus allowing older farmers to benefit from the SPS even when they have exited farming, while the successor farmers gain access to land. The previous subsidy system,

which was linked to certain farm activities, required farming to benefit from subsidies. Under the previous subsidy system the farmer lost all subsidy benefits, when he left agriculture. However, this depends to what extent the pervious subsidy system was capitalised in land values and to what extent framers are also landowners.

11. However, if the SPS is capitalised into land values, while at the same time new entrants or expanding farms do not obtain entitlements, then their access to land is constrained by the higher land price. Under the previous subsidy system farms received subsidies if the farm was involved in agricultural production. Under the SPS farmers receive subsidies only if the farm owns entitlements. On the other hand, if the SPS is not capitalised into land values then the new entrants or expanding farms who do not obtain entitlements are not constrained in having access to land.

3. DATA SOURCES

In order to study the policy impact on agricultural land values, two types of data can be used: farm-level micro data and regional or country level macro data. Farm-specific time series is the most preferred type of data, as the problem of unobserved heterogeneity is minimised. However, undoubtedly, farm-specific time series are among the least available data in the EUSC. Hence, this type of data is not available for the present study.

Alternatively, the policy impact on farmland rental rate and farmland price could be studied either using aggregate time-series data (where the unit of analysis is a region or a country) or disaggregated cross-sectional data (where the unit of analysis is a farm). Although, both types of data involve more statistical problems compared to farm-specific time series, these data are more widely available for countries of the present study. Therefore, we base the empirical analysis of the present study on time-series macro data country level and for selected regions.

The main source of data for the present study is Eurostat. Unfortunately, even at the aggregate level the available Eurostat data is not without gaps. Three types of the data paucity are particularly evident for the countries in our sample: (i) practically no data are available for the two most recent years after the SPS implementation (2006 and 2007); (ii) rental data are only partially covered in Eurostat; (iii) land transaction data (both purchase and rental market) is not recorded at all by Eurostat.

In order to deal with the issues of missing data, in the present study we complement the Eurostat data with four additional sources: FADN, European Commission DG AGRI, national statistics and national survey data.

3.1. Eurostat

The Eurostat data provide time series for two key variables: land values and macroeconomic data. Land values are extracted from the Eurostat website Theme: Agriculture and fisheries, Table: APRI_AP_ALAND *Land prices and rents - annual data*. The Eurostat series *Land prices and rents - annual data* provide data on agricultural land prices and rents for each year since 1973 for all EUSC.[7]

Data on agricultural land prices in most Member States come ultimately from administrative sources, having been recorded by the land registration or tax authorities. The amount of editing, adjustment and correction of the basic sales records varies from country to country, as in some countries the average purchase price is covered in national statistics, whereas in others the market value of land is estimated.

[7] Part of this data is available from the DG AGRI annual report "The Agricultural Situation in the European Union".

Data on agricultural land rents are collected in most countries by means of special surveys. The level of agricultural rents is of interest as an indicator of the return to land. Renting, which takes place in a different legal framework in each country, permits a flexible and thus a more productive use of land.

In addition to the land value data, we also use Eurostat for extracting macro data, which is necessary for the right hand side explanatory variables. All key macroeconomic indicators, such as interest rate, inflation, GDP and growth are extracted from the Eurostat publication Europe in figures - Eurostat yearbook 2008.

3.2. DG AGRI

The second important source of information is European Commission, DG AGRI. From the DG AGRI, Unit G.1 - Agricultural Policy Analysis and Perspectives we received policy data on the SPS implementation as well as data on related policy measures, such as coupled agricultural policies, environmental and rural development policies.

The DG AGRI Unit G.1 also provided data for the general and basic information and key agricultural indicators. Among other variables, the provided data contains information for the EUSC of market value of agricultural land (parcels); rents for agricultural land; and main crops in each EUSC. The data provided by the European Commission DG AGRI covers the period 1995 – 2006. Although, the geographic coverage of Member States is different between years, all countries included in our study are covered for the full period.

3.3. National statistics

The third major source of information came from national statistical offices. The national statistical sources complement the European data at a more detailed scale and in many occasions provides information for the missing times series. In addition, data from national and regional statistical offices, national land registries and national tax authorities was used to obtained detailed information on land market regulations.

In **Belgium** the basic land price information concerning all land transactions are collected through a particular standardised form from the purchases to the "Dienst van de Registratie". These forms are then transferred to the "Nationaal Instituut voor de Statistik", which published the land value information. Additional information is available on the type of land (arable and meadows) and region. The price for a type of land and region can be obtained through the division of the total value by the total area sold.

The rental price data collection is somewhat different from sale price data in Belgium. Every year, in or around December, some 400 agricultural correspondents report on agricultural rents in their respective sector.[8] The sectors belong to 27 designated areas, each of which is supervised by a State Agricultural Engineer. The latter verifies and, where necessary, corrects the data supplied by the correspondents before forwarding them to the National Statistical Institute. The unweighted arithmetical average of all recorded farm rents is deemed to be the average agricultural rent. The results are obtained at national and provincial levels and for each of Belgium's 13 agricultural districts.

In **Finland** the transfers of real estate are recorded by the "Kiinteistöjen kauppahintarekisteri" in a public register (The National Land Survey / The Ministry of Agriculture). This register forms the basis for information of agricultural land prices in Finland. The data includes the price, the area, the type (the agricultural/forest land), the region and the presence of buildings. On the basis of the register the National Land Survey calculates an average land price (median price) for purchases over 2 hectare of agriculture land. Whole farm sales - sales including both the land and the buildings - are excluded.

For rental prices, a small survey of agriculture land rents is conducted annually by the Finnish Agricultural Economics Research Institute. The data includes the total agricultural area of the farm, the rented area and the total rent. On the basis of this survey, the Agricultural Economics Research Institute annually calculates the average agricultural rent.

In **France** the market value for agricultural land is collected by the SAFER and the agricultural statistics services of the Département Directorates of Agriculture and Forestry.[9] In this report we use the information from the SAFER, according to which land prices are market-prices of all transactions of more than 0.5 ha (the yearly averages are calculated by excluding the 10% most and 10% least expensive transactions).

The values for rents per hectare are derived from irregular surveys conducted by the central statistical studies and surveys service of the French Ministry of Agriculture. The results of these surveys are updated annually on the basis of indicators.

In **Germany** the average land prices are calculated on the basis of the prices recorded for each individual transaction. The prices per transaction include, in addition to the monetary amount paid, the value of all the advantages contractually granted by the purchaser to the seller in relation to the land (the value of outstanding mortgages or the

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[8] Each sector comprises one or more of Belgium's 596 municipalities. The correspondent is required to base his returns on as many observations as possible of holdings of at least 1 hectare and on which crop or livestock farming is chiefly practised (chosen by himself).

[9] The methodology of the survey on market value of agricultural land in France takes account of indicators from various sources. The price recorded is the selling price, excluding taxes and legal expenses, but including the "under the table" (tax evasion) component. On the other hand the price does not include the "pas de porte" or "chapeau" or "droit de bail" (the sum which the purchaser gives to the local farmer or owner to cultivate the land).

value of any land given in part-exchange). In the case of regular payments (pensions, farm annuities, payments for right of occupation, etc.), their capital value is taken into account. The price data do not include any taxes, dues, etc. payable in respect of the area sold unless the purchaser has taken over the responsibility for paying any arrears of such payments. Ancillary costs such as land transfer duty, surveying costs, permit fees, estate agents' fees etc., are not included in the price data for these statistics.

The rental data for agricultural land is less detailed in Germany. The published farm rents are average values that are not differentiated according to the date of signing of the contract, length of lease, soil quality, area at land, use as arable land/pasture or similar price-determining criteria. They are not therefore used to calculate indices.

In addition to the FSO results, the Federal Ministry for Food, Agriculture and Forestry (BML) publishes average farm rents paid by full-time agricultural holdings. Results are for crop years and are compiled from data generated by the BML test farm network, which currently comprises around 11 200 agricultural and horticultural holdings (cf. Agricultural Report of the Federal Government, and the BML's "Statistical Yearbook").

In **Greece** agricultural land values are estimated based on all agricultural land not covered with trees or vineyards and which do not have a construction (urban) value. The procedure for calculating value per stremma (0.1 hectare) is as follows: the prefectures directorates of Agriculture, which are attached to the Ministry of Rural Development and Food, collect data on the land sold per category from the local Agricultural Development Offices. In the course of their duties, staff from the local offices (agronomists) go to the municipalities and rural districts and, as well as applying the agricultural policy programs, collect statistical information on all agricultural sector's economic parameters at regular intervals. These data are collected from sources such as the Agricultural Bank of Greece (from the loans it grants), cooperatives, experts, producers, etc. The information collected refers to the number of plots sold in stremma and the weighted mean value in drachma/EURO per category (1 drachma = 0.00293 EUR). These data are forwarded to the main offices of the Departemental Directorate of the Ministry of Rural Development and Food in the capital of the Department (Nomos) and are processed at this level, i.e. the weighted mean value in drachma/EURO per stremma and category is calculated using the number of plots (in stremma) sold and the average values in drachma/EURO from the local offices for agricultural development. These data, at the Department level, are sent to the Central Service of the Ministry of Rural Development and Food to obtain the results at country level, having been checked and processed by computer. The reference period is six months and the data processing is annual.

The rental prices for agricultural land are distinguished by the type of establishment suitable for certain cultivation and the area of the establishment, a farm-sample for the principal cultivations and from several areas of the country is being collected.

In **Ireland** the official series of land price statistics begins in 1990. For the earlier period, several unofficial series have been published. The official series from 1990 onwards are calculated by the Central Statistics Office on the basis of data received from the Revenue Commissioners.

The rental data for agricultural land is rather limited in Ireland, because much of thel renting of land in Ireland is on the 11-month "conacre" system, and thus falls outside the Community definition which specifies a minimum of 12 months.

In **Italy** the market value for agricultural land is based on surveys conducted by the National Institute of Agricultural Economics (INEA). The main results are published in the Yearbook of Italian Agriculture. The results of the annual surveys and updates of time series have also been published on INEA's website (www.inea.it/prog/mfondiario/mfondiario.html). There have been some major changes to the survey methodology since 1993, although the objective remains the same: to provide a detailed summary of changes in the market for land and estimates of land stocks.

The survey procedure entails identifying the average prices of agro-forestry land sold in the course of the year. This involves valuing the land by means of direct estimates, i.e. by comparing it with the most plausible market values. Where possible, an effort is made to eliminate the obvious impact of non-agricultural uses (especially in areas near urban centres). In order to simplify and harmonise the questionnaire as much as possible, with a view to enhancing their reliability, part of the values accounted for by land improvement (infrastructure) are stripped out, which means that the values surveyed relate exclusively to the land as such. In order to take account of the wide fluctuations to which land prices are susceptible, the average values are broken down into types of crop and fairly small areas. Hence, Italy is divided into 767 agricultural regions which are homogeneous in terms of their physical and productive characteristics. They can be grouped into inland mountain, coastal mountain, inland hill, coastal hill, and plain. The size of individual regions varies from a few hundred hectares on the plains to several thousand in certain mountain areas.

Agricultural rents in Italy are covered in the same survey as land prices. However, maximum and minimum rents per survey region are collected, not average rents. In the absence of reliable information on rented land by type of contract and type of crop, it is not possible to systematically survey average rents per "agricultural region". The annual survey is confined to the main trends in the market for rented land.

In the **Netherlands** the property and the transfers of property or real estate are recorded by the The Netherlands' Cadastre, Land Registry and Mapping Agency (called in short *Kadaster*) in a public register. All information on the transfers of agricultural land and the price of this land is directly derived from this registry. The data includes the price, the type (arable land, meadows and so on), the exact location, and information on the trading parties. This dataset is unique in its level of detail and its sheer size, as it encompasses the entire population of land sales.

Until 1995, all lease contracts were registered at the Dutch rental registries. In contrast to land sales, this information is not public in The Netherlands. We therefore had to use aggregated information provided by the Dutch Central Bureau of Statistics (CBS) and Eurostat.

Dutch legal rental prices are changed every three years. In general rental agreements also change every three years. When the agreement (mostly only the rental price) changes, data are passed from the "Grondkamer" to the CBS. As a new agreement mostly follows the termination of a former agreement and the duration of an agreement is as a rule a multiple of three years, every year on average 1/3 of the total rented area is recorded. This information is analysed to provide the weighted average rent prices for The Netherlands, provinces and agricultural regions.

In **Spain** the "theoretical sales value" in pesetas/EUR per hectare is estimated from the figures for actual transactions or from purchase/sales calculations, If the price has been influenced more or less fundamentally by special circumstances which prevent such a price from being taken as representative, in such cases estimates of the "theoretical sales value" are obtained from experts who know the special circumstances which may eventually have an effect.

The respondent provides the average or most frequent price, as well as a maximum and minimum.[10] For the entire national territory, the overall index and the indices broken down for non-irrigated/irrigated land and crops/grassland are compiled. The overall land value index, which reflects the general trend of the prices for agricultural land studied in the survey (the land included in the "effective" population and located within the geographical area concerned) is calculated for each of the Autonomous Communities. An appropriate weighting system is used for calculating these indices. The average agricultural land price in Spain is published by the MAPA Technical General Secretariat.

In **Sweden** the representivity of agricultural land prices is limited, as comparatively few sales of exclusively agricultural land are performed each year. Most sales of whole or parts of agricultural enterprises also include buildings and other kinds of land.

Estimates of agricultural land prices in Sweden are based on information, collected by Statistics Sweden, from most sales of whole or parts of agricultural enterprises and information from the taxation register for real estate. Similar to Finland, in the estimation of the land price, only sales of at least 2 hectares of land or sales with a taxation value of at least 1 000 SEK are included. Furthermore only such sales are included, which are considered to be representative for market values according to the law of estate taxation. This means that sales with community of interests or sales to near relatives or sales with values less than half or more than six times the taxation values are not used in the estimations. In recent years the estimations are based on 1 500 - 1

[10] The maximum and minimum may not be the absolute extremes for the area concerned, but rather the normal variation limits for the most common prices, and reflect the variations caused by differences in quality of land, size of properties, etc.

800 sales and 20 000 - 25 000 hectares of land, less than 1% of the total agricultural land in Sweden.

The estimates of average rents in Sweden are based on sample surveys with postal enquiries. In recent years about 600 farmers have been included in the samples, which are stratified. The questionnaires are designed so that it is possible to estimate the rented values of only the agricultural land, which means that rented values of dwelling houses or other buildings are not included in the estimates of agricultural rents.

In the **United Kingdom** the information on all land and property transactions is collected under authority of the Finance Act. In England, Wales and Northern Ireland this is done by means of a PD (particulars delivered) form which is returned by the purchasers' solicitors to the Inland Revenue. Land transfers in Scotland are recorded in the Register of Sasines and the particulars delivered, under the provisions of that Act passed by the Keeper of the Register to the Inland Revenue. A land price series for each region is derived from this information but the series differ slightly because of the different land transfer and recording procedures. The land sales data from information collected by the Valuation Office Agency (VOA) are supplied to the Department for Environment, Food and Rural Affairs (DEFRA) directly by the VOA.[11]

In England and Wales, data for periods from 1993 is not directly comparable with figures for earlier years. A major change in the post 1993 series is that sales are now analysed on the basis of the time period when the transactions actually took place. They should therefore more accurately reflect the position at a given time than the previous series, which collated data on the basis of the date on which figures were validated by the Inland Revenue. Both the new and previous series cover all sales of agricultural land of 5 ha and over except land sold for development or other non-agricultural purposes, gifts and inheritances. The new series also excludes some other transfers in order to come closer to estimates of market determined prices, but is not designed to represent exactly competitive open market values. It provides information on the number of transactions, area sold and average prices by area size group by type of property (land only or land with buildings) and by type of tenure (owner occupied or tenanted).

In Scotland the original source of land price information is the Valuation Office Agency.[12] The Scottish Government Agriculture and Rural Development Directorate receives the area, price and location of the sites transacted and the area office officials collect further information. The data is compiled to produce statistics on the total number of transactions, aggregate areas and average price per hectare for sales within the required categories. Please note however, that this data is based on the date of sale; defined as the date of completion of the deed transferring the property. Therefore, there are substantial time lags between this and the date when the information on the sale becomes available. Categories used for the land price series are all sales of more than 5

[11] https://statistics.defra.gov.uk/esg/asd/default.asp

[12] http://www.voa.gov.uk/

hectares with vacant possession and all sales of more than 5 hectares without vacant possession (for both equipped and unequipped farms).

Two sets of agricultural land price statistics are published in Northern Ireland. One shows the average price of all land sold and the other an index of the average land value, based on weighted sale prices for different size bands. The latter series removes the effect of price fluctuations caused by differing size band distributions of land sales between years. Both sets of statistics are published in the Department's annual publication "Statistical Review of Northern Ireland Agriculture".[13]

3.4. FADN

The fourth source of data is the Farm Accountancy Data Network (FADN). Although, as detailed below, the FADN data are subject to certain limitations compared to the Eurostat and the national statistics data, because of data paucity we have relied upon FADN data. In particular, the rental data coverage in the Eurostat and national statistics data is patchy. In contrast, the FADN data provides a complete set of internationally comparable agricultural survey data for all countries in our sample.

In the context of the present study three FADN series are of particular interest: Total UAA (SE025), Rented UAA (SE030) and Rent paid (SE375). The fourth variable - rent per ha has been constructed by dividing the total rent paid by the rented area (SE375/SE030).

In the context of the present study, the FADN data has two important features, which are conceptually different from the Eurostat data. The key advantages of the FADN data are representativeness (sample data is weighted according to the population they represent), the large sample size of the underlying farm-level data and the cross-country comparability of the data. First, the FADN sample size is huge compared to other farm surveys. For example, in 2005 it covered more than 50,000 farms in the eleven studied countries: 1209 in Belgium, 7046 in Germany, 886 in Finland, 7352 in France, 4125 in Greece, 1193 in Ireland, 14538 in Italy, 1450 in the Netherlands, 9024 in Spain, 933 in Sweden, 2936 in the United Kingdom. In addition, because exactly the same information is collected in different countries and exactly the same techniques are used to determine the validity, reliability, and statistical significance of the data, the FADN data is well comparable across countries.

The downside of the FADN data is that the lower bound on farm size to be included in the survey is rather high in the FADN. This has consequences to the number of farms and the area that the FADN data represent. For example, for the year 2005 the FADN data represented 43% of agricultural holdings and 92% of utilised agricultural area of the EU-25. Thus, by definition, the smallest farms, which also participate on the agricultural land market, are not as well represented in the FADN data. This suggests that the FADN is upward biased in terms of farm size. However, given that the smallest

[13] http://www.dardni.gov.uk/the-statistical-reveiw-of-northern-ireland-agriculture/

farms receive proportionally less CAP payments than other farms, the change in agricultural payment policy affects more big holdings than the small ones. Moreover, agricultural land is well represented in the FADN data and, hence, serves as a good basis for analysing the general functioning of agricultural land markets.

3.5. Interviews with local land market experts

Finally, given the paucity of statistical data for the period since the implementation of the SPS, the scarcely available statistical data was complemented with survey data obtained from national expert interviews. More precisely, a number of local experts are consulted in each country, real estate experts, land registry departments and state property departments, farm union representatives, lawyers, local government officials etc. In addition to the general assessment of land market development in the particular country, national expert interviews provide qualitative data for drivers of land sales prices, drivers of rental prices and the SPS implementation and its impact on land values.

Hence, the information presented relating to the functioning of land market in the EUSC is the result of weighting statistical data, which is precise but sometimes of limited significance, against "experts' opinions", which are often fragmented and imperfect. It must be borne in mind that the results presented, especially for the two most recent years and at the regional level, are very much merely an indication.

4. SOCIO-ECONOMIC STRUCTURE OF THE AGRICULTURAL SECTOR

4.1. Unemployment and GDP

If we look at some general economic indicators, we see that unemployment levels converged among EUSC in 2007, when compared to 2000. In 2007 the unemployment rate varied between around 3% in the Netherlands to around 9% in Germany, while in 2000 the variation was between 3% in the Netherlands and 14% in Spain. Several countries such as Finland, Greece, Italy and Spain where the unemployment rate was high in 2000, experienced a large decline in unemployment (larger than for EU-27) by 2007 as compared to 2000. On the other hand, in several countries unemployment increased (Belgium, Germany, Ireland, the Netherlands and Sweden) which is the opposite of the trend observed for the EU as a whole (Figure 9).

There is less variation in the change in GDP per capita over the period than in the case of the unemployment rates in the EUSC. GDP grew in most countries between 2000 and 2006 at similar rate to the whole EU. Only in Ireland, Spain and Greece was the growth rate significantly higher than the EU average (Figure 8).

4.2. Share of agriculture in employment and gross value added

The share of agriculture in total employment and in total gross value added of the economy in the EUSC decreased in the last decade (Figure 10 and

Figure 11). Stronger decreases were observed for agricultural gross value added than for agricultural employment.

All countries covered in this study, except for Greece, have lower share of agriculture in total employment than the EU-27 average at 6.2% in 2007. In France, the Netherlands, Sweden, Germany, Belgium, and the UK, agricultural labour as a proportion of total employment is also lower than the average for the EU-15, which was 3.5% in 2007. In Greece the share of agricultural employment is significantly higher compared to other countries. It was around 11% in 2007. At the same time, Greece experienced the largest decline in agricultural labour: from 17% in 2000 to 11% in 2007 (Figure 10).

Similar developments are observed for the share of gross value added of agriculture, hunting and fishing in total gross value added. In all the countries covered by this study the share of agriculture in gross value added was less than 4% in 2007 and in Ireland, Sweden, Belgium, Germany, and UK it was less than 2%. Compared to 2000, there was a considerable decrease of the relative share of agriculture in gross value added particularly in 2007 in Greece, Ireland, Belgium and Spain (

Figure 11).

4.3. Farm structure

The average size of farm varies significantly in EUSC. The largest farms are in UK (56 ha per holding in 2005) and the smallest in Greece (5 ha/holding). Also in Italy farms are small with an average size less than 10 hectares in 2005. In the rest of the countries studies, farm size varies between 20 and 50 hectares. There is an upward trend in farm size in most countries. These trends are driven by labour outflow from agriculture, increasing efficiency and rising opportunity costs of farmers. The only exception is the UK where farm size decreased from 68 hectares per holding in 1990 to 56 hectares in 2005 (Figure 12).

4.4. Agricultural output and labour productivity

The development of total agricultural output in the EUSC is shown in Figure 13. Production increased only slightly in the period between 1993 and 2007. The total output was up by around 4% in 2007 compared to the level in 1993. Up to 2004 output increased and thereafter output declined probably due to unfavourable weather conditions and falling prices for milk and dairy products in 2005 and 2006. With some exceptions this pattern is quite consistent among all countries though the size of the changes varies significantly among countries (Figure 14).

In contrast to agricultural output, labour productivity increased strongly in the EUSC (Figure 15). This was driven by a strong outflow of labour from agriculture. Agricultural labour output productivity had increased by around 42% by 2007 as compared to the level in 1993. The strongest increase occurred in Ireland, Finland, and Spain (more than 75%), while the lowest in Belgium and Greece (less than 20%). In the rest of the countries, labour output productivity increased between 30% and 45% (Figure 16).

4.5. Output and input prices

There has been a sharp increase in the output prices of key agricultural commodities in recent years. These price increases coincides with the SPS introduction. According to FAO (2008) world agricultural commodity prices rose sharply in 2006 and continued to rise even more sharply in 2007. The FAO food price index rose on average 9 percent in 2006 compared with the previous year, in 2007 it increased by 23 percent compared to 2006. The output price was driven by dairy, which on average increased by around 80%, then by oils (50%) and grains (42%). The only exception was the price of sugar, which declined by 32%, after having increased by over 20 percent over the 2005-2006 period.

Main drivers leading to agricultural price increase were: low production due bad weather condition in several world agricultural regions; the gradual reduction in the level of stocks, mainly of cereals; increasing fuel costs; changing structure of demand (the income growth in emerging countries – especially in China and India – led to change in diets with consumption moving away from starchy foods towards more meat and dairy products); expansion of the biofuel sector; and operations on financial markets (FAO, 2008).

In the EU the output prices increased strongly for key crop commodities in recent years particularly for grains and oilseeds. The price increase for animal products was smaller and for some sectors the prices even decreased in recent years (e.g. cattle and pigs) (Table 9, Figure 18 and Figure 19). The input price increase in the EU was particularly strong for fuels. The prices of fertilisers increased less (Table 9 and

Figure 17). EU CAP policy reforms which had aimed to lower EU prices and the appreciation of the euro against the US dollar have limited the extent to which world price increases fed through to the EU market.

4.6. Yields

The development of yield in the EUSC are reported in Figure 20. The numbers in the figure are summarise the evolution of yields for selected commodities: grains, sugar beet, potatoes and milk. In general, there is an upward trend in yields with the strongest increase in milk and maize yields. The lowest increase in yields are for wheat. The decline in crop yields in 2005-2007 could be the effect of unfavourable weather conditions.

Country data show strong differences in the level of yields (Figure 21). Figure 21 show relative yields calculated by dividing country yield with the average yield of all EUSC. In terms of the level of yields, the most productive countries appear to be the Netherlands, France, Belgium, Germany and the UK. The least productive are Finland and Greece.

4.7. Agricultural income

Figure 22 shows the development of real income of agricultural factors per annual work unit in EU. On average incomes have been rising over time in the EUSC as well as in the whole EU. This was driven by rising productivity and an outflow of labour from agriculture. There is high variation in the income development, likely driven by volatile yields and output prices. The development of the real income in EUSC increased at lower rate than the income increase for the whole EU.

Figure 23 shows the variation in income change by country. Half of the countries have experienced a decrease in incomes, while in the other countries the income increased in 2007 as compared to 2000. Particularly in Ireland, Belgium, Greece, and Italy income decreased because of combination of two factors: lower outflow of labour from agriculture and/or lower increase in output as compared to rest of the countries (Figure 23).

5. LAND MARKETS IN THE EU

5.1. Agricultural land market regulations

As all factor and commodity markets, the EU markets of agricultural land are subject to certain institutional regulations. Farmland sales market regulations are different from the rental market regulations. Therefore, we consider them separately starting with the sales market regulations.

5.1.1. Sales market regulations

In the context of the present study, three types of sales market regulations are of particular interest: price regulations, tax regulations and quantitative restrictions for the sale, purchase and use of agricultural land. The key regulations of agricultural land sales implemented in the EUSC are summarised in Table 3.

5.1.1.1. Price restrictions for agricultural land

Farmland sales markets are particularly vulnerable to price regulations. Therefore, we start with sales price regulations. In all sample countries but France (and in selected circumstances in East Germany) sales price is not regulated by the government – it is determined by mutual interaction of market forces. This helps to explain why no impact (only negligible) of the SPS has been found on the formal land sales market in France.

The two most important sales price regulations for agricultural land are minimum and maximum sales price. Their implications on seller and buyer behaviour are rather different. Minimum price reduces land demand, if the ‘unregulated’ market price is lower than the regulated price. In contrast, maximum price reduces land supply, if the ‘unregulated’ market price is higher than the imposed price ceiling. In both cases a black market of agricultural land sales may arise, where in addition to the regulated sales market price, the difference between the equilibrium price and the regulated sales price is paid “under the counter”.

Countries with regulated sales prices for agricultural land

The sales prices for agricultural land are regulated in France and for selected areas in East Germany (see column 2 in Table 3). In both countries the sales price regulations are implemented through state agencies specially created for this purpose.

In France the sales market for agricultural land is regulated by the Sociétés d’Aménagement Foncier et d’Etablissement Rural (SAFER). In addition to collecting the information about land sales, it also has the negotiating power and pre-emptive right to buy land. The SAFER negotiates with seller and buyer aiming to reach a mutual agreement for a land sales transaction. If the SAFER cannot reach a mutual agreement satisfying all the parties involved, it may propose a new buyer who better fits the SAFER’s mission, or another price that is considered more in line with the observed market price. The most powerful land sales market intervention instrument of the SAFER is the pre-emptive right, which is used if a mutual agreement between the seller, the buyer and the SAFER cannot be reached. This right allows the SAFER to acquire the agricultural land being offered for sale. The SAFER then tries to find an arrangement that better fits the SAFERs' missions, e.g., to sell the land at another price, or to sell it to another buyer, or to rent it out for a while. The SAFERs' activity on the sales market of agricultural land may partially explain the relatively low sales prices of agricultural land in France compared to other countries in our study (see Figure 2).

In East Germany the maximum sales price applies only to former land owners, who lost their agricultural land due to collectivisation in the 1950s and 60s. In order to enable those former land owners and current tenants who did not have the possibility to buy land in the former GDR, to buy land at a reduced market price, in 1994 and 1995 the German Parliament passed the Compensation and Indemnity Act and the Regulation on Acquisition of Agricultural Areas. The Compensation and Indemnity Act gives the former land owners (current tenants) an opportunity to buy land at a lower price – 65 % of the current market price. Among other factors, the amount of the agricultural land which the former land owners can buy at a lower price depends on the soil quality of the land. For example, tenants can buy approximately 120 ha of land of a medium soil quality. They are, however, obliged to use this land agriculturally for at least 20 years, otherwise the BVVG may cancel the contract.

Countries with 'free' sales markets

The sales price for agricultural land can be freely negotiated between the sellers and buyers in all other EUSC: Belgium, Finland, West Germany, Greece, Italy, Ireland, the Netherlands, Spain, Sweden and the United Kingdom (see column 2 in Table 3).

In competitive land markets with free sales prices for agricultural land buyers and sellers mutually interact and bargain the terms of the sale with each other. Applying the bargaining literature (e.g. Nash 1950) to agriculture, the buyers and sellers bargain over the price of a given quantity and quality of farm land. If they reach agreement on a price, the transaction is completed. If they do not, the buyer resumes his search for a property or drops out of the market, and the seller resumes his search for buyers or removes his property from the market.

Given that different land sales markets are spatially segmented from each other, often the market power and hence the negotiation power is asymmetric between the seller and buyer (King and Sinden 1994). Especially on the agricultural land markets with family-type farms the market power and hence the bargaining strength is usually on the landowner side (King and Sinden 1994). In addition, the relative bargaining strength of seller and buyer in agriculture is heavily affected by rather high transportation costs, which segment the land markets spatially.

Siegel and Fouraker (1960) show that the relative bargaining strength indeed affects market outcomes. These findings suggest that even in markets with free sales prices for agricultural land, the observed price (and quantity of land sold) may 'deviate' from the competitive market outcomes. Hence, 'free sales markets' for agricultural land do not necessarily imply free and competitive prices. This is particularly important when considering land markets with few transactions.

Hence, the more sales markets of agricultural land are segmented spatially (the plots offered for sale are far from each other) and temporarily (few land market transactions in a given area), the higher is the probability that the observed sales price is not representative of the equilibrium price of perfect and competitive markets.

Sales price building and the capitalisation of subsidies

Among other factors, the impact of subsidies on agricultural land sales prices depends on the mechanism of price formation. Because the sales price for agricultural land is partially regulated by the state in France we would expect that in France agricultural subsidies would affect less the land sales price. However, price regulations may facilitate the emergence of a black market for agricultural land, where an additional amount of money is paid in an envelope. However, due to the lack of reliable data neither the existence of such a black market for agricultural land can be proven nor can its size can be assessed.

In East Germany the effective price which buyer pay for land is affected, because the reduced price is calculated as the percentage (currently 65) of the market price. Hence, if subsidies affect the market price, the effective price which buyers pay is affected too.

Because the sales price for agricultural land can be freely negotiated between sellers and buyers, if other things were equal, among the other EU member states of the study we would expect that agricultural subsidies would affect farmland sales price more in Belgium, Finland, West Germany, Greece, Italy, Ireland, the Netherlands, Spain, Sweden and United Kingdom than in France.

However, as outlined above, usually other things are not equal. For example, the sales price may not be a bargaining outcome between buyer and seller. Instead, it may be set by land owner having a monopolistic/oligipolisitc market power over the land supply in a spatially (and temporarily) segmented agricultural land market.[14] This implies that the impact of subsidies on monopolistic/oligipolisitc land prices will be different from the impact on competitive market prices. Kilian and Salhofer (2008) find that '*ultimately, it is the number of suppliers and demanders on the market that will determine the outcome.*' More precisely, they mean that the higher the seller market power, the higher the share of the SPS that will be capitalised into land values (Kilian and Salhofer, 2008).

5.1.1.2. Sales/purchase taxes and transaction cost

In addition to the sales price regulations, land taxes also play an important role in the market participant decisions to sell, buy and own agricultural land. This section examines the key sales/purchase taxes and the related transaction costs for agricultural land.

Three types of land taxes are of particular interest for the present study: land sales tax (capital profit tax), purchase (registration) tax and usage (real estate) tax. Usually, land sale taxes are devised to discourage land price inflation by absorbing land sale profits. In contrast, purchase (registration) tax and usage (real estate) tax affect the behaviour of the buyer of agricultural land.

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[14] This type of price building for agricultural land transactions is frequently observed, for example, in Greece (see Greece country report).

According to Table 3, land transaction (sales/purchase) tax rates are rather heterogeneous across the EUSC ranging from 1% for low value land in the United Kingdom to 18% for high value farmland in Italy. Similarly, the ownership taxes for agricultural land are highly heterogeneous across the EUSC ranging from 0% tax rate on farmland in Finland to over 15% in the Southern EU countries.

Low taxes for sales transaction with agricultural land and the SPS entitlements facilitate structural change in agriculture via the relocation of agricultural land and entitlements from less productive to more productive farms (e.g. Germany). On the other hand, agricultural land markets in low tax countries are more exposed to speculative farmland purchases (and sales) from non-agricultural investors (e.g. Finland). Differentiated farmland ownership taxes for farmers and non-farmers reduce the incentives for long-run speculative farmland purchases (and sales) from non-agricultural investors, but hinder structural change (e.g. Greece).

Countries with low sales/purchase tax for agricultural land[15]

In Finland there is a land purchase tax which is 4% of the sales price. It is not collected from intergeneration transfers nor from transactions leveraged by the Finnish Government. The tax rate on the proceeds from land sale is 28%.[16] Active farmers who are selling farmland which they are currently farming are not obliged to pay tax on the proceeds of the agricultural land sale.

Currently, there is no real estate tax for agricultural land in Finland. Nevertheless, landowners do not consider selling land as an option under the current policy measures aimed at improving land sales such as the temporary relaxation of capital gains taxes or property taxes.

In France owners of land must pay a real estate tax on their property. The value on which the tax rate is applied is the estimated value of the property based on its characteristics and an index created in 1970 (the “valeur locative cadastrale”) reduced by 50% for built land and 20% for non-built land. The total tax includes several tax rates, that are set at the NUTS2, NUTS3 and municipality level. The municipality tax rate is the highest: for example, the tax rate for built-land in Bretagne is 2.97% at the NUTS2 level, between 8.98% and 11.67% at the NUTS3 level (depending on the NUTS3 region), and on average 20.17% at the municipality level. As for non-built land, in Bretagne for example the tax rates are 4.13% at the NUTS2 level, between 17.74% and 38.61% at the NUTS3 level (depending on the NUTS3 region), and on average 48.16% at the municipality level. Farmers’ residences are taxed, but other agricultural buildings are exempted. As for non-built land, agricultural land is only taxed at the municipal rate (before 1997, the NUTS2 and NUTS3 tax rates were also applied). There

[15] The undertaken regrouping of the EUSC into high and low tax economies is highly arbitrary. However, it is helpful for drawing implications/expectations about the subsidy capitalisation from the tax regulations.

[16] This tax rate applies to all capital gins, for example capital gains from house sale.

exist some further tax reductions or exemptions, for example for young farmers or farms located in Corsica. In general, owners of non-built land must also pay an additional tax, for the Chambers of Agriculture.

In France the transfer of land or property is subject to a total tax of 5.09%, paid by the buyer. The total tax rate includes a State tax, NUTS3 tax and municipality tax of, respectively, 0.2%, 3.60% and 1.20% of the land price, and a State tax of 2.50% on the total tax paid to the NUTS3 level. The 5.09% tax is applied for all built and non-built land; however, the tax is reduced (the NUTS3 rate is 0.6% and the State tax is 0.1% of the price) for non-built agricultural land. The total tax applied to young farmers is 0.715% of the land price. Transactions done by or via the SAFERs are exempted.

The inheritance laws in France stipulate a mandatory transfer to rightful heirs. This means that, in opposite to the full testamentary freedom where the owner can draft a testimony, heirs are designated by law as well as the share of the property and other assets they are entitled to. Hence, the landowner is not free to choose her/his heirs, nor their respective share of the inheritance. Regarding the inheritance tax system, the tax is between 5% and 60% of the bequest value, depending on the heir type and on the value of the bequest. There are some tax reductions when the value of the bequest does not exceed specific thresholds depending on the type of heir.

In Germany taxes incurred through land sales transactions are regulated in §11 of the Purchase Tax Law and amount to 3.5 % of the purchase price. As a rule, the taxes are paid by the buyer (§13 of the same law), but in some cases the seller or both contract parties can be liable for the purchase tax. No purchase tax must be paid if the purchase price is 2,500 EUR or below (§3 Nr.1 of the same law). Additional sales/purchase costs include fees for public notary, cadastral, land registry, and - if needed – a fee for the official expertise and land survey. In the case the agricultural land is traded as a current asset, i.e. a purchase and selling of land within speculative period, the realised profit is subject to the capital profit (speculation) tax. The speculation tax must be paid if the total profit in the legal year exceeds 600 EUR (§23 (3) of Income Tax Act). According to § 23 (1) Nr. 2 (2) of the same law, the speculative period for agricultural land is 10 years.

Besides, the real estate tax must be paid by the real property owners. The nationally registered real estate is liable for taxation.. The legal basis for real estate taxation is the Real Estate Law of 7 August 1973 (Federal Law Gazette BGBl I, page 965) and its last amendments. Real estate tax applies to any kind of real estate including agricultural land and buildings. The basis of taxation depends on (1) where the property is registered (West or East Germany) and (2) on the nature/purpose of property (developed land, rented apartment, agricultural land etc.). Hence, there are 4 different tax bases (rateable values).

In Germany the real estate tax is levied by municipalities and accrues solely to municipalities. Tax rates are municipality-specific and are calculated in two steps. In the first step, the local tax office fixes the base value for tax purposes, which is derived from the rateable value of the real estate. In the second step, municipalities apply their municipality-specific collection rate to the base value.

In Greece, tax rates depend on where the property is located and on the nature or purpose of the property. Each year, the Ministry of Finance and Economics specifies the so-called 'objective' values of the land or property, based on which the tax rates are applied. The real sales price is usually higher, though the price mentioned in the official contracts of each transaction is the 'objective' value. For agricultural land, in particular, these minimum values are estimated for each municipality based on the Initial Basic Value (IBV) or the Special Basic Value (SBV). The IBV and SBV measure the value of agricultural land depending on its exact location and especially on whether the land is irrigated or not and on its distance from coastal areas.

Since 2004 complete tax exemption applies for the transactions of agricultural land made by a farmer (natural person) in Greece.[17] The exemption of 50% applies also for a legal farmer. Farmers are, finally, granted tax exemption for inheritances or inter-generation transfers of agricultural land under certain conditions. The complete tax exemption of agricultural land transactions, under the condition that it is used for agricultural production, aims at the maintenance of cultivated land and the level of employment in rural areas.

Box 1. Transaction costs due to land fragmentation in Greece

The agricultural reforms from 1919-1923 induced the fragmentation of agricultural land in Greece. In particular, land was distributed by giving on average 7 disseminated parcels to each farmer. The institution of dowry (proika), the continuous inherited succession as well as the absence of any institutions that prohibit further segmentation also contributed to this phenomenon. After the Second World War the scattered land constituted one of the main structural features (apart from the small size and the abandonment of agricultural holdings) of rural property in Greece.

The continuous division of agricultural land into smaller and smaller parcels increases the cost of production and decreases the value of agricultural land. In order to initiate the consolidation of the small scattered plots, in 1952 an institution allowing land redistribution was adopted in the constitution for the first time. There was no significant progress in the following decades, though the state continued promoting land redistribution at an annual average rate of about 7 000 Ha during the period 1996-2003. 2006 there were still about 750 000 Ha to be redistributed, and it is essential that new farmers acquire sufficient land.

In order to hinder the further scattering of plots and to contribute to the structural improvement of agricultural land, in 1957 the ATE Bank (Agricultural Bank of Greece) started granting loans under special conditions for the purchase of agricultural land. It also provided the opportunity for young farmers to buy land. This decreased the transaction costs associated with the purchase of agricultural land. However, there is some evidence that these loans did not contribute significantly to the development of the agricultural land market in Greece. In contrast, a significant share of agricultural land is still mortgaged, since it was very often used as collateral for the owners to take such loans from the ATE Bank (and later on from many other cooperative banks). Currently, farmers can still have easier access to credit,

[17] More precisely, tax exemption applies under the following conditions: (i) the main activity of the buyer is an agricultural activity; and (ii) the buyer uses the land that he buys for agricultural production for a period of 15 years. If during this period, the use of the purchased land changes and/or remains uncultivated for a period of 2 years (except of set-aside land), the tax exemption is abolished.

as the entitlements can be considered a fixed income that can be used to pay the instalments.

In addition to high segmentation of agricultural land, an important issue of the agricultural land market in Greece is caused by the fact that about one-third is still state-owned. The Orthodox Greek Church also possesses a significant share of agricultural land.

Source: Ministry of Rural Development and Food (2008).

In the Netherlands a land transaction tax of 6% of the purchasing price must be paid by the buyer. The buyer can apply for tax exemption in case the land will remain in agricultural use for at least 10 years.

In Sweden the land market has been affected by changes in the taxation system for agricultural land. Recently, several taxes were abolished for agricultural land – inheritance tax in December 2004 and wealth tax in 2007. Also the inheritance taxes have changed in Sweden. The previous inheritance tax system used to result in a lock-in effect since the payment of the tax was not due until the estate was divided among heirs. Currently, the same inheritance rules apply to agricultural land as to any other property, that is, inheritance is equally divided between the direct heirs. Given that agricultural estates are exempted from the wealth tax makes them attractive investments for wealthy investors. Acquiring farm properties is becoming more and more popular among the CEO’s of large companies for tax reasons.

The United Kingdom’s Stamp Duty is a tax on transactions involving heritable property, including farmland (more correctly it is a tax due on the registration of transfer). Although the Stamp Duty has been payable for a number of years the zero rated threshold has changed in recently.

Capital Gains Tax (CGT) is a tax on the increase of value of certain assets which is sold or given away in a lifetime and applies to assets such as land, quotas and other capital assets (it does not apply to cash transfers or to disposal of trading stock). CGT rollover relief allows business assets (e.g. farmland) that has been sold at a gain to avoid CGT payment if the whole of the sale proceeds are reinvested in other assets to be used by that business provided it is reinvested in the period between 12 months prior to and 3 years after the sale of the asset. Recent changes to the CGT rules (2007) means that those with longstanding land holdings may be faced by a significantly increase in tax liability due on either the disposal of part of, or the entire farm, although since 5 April 2008 the maximum rate of CGT is 18%.

In the UK the inheritance tax is only chargeable at death and lifetime transfers (gifts) are known as potentially exempt transfers (PETs). When the donor dies within seven years of making a PET, the transfer is taxed on the value at the date of the gift, using a sliding scale. In 2007/08 the rate of inheritance tax was 40% on transfers higher than £300,000 in value made within seven years of death and property passing on death. All other chargeable transfers are taxed at 20%. For the purpose of the calculation of the inheritance tax, farm assets include any woodland and associated farm buildings cottages, farm buildings and farmhouses. Currently owners of farmland are offered two types of relief from inheritance tax, subject to certain ownership conditions, effectively removing much farmland from inheritance tax charges.

Countries with high sales/purchase tax for agricultural land

The highest land purchase/registration taxes are in Belgium (10-12.5%), Italy (11-18%) and Ireland (9%). In Belgium there are three different types of costs that the buyer needs to pay when selling agricultural land, namely the registration costs, the fee for the notary and other administrative costs. The registration costs differ between the regions ranging from 10% in Flanders to 12,5% in Wallonia.[18]

The owner of the land has to pay each year taxes on land, namely the advance levy on real estate.[19] This levy consists of three parts: (i) the base levy for the regional government; (ii) on this base levy the provinces are allowed to tax some extra payments (= "provinciale opcentiemen"); and (iii) also the communities are allowed to tax some extra payments on the base levy (= "gemeentelijke opcentiemen").

The base levy is based on the indexed cadastral income (abbreviated K.I.), that was attributed to each plot of land. The K.I. was attributed the 1st January 1975 and represents the net rental income that the farmer could gain from it in 1975, which depend on the characteristics of the plot (soil characteristics, plot located on a slope or not, etc.). The average KI in Belgium was in 2006 EUR51,40/ ha and EUR50,20/ ha for respectively arable land and permanent grassland. However there are some big differences between the provinces, which reflected the 1975 differences in productivity. Currently, the KI is no longer related to the income that a farmer could earn from cultivating the plot as production does not longer only relates to the soil conditions (e.g. intensive animal breeding). Theoretically, each ten years the value of all properties should be revaluated (so called "Perequatie"), however since 1975 this did not happen anymore. Therefore the KI is indexed since the taxation year 1991 in most of the regulations.

In addition, when a farmer receives a donation or an inheritance he needs to pay regional taxes, which depend on the relationship of the deceased (donator) to the beneficiary and the amount of the inheritance. For example, if a farmer living in Flanders dies and leaves an inheritance of EUR120.000 to his two children, they both inherit EUR60.000. On the first EUR50.000 they will have to pay 3% or EUR1500 and on the next EUR10.000 9% or EUR900. In total they will each pay EUR2.400 taxes.

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[18] In case of an auction the registration costs differ between territorial jurisdictions, but as a-rough-and-ready-rule 20% of the purchase price is used.

[19] In case that the land is rented for a very long period, the tenant farmer will need to pay the advance levy on real estate (in case of "erfpacht" or "recht van opstal").

Box 2. Black market and payments in 'envelope' in Belgium

The registration costs associated with the purchase of a plot and the fact that the seller and the buyer make mutual agreements, give an incentive to farmers to pay part of the purchase price to the landowner in an 'envelope' without reporting it to the government (and without paying any taxes on this amount), which is quite common in Belgium. Approximately 20% of the purchase price is paid as black money (CR 2008).

By comparing the data from auctions and private sales in the period 1990-2004, provided by "FOD Economie, KMO, Middenstand en Energie", one can roughly estimate the additional black money, sine the price in an auction is public known, which is not the case in a private sale. When dropping the 25% highest and 25% lowest number, we roughly estimate that approximately 20% of the purchase price is paid in an 'envelope', which according to experts is a plausible range. It is important to emphasise that although we exclude the extreme values it is still a very rough estimate as we find a large variation in percentages (without excluding the extreme values a variation between 1% and 70%). There is no change over time in the amount black money paid in 'envelope' form and according to experts this amount is more or less stable over time.

Source: FOD Economie (2008).

In Ireland the relevant taxes and transaction charges in the sale and purchase of agricultural land include Stamp Duty, Capital Gains Tax, capital acquisitions tax and sales fees. There is a stamp duty (transactions tax) charge on agricultural land sales which is payable by the purchaser of land. The rates applied are those for non-residential property with the top rate being 9% for land valued in excess of EUR150,000. (Lower rates apply at different bands under that threshold but once the band is breached, the next higher rate applies to the entire amount of the transaction). A Capital Gains Tax is payable by the seller at a rate of 20%. There is no capital acquisitions tax on agricultural land sales, however it does apply to land transferred by gift or inheritance. The current rate is 20%. Land sales fees are not regulated but are usually paid by the seller.

The Italian Law 694/96 identifies the amount of fee compulsory for purchase land. This amount is between 11% and 18% of the "stated value" of agricultural land. The total fee cannot be lower than 129.11 EUR for the whole transaction. Stated value and price of transaction are different. Stated value cannot be lower of an amount calculated as a product between the landowner income (LI) wrote in the cadastre, "moltiplica-tore catastale" and a landlord income updated value. This last two terms is often review by the Ministry of Finance.

The tax rate of 11% to 18% is a sum o three different fees: Imposta di Registro, Imposta Catastale and Imposta Ipotecaria. The Imposta di registro can have a value of 8% in the case that the buyer is full time farmer (IATP) or 15% in other cases. The Imposte Catastale and Ipotecaria have fixed amount of 2% and 1% respectively.

In case of hereditary succession the tax varies between 4 and 8% depend on the degree of relationship.

5.1.1.3. Land use and other quantitative restrictions

In addition to the sales price regulations for agricultural land, sales taxes and other transaction costs, different restrictions of land sale, purchase and use have been implemented in different EU member countries.

For example, in Belgium zoning regulation is in regional competence and hence the land use planning differs between Flanders and Wallonia. In Flanders the objective of the regional spatial structure plan is to reduce the area of agricultural land (-56.000 ha) in favour of woodland and nature reserves (+48.000ha), industrial land (+7.000ha) and recreation (+1.000ha) in 2007. Between 1994 and 2005 11.600ha of agricultural land is disappeared and 13.400ha of woodland and nature reserves was created.

In Wallonia zoning regulation aims at increasing the zone designated to economic activity at the expense of agricultural zone (Grandjean, Hanin and Rousseaux 2006a). Between 1986 and 2005 the urbanised zone increased by 2.950 ha. However these modifications in the sector plan do not reflect the modifications in the occupation of the land. The agricultural zone of the sector plan is not completely occupied by agricultural plots, but also partly by woodland, public infrastructure and housing. And also visa versa, not all agricultural plots are situated in the agricultural zone: in 2001 54.773 ha agricultural land were situated in the housing zone. These plots are particularly under pressure and subjected to speculation.

In Finland the ownership of land is not restricted. However, it is said that one could become a landowner only by marrying or inheriting. All children are equal for land inheritance.[20]

In France the main institution of land sales regulation is the Sociétés d'Aménagement Foncier et d'Etablissement Rural (SAFER). SAFERs are local authorities, one general authority is located in Paris. The main role of SAFERs is to regulate the transfer of agricultural land. Their specific missions are to support the settlement of farmers, especially young farmers, to support land and farm consolidation, and to favour transparency and functioning of rural land markets.[21]

Each sale of agricultural land has to be notified to the local SAFER by the notaries legalising the transactions. When the SAFER receives the information, a first agreement has been reached between the seller and one buyer at a given price. The SAFER has then two months to accept or to refuse the notified transaction. When market forces lead to a transaction that is in line with the objectives of the SAFER and the transaction cannot been suspected of speculation purpose, then the latter accepts the transaction. In

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[20] According to the Finnish country report, there have been no major changes in the land transfer legislation between 1990 and 2007.

[21] The missions of the SAFERs have been progressively extended to rural development support and environmental protection. The 1999 LOA has given them the right to use their pre-emptive right to fulfil objectives of environmental protection.

contrast, when market forces result in a transaction that is suspected of speculation purposes or that goes against the missions of the SAFER then the SAFER can refuse the transaction.[22] The other two market intervention instruments of the SAFER are price related and explained in the following section.

Regarding zoning regulations, all land in France is categorised according to its use by development planning provisions, and therefore, land devoted to agriculture is officially registered as agricultural land. Converting agricultural land into another use (housing, industries, recreational areas, etc) is subjected to approval by the State or its local administration. The so-called "Plans Locaux d'Urbanisme" (PLU) divide the municipality land into several zones according to their use: the urban zones, the zones to be urbanised, the agricultural zones, the natural and forest zones. A PLU protects agricultural land from conversion into development. In theory, it is very difficult for landowners to change the use of their land if such change does not comply with the municipality's map. Building permission is given to projects which are in accordance to the PLU; or, when a municipality has no PLU, projects can be refused if they are threatening agricultural activities or land consolidation. However, despite these provisions, PLUs can be, and are often, modified, which threatens the existence of agricultural land. Especially small municipalities are interested in industrial development (for example in order to get more financial resources) and in housing development (inhabitants being voters for the local representatives). Such pressure on the agricultural land is particularly felt in tourist regions or around urban poles. Moreover, not only municipalities happen to show laxness when giving building permissions, but they themselves have urban pre-emptive rights ("Droits de Pré-emption Urbains"). This means that they can confiscate any land in their area, against compensation, in order to build roads, railways, recreational activities etc. Agricultural land is more and more concerned by this right.

In Germany the Law on the Sale of Agricultural Land regulates procedure of land sale transactions. Thereafter every sale of agricultural land, that is bigger than a certain minimum size, requires a permit by regulatory authority (*Genehmigungsbehörde*) according to §9 of this law. The minimum size is set by each Federal State (e.g. 2 ha in Bavaria). The regulatory authority examines if there are pre-emptive rights on the given land and can disagree to transaction during the first month after the sale announcement. Justification of the refusal can be an inefficient allocation of agricultural land, uneconomical reduction of land and sale price significantly higher or lower than the value of the given plot.

In Germany the procedural regulations of the main legal bodies of the German land law in Bavaria are somewhat less strict compared to other federal states (e.g. the minimum size for the need of a permit of a land sale in the procedural regulations of

[22] E.g., a sale implying the dismantling of a farm; a sale allowing a settled farmer to enlarge his/her farm to the detriment of a young farmer who would have been able to settle thanks to the land on sale; an agreed price that is judged by the SAFER to be non-representative of market prices.

Grundstücksverkehrsgesetz is 2 ha in the federal State Bavaria compared with 1 ha in Lower Saxony and 0.5 ha in the federal state of Saxony).

In the German region Saxony, as in the whole of East Germany, agricultural land regulations are more complex than in West Germany. Additional land sale regulations concern the ongoing privatisation of formerly GDR state-owned land being carried out by the trust company BVVG (Bodenverwertungs- und -verwaltungs GmbH). The relevant laws are the Compensation and Indemnity Act (Entschädigungs- und Ausgleichsleistungsgestz, EALG); and the Regulation on Acquisition of Agricultural Areas (Flächenerwerbsverordnung, FlErwV).

Three key factors are particularly relevant for the land sales market in East Germany: (i) the privatisation of former state-owned land which was confiscated in 1946, (2) the transformation of large collective farms and state-owned farms into smaller private farms, partnerships or corporations, and (3) the reduction of old debts from the Communist system.

The transformation of the agricultural sector, especially the restructuring of cooperatives and the demand from farmers from West Germany and the Netherlands, caused a high fluctuation in the land market. For example, in West Germany only 0.4 % of the agricultural area was sold annually, whereas in East Germany this figure is 1.5 %. Farm restructuring is also affected by the privatisation of farm land. Farmers, whose rental contracts with the BVVG end, can be threatened by the loss of land, because this land should be sold and might be bought by other farmers.

The reduction of old debts inherited from the communist era played a role on the land market, because immediately after the reunification, farmers in East Germany could not afford to buy land because of these debts. Now the financial situation of the farms has improved, and the problem of old debts has been solved. Thus, farmers are beginning to consolidate their enterprises and trying to increase their share of owned land. Hence, the demand for agricultural land increases.

In Ireland all contracts of agricultural land sales must be delivered to the Irish Government's *Valuation Office* in a "Particulars Delivered" form. The transactions below EUR 500 and above EUR 35,000 per hectare are classified as non-agricultural, as are plots of less than 2 hectares and sales of agricultural land in Dublin County.

There is no statutory requirement to register purchased land but is it prudent to do so and it is the norm. The Property Registration Authority has responsibility for the Land Registry and Registry of Deeds in Ireland.

In the Netherlands land transactions, in contrast to the rental market, has always been relatively free. Neither prices, nor other contractual terms were prescribed. However, each sale needs to be recorded by a notary and transmitted to the central land registry. All sales records are public information in the Netherlands.

In 2007, the Spanish Land Regulation 8/2007, of 28th May, was published. This regulation affects town and city planning, expropriation, sale or unavoidable substitution, and the Public Administration's patrimonial responsibility. This regulation has meant an important novelty in terms of rural land valuation. Rural land will be valued for its true value given its situation and not for its expectations, which discourages the purely speculative practices of land classification.

In Sweden the agricultural land market is regulated by the Land Acquisition Law. In the late 1980s the agricultural land market was deregulated and now only a few restrictions remain. Generally, natural persons are allowed to purchase agricultural land without any restrictions such as educational requirements or evidence of previous agricultural experience. However, land in sparsely populated regions is an exception; in these areas a permit is required.[23] The county administrative board identifies in which municipalities such a permit is required. For legal persons a permit is always required, which limits the possibility for such persons to acquire land.

In the UK there are numerous regulations that impact on the land market and these include issues such as: greenbelt development restrictions, development restrictions on grade one agricultural land, tied housing for agricultural workers, development zones, planning regulations, and in Scotland the right to buy land by crofting communities and the pre-emptive right to buy land afforded to rural communities, and tenant farmers. For details see the UK country report.

5.1.2. Rental market regulations

Three types of rental market regulations are of particular interest for the present study: rental price regulations, the tenancy duration regulations and quantitative land rent regulations. The key regulations of agricultural land rental markets in the EUSC are summarised in Table 4.

5.1.2.1. Rental price regulations

Price restrictions are, for example, minimum and maximum rental price for agricultural land. Minimum rental price reduces land demand, if the 'unregulated' market price is lower than the regulated price. In contrast, maximum rental price reduces land supply, if the 'unregulated' market price is higher than the imposed price ceiling. In countries included in the study only rent ceilings have been applied.

Generally, rental prices for agricultural land are more regulated than land sales prices. In one third of the EUSC minimum and/or maximum rental prices are set by government agencies (Belgium, France, Greece and the Netherlands). In countries with regulated rental prices the existence of 'black markets' for agricultural land has been found. The SPS tend to increase the 'black market' rental price (e.g. Belgium) and the size of the 'black markets' for agricultural land (e.g. Belgium, the Netherlands).

[23] It may even be required that the owner is living on the property in cases when properties are classified as forest properties.

Countries with regulated rental prices for agricultural land

In Belgium the rental price is regulated by government agencies – it can not be higher than the maximum price determined by the tenancy law. In the case of a 9 year rental contract the maximum price for agricultural land and buildings is equal to the (non indexed) cadastral income of the plot or building multiplied by a certain “tenancy coefficient” that depends on the agricultural region and the province. In case of a contract of 18 years or longer, the tenant has a strong reliability that his farming activities are assured. The owner can ask a higher maximum price if the contract is made by a notary. The coefficient for agricultural plots is increased by 36% in case of a contract of 18 years and by 50% in case of a contract of 25 years or a “career contract”.

Given that the regulated rents are rather low, in most cases the maximum rent is paid. Depending on the agricultural value of the land and the willingness of the tenant to cultivate the plot, an additional (unofficial) amount is paid in 'envelope'. This amount can be paid each year, in the beginning of the period or at the end, depending on the agreement that the owner and the tenant reach. The rigidity of the tenancy market (at least 9 years of cultivation) enhances the additional payments: if a plot becomes available farmers who want to enlarge their agricultural production will pay a high price because they fear that it will take some time before another plot will become available. Next to this practice pensioners offer also an increasing number of seasonal contracts to young farmers, which is even worse for the farmers as the additional amount of black money because the young farmer can not appeal on the tenancy legislation and can not have any reliability on farming activities (only contract of 10 months).

In France the rental prices of agricultural land are regulated. Each "département" (NUTS3), via the local government representative (the "Préfet") sets a price index ("indice des fermages"). For non-built land, the index is calculated as the weighted sum of the average gross farm income in the "département", the average gross farm income in France, and the average gross farm income in specific productions in France, all averaged over the five previous years to smooth for the variability; it may also include prices of specific commodities. The weights applied are specific to each "département" and the index is re-evaluated each year, based on the changes in farm incomes. It should be noted that up to 1995, the index depended on the type crop cultivated and was based on the average national and local crop yields. For land with buildings, the index is based on the type, use and age of the buildings. The index is then used to set minimum and maximum prices outside which rentals are not possible. The "Préfet" may also issue different minimum and maximum prices for the various production areas within the "département", and for land used for specific productions (e.g. permanent fruits). It is then up to the landlord to decide on a rental price within the given range based on the type of land (e.g. soil quality, irrigation, climatic conditions etc).

In the Netherlands the government sets regional rent ceilings and allowed only very modest rent adjustments each year. Tenants obtained a pre-emptive right to buy the land in case the land was offered for sale.

Ironically, these measures aiming at protecting tenants ultimately had the opposite effect (Swinnen, 2002). Landlords preferred not to lease out the land anymore, since lease regulations locked them in at unfavourable terms for years. Land with lease contracts was worth significantly less than "free" areas. As a result, supply of rental land dried up and the total area under rental agreements steadily declined.

Market participants often simply circumvented the strict regulation. A so-called "grey" rental sector evolved, in which farmers made rental contracts (or informal agreements with peers) outside the official system. Grey rents are not reported to the authorities and they are on average 50% higher than officially registered rents. In 1995, grey rents accounted for 25% of all rented area (Hoek and Luijt 1999).

In order to stop the continuous melt-down of the formal rental sector, more liberal forms of rental contracts were introduced. From September 1st, 2007, onwards, rental agreements for less than 6 years are not subject to any of the historic constraints. Contracts of more than 6 years, however, are still subject to rent controls.

Countries with free rental prices for agricultural land

The rental price for agricultural land can be freely negotiated between farmer and land owner in all other countries of the study (see column 2 in Table 4). Hence, if other things were equal, then we would expect that the SPS would affect farmland sales price more in Finland, Germany, Greece, Ireland, Italy, Spain, Sweden and United Kingdom than in Belgium, France, and the Netherlands

5.1.2.2. Rental contract duration regulations

The duration of rental contracts of agricultural land gives first indication of the rental market possibility to adjust to changes in external environment, such as implementation of the SPS, increase in food prices or changes in opportunity profits of alternative land use. Hence, other things equal, long term rental contracts for agricultural land will adjust less to external changes than will short term rental contracts.

Rental contract duration has been studied in order to obtain a cross-country comparison of rental market possibilities to respond to policy changes. The two key determinants of rental contract duration are social norms (e.g. Greece usually seasonal) and governmental regulations (e.g. Belgium and France min 9, the Netherlands min 6 and Spain min 5). Moreover, in several countries (e.g. France) even the renewal/inheritance of rental contracts is regulated. In these countries the formal rental markets are stickier and the time lag is longer for adjustment to policy changes.

The FADN data for rental markets suggest that the difference between buying and renting agricultural land disappears the higher is the minimum duration of rental contracts. Belgium and France had the highest minimum lengths of rental contracts (9 years) and has the highest share of rented area (77% and 75% in 2006, respectively) among all the EU countries studied.

Countries with regulated rental contract duration

In Belgium the duration of a tenancy contract subject to the tenancy law is at least 9 years. In the case of "recht van opstal" and "erfpacht" the farmer can have a very long term contract. "Recht van opstal" implies that - in this case - a farmer has the property right to have some buildings and plantings on the plot of a third person. Such a property right can be determined for a period of a maximum 50 years and needs to be confirmed by a notary. "Erfpacht" is similar to "Recht van opstal", but the duration of the contract differs: it should be at least 27 years and maximal 99 years.

The most common duration of rental contracts is 9 years. However there are an increasing number of "seasonal contracts" and informal contracts with a short (less than one year) duration. Since the introduction of the direct payments this process is even aggravated.

The regular rental contracts (9 years) are mutual agreements between the tenant and the owner of the plot. This agreement can be written or oral, depending on the custom and the relation of the tenant and the owner. Rental contracts with a longer duration need to be registered by the notary.

The rigidity of the tenancy market (at least 9 years of cultivation) enhances the additional payments: if a plot becomes available farmers who want to extend their agricultural production are willing to pay a higher price (than the regulated) because they know that it will last long before another plot becomes available for renting.

In Finland the legislation regulating the rental market for agricultural land has not been changed since 1966. The standard land lease contract is a short-term contract with a fixed duration and a fixed cash lease payment per year. About 40% of all lease contracts have duration of five years. Contracts longer than 10 years are prohibited by law.

Written contracts have become more and more popular in Finland. Written contract are also supported by the Government and the Farmers' Federation. The Farmers' Federation also provides a platform for rental contract. This platform has become a very popular in recent years. Rents are typically paid at the end of the year.

In France the terms of the rental contracts are defined by law through the "Statut du fermage". The original law of 1945 has been modified several times (1960-1962, 1975, 1984). Generally, the rental regulation has always tried to protect the farmer tenant. The following regulations apply to all rented land except plots less than 1 ha (0.5 ha if several landlords for one plot).

Rental contracts for agricultural land are very rarely short-term in France, usually they are for at least 9 years. There are three types of contracts. The "Baux ruraux" are contracted for 9 years, the "Baux de long terme" are for 18 years, and the "Baux de carrière", i.e. over the tenant's career, are concluded for 25 years. Landowners are given tax incentives to conclude long-term contracts (“Baux de long terme); for example, tenants must not pay the local tax which is otherwise of 0.6% of the rental prices estimated for the next 20 years. During the duration of the contract, landlords do not have the right to terminate the contract and rent out to another tenant. Landowners have the possibility to terminate the contract anytime only in order to sell the land. However, in this case, the current tenant benefits from a pre-emptive right to purchase the land (with the possibility to have the price reduced via the SAFER intervention).

The second element of the rental regulation is that contracts are automatically renewed at the end of the term. At the end of the term, the landlords have the possibility to withdraw their land only if they (or their heirs) farm the land themselves over the next 15 years at least (and satisfy the settlement rules, see below).

The third element of the rental regulation is that, after the current tenant's retirement or decease, contracts are inheritable. Only when exiting tenants have no successor are landlords free to designate the succeeding tenant. However, the new LOA in place since 1 January 2006 introduces a new type of rental contract, called "Bail cessible", that is to say a transferable contract. The main idea behind this contract is that exiting tenants who do not have a successor in their family can now choose to transfer the contract to who they want. In the other types of contracts, it is the landlord who had this freedom. Tenants and landlords must both agree for their contract to be transformed into a "Bail cessible". In compensation for the reduction of the manoeuvre sphere of the landlord, the latter has the possibility to ask for a price increase when the contract is transformed: the maximum limit of the rentals can be increased by 50% at most. Such transferable contracts can be only for 18 years (and not 9 years), and do not entail compulsory renewal. Such contracts have been implemented following the 2003 CAP reform. In the frame of this reform, the entitlements can be transferred from an exiting farmer to his/her successor, whether the latter is from the family or not. However, exiting tenants with a successor outside the family were not able to link the rights to the rental contract, that is to say, to the land. In the case of non-family successor, the choice of the beneficiary of the contract was at the discretion of the landlords, who may not opt for the successor chosen by the exiting tenant. The new "Bail cessible" is thus supposed to link the payments to the land, in case of tenancy agreements.

In France rental contracts may be written or oral. Where they are written this may be simply on normal paper signed by both parties. But in order to be considered as officially "valid" (especially in case of court dispute), the contracts must be declared and registered at a tax revenue office ("Bureau des Hypothèques", part of the Ministry of Finances). If contracting parties want to have more secured terms, they may have their written contract registered with a notary. In any case, all contracts for which the duration is more than 12 years must be signed at a notary office. Following the SPS implementation, more contracts are now written (but the number of notary contracts did not increase), in order to secure the transfer of entitlements with the rented land.

The SPS does not affect the duration of rental contract. When some entitlements are rented together with land, the contract duration should be the same for SPS as for land, in general 9 years. Rentals are usually paid at the Saint Michel, i.e. on 29 September. There may be some variations, but in general rentals are paid after the cultivation campaign.

In the Netherlands the tenure law introduced in 1958 heavily regulated lease contracts with the goal of strengthening the tenant's position. Rental agreements needed to be registered at special rental courts and usually had very long durations of at least 12 years for farms and 6 years for land. A contract was automatically extended for 6 more years at the end of each term, as long as none of the parties cancelled it.

In order to stop the continuous melt-down of the rental sector, more liberal forms of rental contracts were introduced in 1995. Certain freer forms of rental contracts were possible that were not subject to rent control, automatic renewal, and the option to buy for the tenant. In 2007, the entire Tenure Law was updated and merged into the Dutch civil code. From September 2007, onwards, rental agreements for less than 6 years are not subject to any of the historic constraints. Contracts of more than 6 years, however, are still subject to rent controls.

In Spain the minimum duration of rental contracts is 5 years. Existing legislation encourages drawing up written renting contracts, but presently, this does apply and most contracts are oral.

Countries with unregulated rental contract duration

In Germany the usual form of rental contracts are written with a fixed price and limited duration. Although there still exist oral contracts and contracts of unlimited duration. When a contract with limited duration ends and there are no other arrangements, the contract will change to a contract with unlimited duration, which can be cancelled from year to year. Some contracts have a price conformation, which is normally a general clause that orientates on the general rents of the area.

The average duration of rental contracts varies significantly between regions. The average duration in Saxony and Weser-Ems is longer than in Bavaria. In Saxony the average duration of rental contracts is 11.5 years. Variation between 7 years to 18 years, with the long contracts linked to investment credits. In Weser-Ems the average duration of a rental contract is 7 years with variation from 5 to 10 years. The longest contracts are in grassland areas or in livestock intensive farming areas. In livestock intensive areas, farmers need long term contracts. In Bavaria the average duration of rental contracts is 6 years. The duration of rental contracts for arable land and grassland are the same. Even if the average duration of rental contracts is 6 years, there are many contracts which are only one year and others at 9 years. In Bavaria and Weser-Ems the contracts are normally renewed without an invitation to tender.

The average duration of rental contracts is not directly affected by the SPS. Indirectly the duration of rental contracts is affected by the German pension law, according to which, if a farmer wants to retire and receive old age payments he has to lease his land for at least 9 years. Those farmers retiring at the time of the SPS introduction will trade the old age payments from retiring and renting out land versus continue working and benefiting from the SPS.

When and how often the rent is paid differs between regions. In Saxony land rent is paid once a year afterwards, if the land is from a private person. If the land is rented from the BVVG, then the land rent has to be paid every third month in advance. In Saxony it strongly depends on the landlord how often the rent is paid. In Weser- Ems it depends on the size of the land and the amount of money to be paid. If one has more than 10 ha or has to pay more than a couple of thousand EUR, it is paid monthly or a couple of times a year. Smaller amounts are normally paid once a year after-wards. In Weser-Ems the timing and the frequency of the rental payment depend on the size of the rented land or the amount of rent which must be paid. The land rent is paid once a year in Bavaria. There is no uniformity in when the land rent is paid, as some pay in advance and others after the cultivation period.

In Greece the agricultural land is usually rented for just one farming period or, commonly, for a period up to 4 years. Rental contracts longer than 4 years are untypical in Greece. The rental agreements are either oral or written (a private informal contract) and less often is based on an official contract. Rents are usually paid in advance, and they are not affected by the economic outcome of the year.

In Ireland there is no requirement to register leases and as a consequence official data on the share of agricultural land that is rented is not available. Estimates put the share of land rented at less than 20 percent. Short term rental contracts, known in Ireland as conacre,[24] are a popular way of renting land. Often conacre prices are agreed orally whereas longer term leases are more likely to be written.

In Italy the rental market was heavily regulated for many years and is still subject to certain rental price regulations. The “equo canone” is the rent which the tenant must pay to the landowner. The particularity of this rent is that the rental price is not negotiated between the parts but it is defined by a technical commission which determines the rent valuing: the prices of agricultural products, the production costs and farmer income. Given that usually the "equo canone" value was underestimated and fixed for several years; it discouraged owners to rent the land out.

The Italian land rental law was modified several times in order to equilibrate the contract positions between the tenant and landowner. The last law on agricultural contracts was issued in 1982 and includes mainly provisions about duration and typology of contracts. It also states that any type of contracts can be stipulated if there is a representative of a farmers' association. In all Italian regions, most of rental contracts are written and registered without the notary but, with the assistance of farmer associations. This is because registration is needed to benefit from subsidies. Written contracts signed with the assistance of farmer associations are more often used because they are classified as official contracts. Oral contracts are stipulated especially among members of the same family for rental of fruits crops or grassland.

The average duration of rental contracts in Italy is highly heterogeneous across crops and regions. For arable crops it goes from 2 to 5 years while fruits crops rental can vary

[24] Conacre (a corruption of corn-acre), in Ireland, is a system of letting land, mostly in small patches, and usually for the growth of potatoes as a kind of return instead of wages. One third of agricultural land in Northern Ireland is let as Conacre.

from 5 to 10 years but also up to 20 years. Usually the tenant pays the land rental at the beginning of the year but there is no regulations on this subject.

In Sweden both formal (written) contracts and informal land rental contracts are used. The former are always used in case of larger transactions. Informal contracts are most common in the forest districts in Northern Sweden, were land rents are low or in many cases even zero. The introduction of the SPS implied an advantage for the tenant in case of long term rental contracts. In most cases the contracts could not be terminated (because of rules for the termination of contracts) in time for the landowner to apply for SPS entitlements. Entitlements were allocated to those who cultivated the land. In the case of short term or informal rental contracts the SPS implementation created a lot of conflicts between tenants and landowners.

It is possible that the SPS has affected the average duration of rental contracts, as contracts now tend to be shorter. However, increased risk in crop production may be another reason. The trend is currently towards one year contracts.

Previously, rents were in general paid twice a year. The introduction of directs payments has changed this pattern. Now the rent is usually paid in December when the EU-money arrives. The SPS has not changed this new practice; it was the introduction of direct payments that induced the change.

In the United Kingdom the tenancy regulations are different between regions. In England and Wales the Agricultural Tenancies Act 1995 (ATA) made a radical departure form the preceding legislation dealing with agricultural tenancies. The ATA is much shorter, and does not attempt to provide an all embracing safety net but allows greater flexibility for landowners and tenants to draw up tenancy agreements to suit their particular circumstances. The ATA applies to England and Wales but it does not apply to Scotland or Northern Ireland. The Regulatory Reform (Agricultural Tenancies) (England and Wales) Order 2006 amended the Agricultural Holdings Act 1986 and Agricultural Tenancies Act 1995. These reforms were intended to[25]: (i) encourage diversification by tenant farmers; (ii) maintain and improve viability of tenant farmers; (iii) allow restructuring of holdings without jeopardising valuable rights; (iv) improve flexibility in the tenanted sector; and (v) maintain a balance between landlord and tenant interests.

The ATA created a new form of agricultural tenure know as the ‘Farm Business Tenancy’ (FBT). For an FBT to be created, the land must be used, in part at least for the purpose of an agricultural business. If the land is not used for an ‘agricultural business’ then the Act is unlikely to apply, and the tenure may come under Part II of the Landlord and Tenant Act 1954.

[25] See the Guide to the Regulatory Reform (Agricultural Tenancies) (England and Wales) Order 2006

The length of the term is entirely flexible and a longer term leases are more likely to encourage tenants to invest capital in the business whilst smaller parcels of land may be better suited to shorter terms.

A FBT for a term of not more than two years terminates automatically on the expiry date. A fixed term of more than two years will only terminate once a valid ‘notice to quit’ has been served. The 2006 Regulatory Reform Order (RRO) now means that landlords and tenants can agree whatever notice period they wish, providing the notice is given at least 12 months in advance. This means that landlords and tenants can agree, for example, a 3 year notice period, where the notice to quit could be served anytime between 36 and 12 months prior to the expiry date. If no notice is served, then the tenancy will continue from year to year until a valid notice is served.

Following the death of a tenant, the landlord can only resume the tenancy if provision has been made for this in the original lease. Similarly, the ATA does not allow the landlord to regain possession because of insolvency of the tenant or non-payment of rent. The agreement can be established to specifically reserve this right.

In Scotland there are now 4 forms of agricultural lease permitted under the 2003 Act. First, it is still possible to grant a new “traditional” agricultural tenancy under the Agricultural Holdings (Scotland) Act 1991.

Second, grazing or mowing lease for not more than 364 days. Failure to ensure the land is vacated at the end of each grazing period means it becomes a 5 year Short Limited Duration Tenancy (SLDT).

Third, Short Limited Duration Tenancies (SLDT) are an agricultural lease for a term of not more than 5 years and are aimed at validating cropping lets (potatoes, turnips, etc). If the lease is for a period of less than 5 years and the tenant remains in occupation (with the express or implied consent of the landlord) the lease will default to 5 years. Should the same happen at the end of the 5 year period, the lease will default to a limited duration tenancy, with a term of a further 15 years. Successive leases of the same land to the same person are accumulative. Tenants who occupy land under a SLDT are not allowed to diversify nor are they able to exercise the pre-emptive right to buy their tenanted land.

Fourth, Limited Duration Tenancies (LDT) were introduced as the standard form of tenancy. They must be for a minimum period of 15 years but can be for longer by agreement. Termination of limited duration tenancies at the end of their term is by a minimum of 12 months and maximum 24 months written notice. The landlord must serve 2 notices on the tenant; one 24-36 months prior to the effective date and one 12-24 months prior to the effective date (at least 90 days apart). If the lease is not terminated by notice at its agreed termination date it will continue for a further initial 3 year period. If no notice is served terminating the lease, a second 3 year period will follow, which if not terminated will be followed by a further 15 year term. LDTs can be assigned with consent from the landlord. LDTs can also be sublet if expressly permitted in the lease, or without express permission if the subletting is ancillary to an approved diversification scheme. A LDT may be bequeathed as with a SLDT under 1991 Act provisions relating to bequest. A tenant with a limited duration tenancy is not entitled to the right to buy but he is allowed to diversify and harvest trees planted by him (subject to landlord consent).

In Northern Ireland most of the rented area is leased through the conacre system, which is unique to Ireland where land is let on a seasonal basis (nominally for 11 months or 364 days) without entering into a long-term commitment.[26] Due to the use of conacre rental agreements farm businesses may have a number of plots of land but usually within 5 miles of core farmstead.

5.1.2.3. Other rental market regulations

In this section we summarise the key quantitative and other rental market regulations. A distinctive element of the rental market regulation in France is that, after the current tenant's retirement or decease, contracts are inheritable. Only when exiting tenants have no successor, landlords are free to designate the succeeding tenant. However, the new LOA in place since 1 January 2006 introduces a new type of rental contract, called "Bail cessible", that is to say a transferable contract. The main idea behind this contract is that exiting tenants who do not have a successor in their family can now choose to transfer the contract to who they want. In the other types of contracts, it is the landlord who had this freedom. Tenants and landlords must both agree for their contract to be transformed into a "Bail cessible". In compensation for the reduction of the manoeuvre sphere of the landlord, the latter has the possibility to ask for a price increase when the contract is transformed: the maximum limit of the rentals can be increased by 50% at most. Such transferable contracts can be only for 18 years (and not 9 years), and do not entail compulsory renewal.

In Ireland stamp duty is liable on the execution of a lease at a rate of 1% of the annual rent (once off payment on stamping). There is no requirement to register leases and as a consequence, official data on the share of agricultural land that is rented is not available. In the past the general view would have been that most rentals are conacre, but that situation may be changing since some farms may now require so called 'spreadlands' for manure under the Nitrates Directive and increased participation in the Rural Environmental Protection Scheme (REPS). Also some income tax exemptions have been introduced for encouraging long-term leases, but again we are uncertain of the uptake of these exemptions.

In Italy the SPS has produced some incentives for written contracts because in order to apply for the SPS entitlements official rental contracts are required.

The rent market for agricultural land in Spain is regulated by the State Law 26/2005, of 30th November, which amends the State Law 49/2003, of 26th November. On the other

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[26] A similar farmland renting system exists in Greece. However, in contrast to Ireland, the conacre rental agreements are not widespread in Greece.

hand, there is historical rural renting which is regulated by the State Law 1/1992 that governs land farmed by a family over several generations. Only the rural renting agreed before 1942 are considered historical rural renting.

State legislation on historical lettings of agricultural land is complemented with Autonomic laws in the Valencian Community and Galicia on Valencian and Galician historical renting, respectively.

These historical lettings of agricultural land are located in the outskirts of urban areas, which are under considerable urban pressure. Therefore, such rental agreements of farmland are gradually disappearing. Indeed, the Galician Law 3/1993, of 16th April, established that historical rural renting and share-cropping had to end in 2005. However this law was modified by the Regional Government of Galicia by an emergency procedure in same year, 2005, to extend historical rural renting and share-cropping contracts until December 2010.

Other than the historical lettings of agricultural land, the law 1/1992 regulates a special kind of rural contract known as "share-cropping" which is of special relevance in some areas of Spain. The share-cropping contract is that which the owner of a rural property orders to leave a natural person (a sharecropper) in charge of this property in exchange for a percentage of the results obtained.

As outlined above, in the United Kingdom the tenancy regulations are different between regions. In England and Wales the “livelihood test” is part of the eligibility criteria for statutory succession to a tenancy, as prescribed in the 1986 Act. Previously, this obliged successors to have earned their principal source of livelihood from agricultural work on the holding for 5 out of the last 7 years. Successors could risk their right to succession if they drew significant income from non-agricultural activities on the farm, thus inhibiting diversification activities. The RRO allow successors, with landlord consent, to earn income from on-farm diversification or from activities off the farm which counts towards “the livelihood test”. The landlord’s agreement must be given in writing and it must have been given on or after 19 October 2006. The changes do not impact on a successor’s right to succeed to a tenancy where the principal source of income is from agricultural work on the holding.

The level of rent can be fixed for the entire term of the lease, increased according to a specified formula based on pre-agreed criteria, or reviewed according to the ATA. The first two methods of review are agreed between the parties at the commencement of the lease. An example of an agreed formula may be a rent that changes in line with the price of wheat. The statutory review requires the service of a valid notice of intention to review rent at least 12 months and less than 24 months before the review date. Statutory reviews can only take place every three years. The rent as set under the ATA requires that the open market rent is considered, taking into account certain considerations and disregards.

In order to claim compensation at the termination of the lease, tenant’s improvements require landlords' written consent prior to commencement, unless the improvement is a routine improvement as defined in statute. The amount of compensation at the termination is set out in the ATA but the RRO now allows landlords and tenants to agree an upper limit on the amount of compensation to be paid. This agreement must be made in writing. Any disputes regarding compensation may be resolved by reference to arbitration.

Whitehead et al. (2002) identified 3 types of FBTs being used in England: bare land only, land and buildings, and land buildings and house. Their analysis found that most lets of fewer than 25 hectares were for bare land and the median length of such leases was only 2 years. This contrasted with the average length of leases for land and buildings (3 years) and whole holdings (10 years). They reported that that the ATA had led to significant additional land being made available to let and that new landlords had entered the letting market using FBTs, particularly those withdrawing from farming but wishing to retain ownership of the farm.

The Agricultural Holdings (Scotland) Act 2003 introduced changes for tenants holding "traditional" leases under the Agricultural Holdings (Scotland) Act 1991. Part 2 of the Act came into force on 15 December 2004 and gives tenants with 1991 Act tenancies a *pre-emptive right to buy* to the land they lease. A tenant can register an interest in acquiring the land comprised in his lease and if the landowner intends to transfer the land, he must notify the tenant and must not enter sale negotiations until he has dealt with the tenant's interest. The tenant may purchase at a value fixed by a valuer, likely to be the price a reasonable and willing seller would sell where the buyer is a sitting tenant. In addition, under "traditional" 1991 Act a tenant's use of land for non-agricultural purposes was typically not permitted. These clauses no longer have any effect and if a tenant intends to diversify or plant and harvest woodland he must notify the landlord, who can seek further information or impose reasonable conditions relating to the proposed new use. The rent review process also changed and the *economic conditions prevailing within agriculture* now have much greater importance and in all situations distortion of market rents due to scarcity must be excluded when reviewing rents.

The Land Reform (Scotland) Act 2003 (Part 2) introduced, for *rural communities*, a pre-emptive right to buy land with which the community has a connection. The right arises in relation to land in which the body has registered an interest when the land comes to be marketed or sold. Part 3 of the Land Reform (Scotland) Act 2003 gives bodies representing *crofting communities* the absolute right to buy certain land.

5.2. Land market developments

In order to obtain a robust picture of land value response to the recent CAP changes, agricultural land values have been studied from two different perspectives: sales price and rental price development using two different measures: real price development and price indices, which capture annual changes.

Theoretically, if markets are perfect and transaction costs insignificant, then agricultural land prices and rents are expected to change in parallel. Although, this is sometimes observed in the EUSC, as we will see, there are quite a few exceptions.

5.2.1. Evolution of land sales market

In this section we analyse the sales market for agricultural land. The studied period 1992-2006 covers three major CAP reforms capturing both coupled and decoupled policy instruments. The sales market development is analysed using sales prices and the size of sales market for agricultural land. The land sales market development in EUSC is summarised in Table 5.

5.2.1.1. Sales price development for agricultural land

Land prices are highly variable, even when sales of land for non-agricultural uses and sales between relatives are excluded. Indeed, Eurostat data for land prices suggest that agricultural land prices are rather heterogeneous across the EUSC. In the peak years, land price difference between the most expensive country and the least expensive country exceeds 2000% ranging from some 2000 EUR/ha in Sweden to over 40000 EUR/ha in the Netherlands. These figures suggest that awarding the same amount of subsidy per hectare of agricultural land in different EUSC would have rather different impact on land prices. More precisely, a subsidy of 500 EUR/ha would have a considerably bigger impact on land prices valued at 2000 EUR/ha than on land prices valued at 40000 EUR/ha, because the subsidy share in the total land value is considerably higher (25% compared to 5%).

Studying annual price changes for agricultural land, we again found a rather heterogeneous pattern in land price development. The farmland price evolution ranges from almost 50% decline in Germany to over 250% increase in Ireland compared to the reference period 1992 (see Figure 3).

Countries with decreasing sales prices for agricultural land

The real sales prices for agricultural land have been decreasing only in two countries – Germany and Greece. The causes for the observed price decrease are rather different in the two countries.

In Germany the real sales prices for agricultural land have decreased most significantly since 1992. The nominal land sales market has remained relatively stable over the last 5 years. The total amount of land sold at market value annually has remained almost unchanged since 2005. Although land prices have been relatively constant on the aggregate level, in East Germany they increased slightly, while in the Western regions they have edged down (see Figure 53 in the Appendix).

Land prices on the sales market are affected not only by location and soil quality but also by the purpose of use. The highest prices were realised in Bavaria (especially in Upper Bavaria) and in North Rhine-Westphalia (particularly in the Düsseldorf district), in both cases largely due to the high demand for agricultural land for urban or industrial usage.

In the German region of Bavaria the main characteristic of the land market as well as the land market of the whole West Germany is the relatively high land price. In 2006 the land price was at 24,294 EUR /ha, which equates to the second highest value among federal states in Germany.

The German region of Lower Saxony is untypical for the federal states in West Germany. The land price in Lower Saxony averages 13,170 EUR /ha, which is below West Germany's average price of 15,941 EUR /ha.

In the German region of Saxony the Compensation and Indemnity Act was enacted in December 1994, while the Land Purchase Regulation (*Flächenerwerbsverordnung*) came into force in December 1995. Thus, purchases in the frame of the Compensation and Indemnity Act started in 1996. In 1998 they were stopped by the European Commission, because the Compensation and Indemnity Act was not confirmed within the EU-regulations. In 2000 the German Parliament changed the law and the land purchases started again.

For land sales that do not fall under the conditions of the Compensation and Indemnity Act (approx. 375,000 ha in the former GDR), the BVVG worked out a new concept to accelerate privatisation. The main idea of this concept is that land under contracts with remaining duration of two years has to be publicly offered for sale and for rent. Thereby, the farmer with the highest bid will receive the land. Thus, on the one hand the former tenant must buy the land if he does not wish to lose it, and on the other hand prices for land sold by the BVVG are rising. The interviewed experts criticised this practice of the BVVG and are afraid that prices for land sold by private persons will also increase in the future. However, till 2006 the sales prices for land in Saxony were relatively stable. In contrast, even after 1994 they were declining rather than increasing. During the first years after the reunification, the land sales prices were higher because people from West Germany came east with their ideas of land prices; in West Germany at that time, farmers paid an average of 14,000 EUR /ha for agricultural land.

In Greece the nominal sales prices for agricultural land have been decreasing less than in Germany and stabilised since implementation of the SPS. The average sales price varies between EUR 4500 and EUR 18000 per hectare. The sales price of agricultural land is much higher than the expected value of rents capitalisation, affecting the number of transactions. According to the unofficial information provided by Agrogi, there seems to be no linear relation or even regularity between the availability of agricultural land for sale and its price.

Countries with stable sales prices for agricultural land

The real sales prices for agricultural land have stayed relatively stable (changes<10%) in two large EUSC – France and Italy. Whereas in France the relative price stickiness is caused by rigid land market institutions, in Italy the price decline for agricultural land is mainly driven by demand factors.

In France the real price for agricultural land continuously increased from 1995 onwards (see Figure 3). In contrast, nominal prices have been increasing (see Figure 50in the Appendix). The increase is very pronounced, with a base 100 in 1994, the index of the average price was 208 in 2004. However, prices were much higher in advance of the 1990's, and the 2004-level has not yet reached the 1980's level. In 2004 the average price was 9,341 EUR/ha. The highest prices in France are found in NUTS2 regions Corsica and "Provence-Alpes-Côte-d'Azur" (extreme south-east of France) (respectively 17,530 and 14,290 EUR per ha in 2004), suggesting a pressure from urbanisation and tourism. This pressure is less of an issue in both the NUTS2 regions studied here, Bretagne and Centre. Price differences, addressed at the NUTS3 level are also attributed to price differences between types of land (vineyards being sold for example for a much higher price than other land).

For France the evolution of average sale price of agricultural land and other indicators (indices with base 100 in 1994) are reported for the period 1994 to 2004 in

Figure 51 in the Appendix. While agricultural output per ha and soft wheat price do not follow the same increasing trend as the agricultural land sale price, population density and to a bigger extent public subsidies do, in particular the direct payments from the First pillar of the CAP.

Based on 1994-2004 data, it seems that prices started increasing more strongly in 1996, but there is no shock over the period, rather a general upward price trend in France. From 1997, the global real-estate boom (due to low interest rates) resulted in more transactions and higher prices. Three more factors may have contributed to the increase of transactions and prices in the second half of the nineties: i) pre-retirement scheme, ii) environmental regulations, and iii) change in the rental index calculations. i) Introduced with the 1992 CAP reform, the pre-retirement scheme applied to farmers aged at least 55 years, and included the obligation to firstly rent out the land during 3 years before selling it and exiting the farming sector. 1996-1997 thus corresponds to the first sales after these 3 years. ii) Regarding the environmental regulations, following the 1991 European nitrate directive, since 1993 livestock farms have to conform to pollution standards (PMPOA, "Programme de Maîtrise des Pollutions d'Origine Agricole"); farms that implemented changes in order to comply with the standards became more expensive, while farms that did not conform became non-usable for agriculture and were sold as residences. Moreover, the environmental regulation constrains livestock producers to have a minimum area where they would spread the manure; this increases the competition for land and thus prices. Using data on individual agricultural land transactions in Bretagne between 1994 and 2000, Le Goffe and Salanié (2005) showed that the spreading "quota" has been capitalised in land prices, pushing them up. iii) Another reason that may explain such increase is the introduction in 1995 of a new way to calculate land rentals. Indeed, prior to 1995 rentals were based on theoretical land production potentials (in quintals per hectare). These (rather low) theoretical potentials were not reflecting either the exact evolution of the market nor its components. Therefore, an index-based rentals calculation was introduced from 1995. That has led to an increase in rental prices, and potentially may have resulted in higher land sale prices (the increase being attenuated by the SAFER intervention power).

In Italy the real sales prices for agricultural land have been on a slight decrease over the last 15 years (see Figure 3). Trends in nominal land prices show a clear long term increase in current values since at least the beginning of the '90s (Figure 60 in the Appendix), compared to a substantial stability of real values. Agricultural land prices have constantly increased, in nominal value (INEA, Banca dati dei valori fondiari); but in 2004 - 2006 the value was stable or slightly decreasing, because of low agricultural product prices and low profitability (Il Domani, Speciale Agricoltura, 19/04/2007, Luigi Rossi). In 2006 the average national price of land in Italy was 15,900 EUR/ha. Higher prices are reported in the North (North-west hill littoral and North-east plain being the highest). Lowest prices are reported for the South and Isles (interior mountain being the lowest). Land prices reflect the regional variety of conditions. Prices of agricultural land by location are reported in Table 28 in the Appendix. The variation in sales prices captures a wide average of very heterogeneous categories. Among the reported values by land use type, extremes range from 1000 EUR/ha for southern grazing land, to up to 516000 EUR/ha for vineyards DOC in Veneto (North).

On the long run average it seems that the land value tends closely follow the national inflation. However shorter term trends can be also recognised. Of interest for policy analysis is the stability of prices in the period just around major policy reforms (1992 and 2005). Though there can be different causes, this is mostly interpreted as reflecting a perception of uncertainty by the operators. This translates in a reduction of transaction and a stability of prices.

In the Italian region Emilia Romagna land sale prices differ by altimetrical zones and land uses. In mountain areas and arable land prices are about 6000 EUR/Ha whereas land prices for other crops are about 4000 EUR/Ha. In hill, arable land price is about 18000-22000 EUR/Ha, whereas other crops price is about 20000-36000 EUR/Ha. In plain, arable land price is about 30000 EUR/Ha, whereas other crops price is about 34000 EUR/Ha. From 1990, land sale prices have increased by 50% (INEA).

In the Italian region Puglia the average land prices are about 8000 EUR/ha for arable crops, about 50% of Italian average. The region is characterised by low competition with urban uses, except in some small areas. Agricultural land market is strongly segmented depending on water availability and land use specialisation. Irrigated land have prices as high as 60% more than non-irrigated land. Uses different from arable crops are often associated with vegetables, and, more frequently with olive production and have prices about 10-15% higher than arable crops on average. Differences between different altimetrical areas are not so strong as in other regions; however land for arable crops in plain have prices 40% higher than land for arable crops on in mountain areas. Land for other uses have prices in plain areas about four time the prices in mountain areas. Land market in Puglia is characterised by one of the lowest increase of prices in the last 15 years among all Italian regions. Prices of arable land increased by only about 15% between 1992 and 2006. The trend was the opposite for irrigated coastal hill arable land (decreased 30% at the beginning of the '90s and substantially stable afterwards). The slight increase happened with a regular trend during the '90s, then prices were roughly constant from 2000 to 2005. In 2006 prices were either the same as 2005 or slightly lower. In Puglia land sale prices are different for altimetrical zones and uses. In mountain, arable land price is about 6000 EUR/Ha, whereas other crops price is about 2000 EUR/Ha. In hill, arable land price is about 7000-8000 EUR/Ha, the same as other crops price. In plain, arable land the price is about 8000 EUR/Ha, whereas other crops price is about 10000 EUR/Ha. From 1990 prices have increased about 5%, which means that they decreased in real terms (INEA 2008).

Countries with increasing sales prices for agricultural land

In the rest of the countries – Belgium, Finland, Ireland, Netherlands, Spain, Sweden and the UK – of the study the real sales prices for agricultural land have been increasing since 1992.

In Belgium the sale prices for agricultural land have been increasing steadily since the middle of the 1990s. However, the development of sales price for agricultural land is highly different across regions (see Figure 38 in the Appendix). In Flanders the average real price of arable land and permanent grassland was relatively stable in the beginning of the 1990s, however since 1996 the average real price of all plots increased each year on average by respectively 2% and 3%.The real price of permanent grassland of all plots in Wallonia also increased each year on average by 3%. In contrast, the average real prices of arable land in Wallonia show a different evolution. From 1996 to 2004 the prices of all plots increased (yearly average +1%). Prices have remained constant since 2006.[27] Due to the break in the series, it is impossible to relate this relative land price decline to the introduction of the SPS or to the extensification of production, which was predicted by the OECD (OECD 2003).

In Finland real land sale prices have been steadily increasing since 1995 (see Figure 46 in the Appendix). The Figure does not suggest any unusual changes in land price since the introduction of the SPS. As noted in the section below, most of the SPS impact on the agricultural land market in Finland is through the its impact on the number of transaction, and not through land prices.

However, there is a significant portion of uncertainty in the Finnish land price data from 2007 onwards. This is because the land transaction represents a bundle containing both the land and the entitlement. Land buyers, if farmers, could include the part of land price agreed for the entitlement as farming expenses and therefore decrease the amount of tax due.

In Ireland the sales price of agricultural land has grown very strongly since 1990. The average price per hectare in 2005 was over 214 percent higher than the price in 1990. In the last 5 years for which annual data are available (2001-2005), the price of agricultural land increased by almost 17 percent (see Figure 59 in the Appendix). The factors behind the strong growth in land prices are largely unrelated to agricultural market and/or agricultural policy developments.

It is notable that there has been strong divergence in the path of agricultural land sale prices and agricultural land rental prices in the last 10 years (Figure 59 in the Appendix). This is particularly a feature of agricultural land near cities and towns with potential for rezoning for non-agricultural uses.

The largest year on year decline in land rental prices in Ireland over the period 1997 to 2006 occurred in 1998. The key factor behind this decline is not clear (the average 1998 rent was 30 percent lower than that in 1996).

Ireland has a highly dispersed rural population. Unlike elsewhere in the EUSC, rural dwellers are not concentrated in towns and villages and there is a strong desire to build so called “one off” houses (individual houses typically on plots of up to 0.25 hectares) in the countryside. Where farms have access to public roadways, it has not been uncommon for a farmer to sell several such plots over the last ten years.

[27] In 2005 prices suddenly dropped. The sudden drop can be caused by the break in the series.

Ireland is experiencing strong population growth, largely due to returning immigrants who had been based in other English speaking countries (e.g. UK, US, Australia) and due to immigration from other EU MS. This has created pressures for housing and other facilities which has also contributed to increased land prices.

In the Netherlands the land price dynamics for the last 15 years are characterised by three major developments. First, prices display a strong upward trend in combination with pronounced cycles. Second, huge price differences related to the location can be observed. Third, the liquidity of potential buyers is very volatile in time.

According to Figure 61 in the Appendix, during the 1990s, prices for agricultural land doubled, shooting up from 17,000 EUR/ha in 1993 to 36,500 EUR/ha in 2001 on a national Level. The average price growth rate in these years was 10% annually. From 2001 to 2005, prices fell by 17% before recovering pronouncedly in the last two years. The value of all agricultural land in 2006 is EUR 65 billion, which is about 10% of Dutch GDP. To put these growth figures into a different perspective, a comparison with the Dutch stock exchange is illuminating. The return on the Amsterdam stock index AEX was twice as big in magnitude. In the first 8 years after 1993, the AEX gained on average 20% per year, but lost 40% from 2001-2005.

Prices for arable land exceed prices for grassland, but the deviations are never large enough to allow for big gains from arbitrage. In the period 1993-2000, the difference was on average 1400 EUR/ha. In the years 2001 through 2007, the gap between the indices widens to on average 3200 EUR/ha. Since grassland was converted on a large scale into arable land during the entire period, the rising price difference indicates that either the cost of converting grassland into arable land has increased or that the quality of grassland on the market has declined. Probably, meadows at favourable farming locations were bought and ploughed up first, decreasing the average quality of the remaining plots.

In the Netherlands location is one of the key determinants of differences in land prices. In Table 33 and Figure 62 in the Appendix we observe very heterogeneous land prices across regions, and distinct regional price dynamics. The *IJsselmeerpolders*, for instance, with their very fertile soil, large plot sizes, and highly specialised agricultural production had the largest increase of all regions; especially in the last years. However, there were relatively few but extremely large transactions, complicating the comparison to other regions. Land in the specialised livestock production region *Zuidelijk Veehouderijgebied*, on the other hand, had a higher price initially, but experienced only half of the price growth in subsequent years.

A general trend of regional price catch-up can be observed in the Netherlands. Prices in regions with relatively low land prices in 1993 grew more than those with high initial prices. Anecdotal evidence suggests a trickle-down explanation for this phenomenon: Farmers from areas with high prices sell their land and move to larger farms in less pricy regions, driving prices up at their destinations.

Figure 62 in the Appendix plots land price developments for selected Dutch regions. Due to relatively poor soil, the land values for the *Veenkolonien* area are driven for a large part by the starch potato industry, an industry heavily reliant on EU subsidies, and not so much by the implicit call option. Values in *Westelijk Holland* are driven by both the high value horticulture and outside land possibilities and urban pressure. The two other regions follow the *Veenkolonien* price but at a higher level, because the soils allow for better returns in these two areas than in the *Veenkolonieen*.

According to Figure 63 in the Appendix, the tails of the transaction prices distribution are getting wider over time. In 1993, the range from the 10^{th} to the 90^{th} percentile was 1.5 times the median, while the range was about three times the median in 2007. We interpret this trend towards a higher share of very expensive plots as an indicator that the competition for land has increased. The positive outliers are probably areas with a high probability of being transformed to more profitable uses like property development.

In Spain three clearly distinct periods of land price evolution can be distinguished in the last 25 years. The first stage from 1983 to 1989, is characterised by a moderate rise in prices. In the second stage, from 1989 to 1992, land prices drop for all crops; while the third stage, from 1992 to the present-day, is characterised by a sharp increase in land prices, especially in recent years.

In 1992 a sharp inflection in market land prices took place, as land prices which has been dropping then increased, as a result of the CAP coming into being. As support payments were linked to productivity, land market prices went up.

Specifically in the period 1997-1999, land prices increased the most due to the EU payments. Once again in the two-year period 2005-2006, land prices increased due to urban pressure and due to the spectacular increase in housing prices in Spain.

In this way, it may be stated that the main characteristic of the land market in Spain in recent years has been the constant increase of its market value. On the one hand this has been due to increased productivity and to the higher number of supports, and on the other hand, to land being used for alternative uses.

Figures since 1990 indicate that the average annual increase in nominal values to 2006 has been 5.47%. In particular for the period 1997-1999, the average increase was about 13.95%. However, this increase has neither been homogenous for the Autonomous Communities (AC) nor for land uses.

If we analyse the different AC, an increase of 10.3% was noted in the Canaries followed by the Basque Country with 8.91% and Andalusia with 7.66% given their more relevant crops: banana plantations in the Canaries and olive groves in Andalusia; as opposed to Cantabria, Galicia, Asturias and Aragon, with only an increase in the period 1990-2006, of 1.69%, 2.09%, 2.33% and 3.21 %, respectively.

The price of non-irrigated grown olives for processing increased the most, by an average of 9.43% in the period 1990-2006, and in general terms, the opposite occurred with meadow lands which registered an increase of only 1.67 %.

As for land prices by AC, the highest price corresponds to the Canaries, for banana plantations, followed by the Valencian Community, for orange groves and because of the influence of tourism, which were followed by the Balearics and Andalusia, whose values in the year 2006 were of 73,902, 31,635, 20,736 and 20,536 euros/ha, respectively. Conversely, the lowest prices were given to Aragon, Extremadura and Castille-Leon, 3,786, 4,419 and 4,554 euros/ha, respectively

If we analyse prices by crop use, the highest price was for irrigated orange groves, 70,385 euros/ha in the year 2006, not because of their profitability as a crop, but because they are located in the Valencian Community and part of Andalusia, where the pressure for land created by tourism is immense. The price of land for non-irrigated olives for processing, mainly located in Andalusia, differed greatly at 21,229 euros/ha, while pasture lands obtained the lowest price in the whole period considered, at just 2,883 euros/ha.

In Sweden the prices for the most common sales of agricultural land – arable land and grazing land – have been increasing. The price of arable land was around 2000 EUR per hectare on average during 1990-2005 and the price of grazing land was on average around 700 EUR per hectare. Figure 40 in the Appendix plots the development of land sale prices since 1990. It clearly shows that prices of grassland have increased at a faster rate than prices of arable land. This trend is particularly strong during the last couple of years. The strong growth of prices of semi-natural grazing land in the recent years is, most probably, explained by the introduction of SPS, since this type of land was not eligible for direct payments previously. Payments to semi-natural grazing also come from environmental support. Environmental support amounts to 263 EUR per hectare on average, which is nearly 20 percent of the sales price in 2005.

In Sweden agricultural land is often sold as a part of agricultural property, which also includes other assets (buildings, forest land etc). Accordingly, land prices are based on calculations on the contribution of agricultural land to the value of the property. In 2005, a new method to calculate how much of the value of an agricultural property is attributed to agricultural land was introduced, which makes it difficult to compare the recent years with earlier years. There are two different estimates of land prices available for 2005. Furthermore, land prices are considered as underestimated for the period 1999-2004 according to the National Board of Agriculture.

In Table 34, prices of agricultural land are shown using the new valuation method. Prices are somewhat higher than with the old method. Prices are also higher in 2006 compared to in 2005. The increase in agricultural land prices in 2006 was a little more than 10 percent. Grazing land prices increased more than arable land prices (20 percent).

A close look at the yearly changes in land prices reveals that arable land price changes varied substantially in the beginning of the 1990s (see Figure 75 in the Appendix). They increased more than average in 1996, 2000 and 2006. The changes in the beginning of the 1990s could be attributed to the agricultural reform that was introduced before Sweden joined the Union in 1995. In 1994 the efforts to implement this reform were discontinued and land sale prices have increased most years after 1995.

Prices of grazing land vary more than prices for arable land, although both prices seem to display a similar pattern. Price increases for grazing land were substantial in 2004 and 2005.

Since the quality of land varies between different parts, of the country it is interesting to look at the regional variations in land sale prices. Figure 76 in the Appendix plots land prices in six different regions and the average land price of these regions during three time periods; 1990-1999, 2000-2004 and 2005-2006.

The most fertile land in southern Götaland is sold at much higher prices than land in the northern part of the country or land in the forest districts. For example, prices in the plain districts in southern Götaland were 12 times higher than in the upper parts of Norrland in 2005-2006.

The change in land prices seems to be in the same direction across the country. The plain districts in Svealand and in southern Götaland, however, have the highest increases in prices. In these two areas, land price increases have been above the national average during the period 1990-2005. Also central and forest districts of Götaland, in the south, have had substantial increases in land prices. In forest districts further north, in central Sweden and in Norrland, prices have not increased at the same rate as in other parts of the country.

In the United Kingdom, in recent years there has been a considerable increase in land values, particularly in Northern Ireland, where, according to figures published by DEFRA up until 1996 land values were at a similar level to those in England, at around £6,000 per hectare (see Figure 83 in the Appendix). Since then, there has been an unprecedented annual increase in the value of agricultural land and Northern Ireland, rising to over £20,000 per hectare. This is in part, is due to the dearth of land available to purchase as expressed in the Northern Ireland regional report. According to the DEFRA figures land values in Scotland, Wales, and England decreased in the early 1990s, before increasing up until 2001. However, these figures do not appear to pick up the stagnating market in the late 1990s that most land agency firms reported.

Up until the 1990s, there did appear to be a strong link between land values and farm profitability but that appears to have diluted, with the emergence of buyers who purchasing farmland for wealth and lifestyle reasons. The emergence of these buyers has been incredibly significant in stimulating demand and Savills Research suggests that in recent years around 40% of all buyers have been lifestyle purchasers.

Figure 87 in the Appendix shows how the supply of farm land in England is low in comparison to pre 2000. However since 2004 there has been significant growth (63%)

in land vales and the amount of land being marketed has increases from its low of only 35,337 hectares in 2003 (60% less than the amount sold in 1998). Although the publicly marketed land does not account for all land traded in England (there are many private sales) it is indicative of the prevailing market conditions and the total amount of land being sold. Clearly 2001 sales of land were badly affected by the Foot and Mouth Disease crisis in the UK meaning very little land was put forward for sale. In 2003 and 2004 anecdotal evidence suggests that there was considerable uncertainty surrounding the mid-term review of CAP and the proposals for the introduction of a SPS.

Figure 87 in the Appendix also shows that English land values fell by 10% between 1999 and 2003 before making a dramatic recovery to and average of EUR 13,259 per hectare in 2007. This dramatic recovery is considered further in Figure 88 in the Appendix which shows the average value of different land types in England since 1993. It is interesting to note that in the early 1990s that dairy land had the highest value but was quickly overtaken by prime arable land which by 1997 was EUR1,650 per hectare more expensive than dairy land (reflecting the margins that were being made from those different types of farming). As expressed above the land values in England saw stagnation and decline between 1998 and 2003 but have seen rapid growth since 2003 to reach record levels. Since 2004 better quality arable and livestock land has not grown at such rapid rates as poorer quality livestock and arable farmland as shown in Table 36. This is attributed by some commentators as being attributable to (a) an increase in demand for poorer quality land by lifestyle buyers (as it tends to be located in more scenic areas) and (b) some effects of the SPS movement to a flat rate scheme making marginal land more attractive as an investment because the entitlement value is growing relatively faster than for the better quality land which had higher historical payments.

Figure 89 in the Appendix shows the regional variation in "average" farmland values across England where land values in the East of England are consistently above those in other regions, being EUR3,364 per hectare higher in 2007 than in the West Midlands. The variance in regional prices can be attributed to the quality of the farmland (production potential) in each region and also the level of demand for land from lifestyle purchasers.

Figure 95 in the Appendix shows the rapid growth in farmland values in Northern Ireland over the last 10 years (average increase of 14% per annum since 1993 with 45% increase between 1996 and 1997 and 25% increase between 2001 and 2002. The rate of land value increase did appear to slow between 2003 and 2004, falling to just 8% growth during the year (perhaps because of the uncertainty of SPS implementation).

Figure 99 in the Appendix shows the long term trends in agricultural land values in Scotland since 1992. Between 1994 and 1997 there was significant growth in all types of Scottish farmland, largely as a result of increased profitability in the farm sector and the increased interest in farmland by "lifestyle" buyers. These values largely stagnated in the late 1990s as farming incomes were suppressed, and this continued until 2004 and the pick up in the fortunes of the agricultural commodity prices. Between 1993 and 2007 arable land values (~75%) and better quality grazing land values (77%) did not grown as quickly as dairy values (93%) and poor livestock land (104%).

5.2.1.2. Number/share of land sales transactions

The extent of activity in the agricultural land sales market provides an indication of reaction of market participants (i.e. buyers and sellers) to changes in external environment, such as implementation of the SPS, increase in food prices or changes in opportunity profits of alternative land use.

The national statistical data for land market transactions suggest that the share of agricultural land sold on markets has stayed rather stable in most of the sample countries (see Figure 4). This implies that changes in agricultural policies do not affect the amount of land sale transactions. Only in three countries - Finland, the Netherlands and United Kingdom – has the farmland market been more dynamic in terms of transacted area. In these three countries the share of agricultural land sold in the total UAA is higher, and it is fluctuating more significantly year on year than in other countries in our sample. However, even in these countries, changes in extent of land sale transactions cannot be straightforwardly attributed to changes in agricultural policy.

Countries with fluctuating share of sold agricultural land

In Finland the average size of the area owned is very small (5.5 ha) but concentration of landownership is high. About one fifth of owners own more than 60% of all arable land. Typically, these landowners with larger areas were farmers. However, the majority (54%) of landowners did not receive income from agriculture. About 24% of the agricultural land was owned by these passive landowners who did not take part in commercial production or land leasing.

In Finland the number of land sale transactions has been fluctuating between 4,500 and 6,500 per year over the last ten years. 2005 was an exceptional year, when almost twice as many land sale transactions were registered as in 2004. This exceptional year could be related to changes in investment support programmes, regulations in generation transfers and farmers' predictions about changes, as well as uncertainty over the continuation of the temporary early retirement programme.[28] Uncertainty about future support has encouraged farmers to exit before the expiry of the programmes. The uncertainty was important for land markets because the large 'baby-boom' generation reached early retirement age at this time. In 2005start-up support grants for new farmers were introduced and these were valued at EUR 25,000 for crop farm and EUR 55,000 for livestock and dairy farms. This policy boosted inter-generational land transfers remarkably, i.e. sales between relatives, in 2005 (Figure 45 in the Appendix).

The number of land sale transactions has been steadily decreasing since 2005. On the one hand the number of inter-generation transactions decreased. On the other hand, the

[28] The early retirement system was supposed to be renewed in the beginning of 2007. However, the renewal of the system was open and especially the age limit in farm succession was questioned. Minimum age was raised from 55 to 56 years in 2005 and there was a threat that it would be raised again in 2007.

SPS was implemented. Because of the future prospects of an SPS payment stream, some potential sellers opted to hold on to their land.

The number of sales transactions is strongly correlated with the yearly average transacted area. In Finland the yearly average transacted area was 47,000 ha over the perio 1998 - 2007. However, there were some exceptionally high years such as 2005 and 2006 and some low transaction years such as 2000. While the total agricultural area transacted on the markets was 2.3 million ha, the length of rotation in land ownership is almost 50 years. The evolution of the transacted area of agricultural land is reported in Figure 44 in the Appendix.

In the Netherlands the depth of the market is subject to large variation across time and is correlated with the price of land (see Figure 66 in the Appendix). In the boom period of 2000, 5% of the total agricultural area was traded, compared with only 2.5% during the price dip three years later. This pattern is shared across the regions, but large regional differences exist. In the Northern Provinces of Groningen, Friesland and Flevoland, for instance, a higher share of the agricultural area is traded than in the rest of the Netherlands, making it easier for a farmer (or an investor) to buy or sell land if needed. The regional land markets became harmonised in 2002, when the regional shares of transacted area moved towards a common range of 2-4%.

In the United Kingdom around 1.6% of GB land was turned over in sales in the 1960s but this has now fallen to about 0.6% of GB land being sold per annum. Savills Research estimates that private transactions account for about 15% of the land market transactions with the remainder sold through public means, and as such the use of publicly marketed land as a proxy for area sold, is sufficient enough to give an accurate picture of trends. Figure 84 in the Appendix shows the average number of hectares, publicly marketed in Scotland, England and in Great Britain from 1990 to 2007 and the reported price per hectare. The figure shows that the GB land market is closely tied to the value of English farmland, despite significant areas being sold in Wales and Scotland (particularly pre-2000). Figure 84 in the Appendix also clearly highlights how the supply of land in Scotland has been particularly stifled in recent years, and how land supply in England has partially recovered since the very low levels marketed in 2003. It is evident that English and British land values have increased significantly since 2003, although Scottish values have lagged somewhat behind (e.g. Scottish land values are 75% of English values in 1988, whereas they are now only two thirds of the English values).

In Northern Ireland many farmers increase the size of their farm business by taking land in conacre. However, in the new era of decoupled support, some of the reasons for taking conacre have changed as, for example, extensification payments and livestock numbers no longer affect the amount of subsidy received by a farm business. Despite the expected reduction in demand for conacre to meet extensification requirements, according to commentators the limited supply of conacre land each year rarely matches demand levels[29].

Figure 95 in the Appendix highlights how little land is sold annually in Northern Ireland. In 1993[30] 4,721 hectares were sold in 467 transactions (small average plot sizes) and the supply to the land market continued to fall to a low of jus a mere 520 hectares in 2003 from 44 transactions. Clearly this constricted supply of land to the market is one of the key factors in driving land values up. Despite the supply of land doubling in 2007 average prices still increased by 25% to EUR36,480 per hectare as demand continues to considerably outstrip supply of land. Moreover, because Northern Ireland is geographically remote from the rest of the UK it means that land values have little relationship to the other regions (which do follow similar trends and influences). Despite the high sale values of farmland in Northern Ireland in recent years, many landowners choose not to sell land because of their desire to carry on a family tradition, where land is passed down from generation to generation.

Figure 97 in the Appendix shows how the supply of farmland in Scotland is very low in comparison to pre 2000, despite the significant growth (76%) in land vales since 2004. Although the publicly marketed land does not account for all land traded in Scotland (there are many private sales) it is indicative of the prevailing market conditions and the total amount of land being sold.

In 2000 some 46,579 hectares were marketed compared with only 35% of that in 2007 (16,152Ha). There was a significant decline in the marketed are for sale in 2004, perhaps due to the uncertainty in the rules relating to the SPS implementation.

Countries with stable share of sold agricultural land

In most of the countries in our sample the agricultural area sold has been pretty stable (and low) during the last fifteen years. Although, there are no significant differences in the shares of farmland sold between countries (see Figure 4), the factors driving the sales market differs not only between countries, but also between regions within countries.

In Belgium the number of sales transactions for arable land and permanent grassland has steadily decreased over the last twenty years (see Figure 37 in the Appendix). The decreasing number of land sale transactions could be explained by the increasing number of informal/illegal tenancy contracts and "seasonal tenancy contracts" between pensioners and young farmers. This implies that instead of selling their land, the retiring farmers tend to rent the land out, which decreases sales supply but increases the supply

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[29] For example see http://www.macpr.co.uk/index.php/news/show/125

[30] In 1982 there were 921 transactions involving 8,950 hectares at a value of £2,683 per hectare

of informal/illegal tenancy contracts. The number of transactions seems to stabilise since 2005.[31]

In France the number of agricultural land sale transactions has followed a general stagnating trend over the period 1994-2004, with a slight increase in 1997 – 1999 but a decrease back in 2001 (see

Figure 48 in the Appendix). The number of sales transactions is around 80,000 per year.

Regarding the evolution of the area transacted, it was 274,271 ha in 2004, which is equal to 0.93% of the total UAA. As shown in Figure 49 in the Appendix, despite an increase in 1994, the decrease in 2001 in the number of transactions is confirmed by a decrease in the number of hectares transacted. This 2001 decrease may be due to farmers' anticipations regarding the implementation of SPS on a historical basis: sales were kept limited in order to retain a reference area as large as possible during the period 2000-2002. Anticipations may also have played a role in 2004, where farmers waited for the SFP modalities to be decided.

In Germany the sales market has remained relatively stable during the last 5 years. Despite the rapid structural changes in the agricultural sector there are hardly any sales transactions for arable land or grass land. In 2005 only 0.6 % of agricultural land was sold (58,200 ha in East and 38,500 ha in West). The main trait of the German agricultural sector, its two-fold nature, has made an even stronger appearance in the last years. An overview of transactions on sales market in 2006 is given in Table 24 in the Appendix.

In East Germany there is pressure on farms to buy land, which is caused mostly by (i) the ongoing privatisation of land managed by the state trust holding BVVG (Bodenverwertungs- und Verwaltungs GmbH), and (ii) the selling of land by owners or heirs who are not active farmers. Nevertheless, the total amount of land sold at market value annually has remained almost unchanged since 2005. During the same period, the number of areas sold at reduced prices according to the Compensation and Indemnity Act[32] has dropped significantly, which has led to the overall decline in areas transacted on sales market.

Hence, in Germany with the present share of 40 % of owned farmland and 0.6 % of new sales transaction p.a., the sales market plays a secondary role in the German land market.

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[31] Due to a break in the series it is difficult to interpret the number of transactions around 2005.

[32] German: Entschädigungs- und Ausgleichsleistungsgesetzt (EALG).

In the German region of Bavaria the main characteristic of the land market as well as the land market of the whole West Germany is the small number of transactions in comparison to East Germany. In 2006, only 5,569 ha UAA were sold in Bavaria, this equates to 0.16 % of the total UAA in Bavaria. This is the lowest share of sales of all federal states in Germany. For 2006, the average share of sales adds up to 0.31 % in West Germany and 0.94 % in East Germany (STATISTISCHES BUNDESAMT 2006).

The German region of Lower Saxony is untypical for the federal states in West Germany. In 2006 14,783 ha UAA were sold, equating to 0.52 % of the total UAA in Lower Saxony. It is the highest share of sales of all federal states in West Germany, approximately as high as in Saxony (0.54 %). In 2006 the average sales constitute 0.31 % in West Germany, and 0.94 % in East Germany (Statistisches Bundesamt 2006).

In Greece most of the land for sale belongs to those who have moved to urban areas. This verifies the fact that the residents of rural areas are not willing to sell their holdings, apart from cases of potential economic problems. Land-owners who live in towns do not sell their property not only for sentimental reasons, but also because they plan to use their land when they retire and move back to rural areas. Moreover, the limited number of transactions in (semi-)mountainous areas, combined with the large share of abandoned land, indicates the decreased interest of potential buyers in investing in such holdings, as they cannot exploit them for non-agricultural activities. Transactions are mainly reported for plots that are located next to those of the buyer and the latter wants to increase his property and/or avoid any frictions and litigations with the neighbours. As a consequence, agricultural land sale transactions are very few and involve holdings located in plain areas, near towns and with certain prospects of future use as house-sides. It should be noted, finally, that if part of the state-owned land is sold, then the selling price is relatively low.

Moreover, in the majority of rural regions, there is no land available for sale. This indicates that investors are not interested in buying agricultural land if land cannot be used for activities other than agriculture. If land is located close to towns, seaside tourist resorts, or regions of agro-tourism, then its use will change if it is sold. This affects the level of demand that does not relate to agricultural investments and the selling price of agricultural land, distorting its market. In addition, the availability of land for sale is non-existent in regions with low prices, whereas there is land available in regions of higher prices. It should though be noted that land for these two categories does not differ in terms of productivity.

However, perhaps the greatest distortion in the availability of agricultural land for sale is caused by the land owners' dual activity. The latter prefer to either rent out their holdings, particularly in cases of arable land, or to exploit only occasionally their land, particularly in cases of permanent plantations (e.g. olive groves). The income earned from this additional activity increases their family income. However, this situation affects the level of land for sale, provided that non-farmers retain agricultural land and under-exploit it, leading often to ecological degradation of this land and to the reduction of its productivity.

Overall, agricultural land for sale in Greece is rather limited and various non-economic factors affect the level of selling prices.

Ireland has a highly dispersed rural population. Unlike elsewhere in the EUSC, rural dwellers are not concentrated in towns and villages and there is a strong desire to build so called "one off" houses (individual houses typically on plots of up to 0.25 hectares) in the countryside. Where farms have access to public roadways, it has not been uncommon for a farmer to sell several such plots over the last ten years.

Ireland is experiencing strong population growth, largely due to returning immigrants who had been based in other English speaking countries (e.g. UK, US, Australia) and due to immigration from other EU MS. This has created pressures for housing and other facilities which has also contributed to increased land prices.

In Italy, land sale transactions account for about 1-2% of the total available UAA each year, though precise information about sales market exchange is not available (Gallerani et al. 2004). Moreover, a large number of agricultural land transactions, are actually driven by non agricultural use, e.g. the prospect of building. Given that land is usually exchanged together with related assets (such as farm buildings), makes it difficult to elicit a clear price for land in isolation. In addition, in most cases, the subsequent use of land is not known, so that the role of non agricultural drivers is very difficult to elicit.

In Spain the land property market lacks transparency, although highly active, as we can deduce from the 200,000 property transactions of sales and purchases of rural properties, and the 50,000 mortgages that have been set up on average in Spain in the years 2004-2007.

This lack of transparency in the land market is due to the fact that there is not enough detailed information available, and besides, statistics become available only after a time lag - for example in May 2008, the values for the AC and the large crop groups for the year 2007 were still to be published. At the autonomic level, the data are somewhat more detailed since the 17 AC are disaggregated into 48 provinces. Furthermore, direct access to these data, which have been broken down, is not automatic since some communities have not supplied their data.

On the other hand, the average value of mortgages is seen to grow more rapidly in recent years to an average of 12.8% in the period 1990-2007, and of 27.9% in the period 20003-2006 than the price of land, which increased at an average value of 5.47 % in the period 1990-2006. This indicates that land is becoming concentrated and, therefore, the rural properties which are bought or mortgaged are becoming increasingly higher.

A slight decrease in the number of property transactions for purchases and sales was noted in 2007, which went from 218,787 purchases/sales and 53,590 mortgages in 2006 to 189,785 purchases/sales and 47,910 mortgages in 2007. The reasons for this decrease are multiple: uncertainty perceived about the future of the SPS, the expected capital gains through urban development, the recent real estate crisis which has made land become a safe asset that the owner does not wish to be parted with, and other recent alternative land uses: biofuel production and the installation of solar energy plants.

In Sweden only a small part of the total utilised agricultural land is being sold (see Figure 72 in the Appendix). The share does not seem to have changed much over recent years. In 1999 an unusually large amount of land was sold compared with other years. The reason may be that in 1998 property was given new taxation values which probably caused more sales than usual in 1999. Since then, the share of sales has been stable at around 0.6 percent of the total utilised area. Although, land sales have become a somewhat smaller part of the total utilised agricultural area, the number of transactions has increased. In the beginning of the 1990s the number of transactions was around 2000 per year compared to about 2500 in 2006.

5.2.1.3. Average size of transacted plots

This section describes the development of the average size of transacted area, which is a further indicator of behaviour of land market participants.

In Belgium the average size of a transacted area is more or less stable over years at around 0.9-1.0 ha. It is bigger in Wallonia than in Flanders, which could be explained by the fact that the average farm size in Wallonia is 2.4 times bigger than in Flanders and the fact that the region is less dense populated. Given that the average sales plot size has remained roughly the same over time whereas the number of transactions decreased (see section 5.2.1.2), the transacted area has decreased during the period 1990-2007.[33]

In France the average size of land sale transactions has been fairly stable over the last 15 years at around 3.3 ha. The relative stability in the observed pattern of the average size of farmland sale transactions is likely to be determined by the rigid sales market regulations in France.

In Germany there are significant differences in the average size of transacted plots across regions. Generally, in East Germany the average size of an agricultural land area sold is considerably higher than in West Germany. In the German region of Lower Saxony the average plot size of agricultural land sold fluctuated between 2.4 ha and 2.7 ha in the recent past.

In the Netherlands the distribution of plot sizes for transacted land is highly concentrated around small plots of up to two hectares (see Figure 64 in the Appendix). On a national level, 50% of all areas sold are smaller than 2.7 ha. Again, large differences prevail across regions (see Figure 65 in the Appendix). The relatively young agricultural areas located in the IJselmeerpolders in the Province of Flevoland (FL) have plot sizes more than 8 times the national average. The agricultural areas in the centre and the south of the country, however, have smaller plots due to their different topographic situation and limited consolidation of land holdings (so-called *kavelruil*).

In Sweden the average plot size of transacted area has decreased (see Figure 73 in the Appendix). The average plot size sold was less than 8 hectares in 2006, a decrease from

[33] A similar evolution can be found for the plots between 1 and 3 ha.

around 14 hectares in the beginning of the 1990s. Most of the registered transactions are small holdings. For example, in 2005 85 percent of traded plots were smaller than 10 hectares. These small plots are normally bought to enlarge holdings. The increased sales of small plots could thus be part of the structural change of the sector; farms are becoming larger over time. On a regional level, plots sold are smaller in northern Sweden and larger in the Stockholm area, the south east and the south.

For the United Kingdom the average number of hectares, publicly marketed in Scotland, England and in Great Britain, as a whole from 1990 to 2007 and the reported price per hectare is shown in Figure 84 in the Appendix. The figure shows that the GB land market is closely tied to the value of English farmland, despite significant areas being sold in Wales and Scotland (particularly pre-2000). Figure 84 in the Appendix also highlights how the supply of land in Scotland has been particularly stifled in recent years, and how land supply in England has partially recovered since the very low levels marketed in 2003. It is evident that English and British land values have increased significantly since 2003, although Scottish values have lagged somewhat behind (e.g. Scottish land values are 75% of English values in 1988, whereas they are now only two thirds of the English values).

5.2.2. Evolution of rental market

In contrast to the sales market, the rental market for agricultural land is to a lower extent subject to non-agricultural investor demand. However, if the rental duration is relatively long and regulated by the state, also rental markets may reflect to some extent the opportunity profits in non-agricultural sectors. The rental market development of agricultural land is summarised in Table 6.

5.2.2.1. The evolution of rental price

In this section we analyse rental prices for agricultural land. The evolution of real rental prices for agricultural land in the EUSC for the period 1992-2006 is plotted in Figure 5. Figure 5 offers a cross-country comparison of the rental price levels, the direction of price changes (increasing/decreasing) and the rate of changes.

The FADN data for rental prices suggest that the rental price heterogeneity is lower than the sales price heterogeneity across the EUSC. Moreover, the cross-country variation is increasing over time (from 600% between the lowest and highest country in 1992 to over 700% in 2006).

Annual rental price changes have been studied using the same FADN rental price data. Similarly to the sales prices for agricultural land, the rental price development has been highly heterogeneous across the EUSC ranging from -14% decline in Greece and the United Kingdom to 54.1% increase in Spain compared to the base year 1992 (Figure 6).

According to Figure 5, we can distinguish three distinct patterns for rental price development in the period 1992-2006. The real rental price for agricultural land decreased in Germany (-37.4%), the United Kingdom (-13.7%) and Greece (-13.6%). In Finland and France the real rental price for agricultural land changed insignificantly

(<5%). The real rental price for agricultural land increased in Belgium (+16.8%), the Netherlands (+17.8%),[34] Italy (+24.4%), Sweden (+30.1%) and Spain (+54.1%).

Countries with decreasing rental prices for agricultural land

The most significant decline in real rental prices has been experienced in Germany. Partially this is due to the unification with East Germany. However, real prices have declined also in West Germany since 1992. Although we can observe a convergence of rental prices between West and East Germany the ratio is still almost 2:1 in 2005.

There exist a number of explanations for this rent gap between East and West Germany. For instance, Balmann (1999) shows, that these are, the low livestock density in East Germany, and unexploited returns to scale by family farms in West Germany, Another explanations lies in the way the BVVG awarded rental contracts after the reunification. The administrative prices by the BVVG served as focal point for the rental market. Although this changed in the last years (as we discuss later on) the effects are still present due to the often long duration of rental contracts.

The ongoing discrepancy between rental prices in West and East Germany are in part due to the differences in farm structure. While farms in East Germany face high opportunity costs for the used factors, this is often not the case for family farms in West Germany. Unused labour capacity, high self-financing shares (which ease access to credit capital) and the high stocking densities determine the high rental prices in West Germany.

At the regional level a sizeable heterogeneity in rental prices can still be found.

Figure 56 in the Appendix reports the rental prices for arable and grass land on the level of federal states in Germany. The states with the highest rental prices are North Rhine-Westphalia (NRW), Lower Saxony (NS) and Schleswig-Holstein (SH), whereas the lowest prices can be found in Brandenburg (BB), Saarland (SL) and Saxony (SN).

In Bavaria the land rent for new rented areas increased from 260 EUR /ha in 1999 up to 275 EUR in 2005. In the case study region, in the period 1999 to 2005 the land rent market is characterised by increasing prices (growth rate 6 %) and increasing rent share (growth rate 17 %).

In Lower Saxony the land rent for new rented areas increased from 339 EUR /ha up to 349 EUR /ha between 1999 till 2005. In summary, in the period from 1999 to 2005 the land rent market in the case study region is characterised by increasing prices (total growth rate 2.9 %).

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[34] The Netherlands is not plotted on the graph, as the rental price for agricultural land is considerable higher (635 EUR/Ha in 1992 and 866 EUR/Ha in 2002) than in other EUSC.

In Saxony in contrast to sale prices, rental prices have constantly increased since reunification. In 1991, the average rental price for arable land in Saxony was 72 EUR /ha, which by 2005 had increased 71 %, to 123 EUR /ha. However, farmers are actually willing to pay more than 200 EUR /ha for renting arable land.

In Greece the rental price depends on the demand for rental land, which is a function of land fertility, morphology, type of plantation, etc. Figure 26 in the Appendix presents index of agricultural rents in Greece.

Rents are maintained at relatively low levels, as farmers expected higher revenues from the level of production and not from the land. There are though regions where rents are relatively high affecting the cost of production.

Occasionally tenants prefer to give to owners part of their production (payment in kind and up to 30-50% of total production) instead of money. No differences are observed in terms of rents paid to the owners who have moved to urban areas and to those who remain in rural areas.

In many regions the real value of land also differs from its rental rate. The market value and rents of agricultural land in Greece are indicated in Table 27 in the Appendix. It is often argued that it is the rental prices that better reflect the real value of agricultural land, as the selling prices usually do not correspond to the quality and fertility of the soil.

In the United Kingdom the farmland rental figures are not published on an annual basis. However, DEFRA do publish an index of average rents in UK countries. Figure 86 in the Appendix highlights that since 2000 average rents in Britain have remained relatively stable having grown 30% between 1989 and 2000. According to these figures, average rents in Scotland grew significantly during the 1990s but have since died off and have actually fallen since 2004 (introduction of SPS has perhaps had an effect on the market). Rents in Northern Ireland are also reported to have decreased significantly since 1997, although that is not fully reflected in the conacre rents discussed in the Northern Ireland regional report.

Figure 91 in the Appendix reveals the average rents paid for leased land in England between 1996 and 2006. As full agricultural tenancies are long term (often inter-generational) leases the average rents tend to remain relatively stable through time and the decrease from 1999 to 2002 is symptomatic of the returns to agriculture in those years. Those tenants with rent reviews during that period would have pleaded hardship and landlords would have to take that into consideration in agreeing the levels of rent to set (if needed arbiters can be used). Since 2004 there has been a slight increase in the rents paid on full agricultural tenancies as returns to farming started to recover. Farm Business Tenancies rents have declined by 34% from their peak of EUR220 per hectare in 1997 largely because they are shorter term agreements and better represent the prevailing market for leased land (in terms of supply and demand) with farmers being shrewd when considering the economic benefits of taking on additional land.

Since they have continued to decline after the pick up in farming returns from 2004 onwards this can be interpreted as either (a) the SPS area payment being taken by the landowner (of short term leases) with a corresponding reduction in rents to account for the loss of CAP support by the producer, or (b) farmers not needing to take on additional land to meet CAP support requirements under the coupled regime (e.g. extensification) meaning that there is an oversupply in the market putting downward pressure on rents. Figure 92 in the Appendix reports a breakdown of these FBT rents by farm type and it is evident that rents have been reduced in all sectors with the exception of dairy which fluctuated at around the EUR210 / hectare. This figure also shows the significant variance in rental value of less favoured area grazing and cropping land which fully reflects the earning potential of the different types of land. These trends are also shown for full agricultural tenancies in Figure 93 in the Appendix.

Figure 98 in the Appendix shows the average conacre rents in Northern Ireland over the last 10 years. Overall "average" values are closely tied to rents paid for grassland and currently grassland is leased for around EUR255 per hectare with potato rents more than 3.2 times that value at EUR832 per hectare. Average rents have remained relatively stable over the last 10 years although grass land rents fell 13% between 2004 and 2006 and cereal rent and rough grazing rented also falling by 17.7% over a similar timescale. Rental values of conacre for potatoes increased by over 29% between 2004 and 2006, perhaps as a result of allowing SPS entitlements to be enabled on such crops for the first time (i.e. because of the area payment of the hybrid system).

Countries with stable real rental prices for agricultural land

In Finland there are no official statistics on land rents. The level of land rental prices is estimated from National Accounts. It is based on two data sources: first, rental charges paid by farmers and, second, the rented area.

According to the interviewed experts, predictions related to profitability have had a significant impact on farmland prices in Finland.

In France the rental prices have slightly increased from 112.1 EUR/ha in 1997 to 122.3 EUR/ha in 2004.[33] However, these negligible changes are not representative for the land market trends in France, rental (and sales) markets for agricultural land are heavily regulated in France.

In Ireland the rental rates of agricultural land have been in decline over the last ten years. Figure 59 in the Appendix illustrates the evolution of agricultural rental rates since 1997. Average rents in 2006 were over 33% lower than in 1997.According to Figure 59 in the Appendix, farmland rents have changed significantly during the last 10 years. The largest yearly decline of land rents over the period 1997 to 2006 occurred in 1998. It is not clear at this point what the key factor behind the large decline in rents was (the average 1998 rent was 30% lower than that in 1996).

Countries with increasing rental prices for agricultural land

In Belgium in most cases the maximum rental price, as determined by the government, is paid. The additional amount that is paid varies depending on the circumstances. The implementation of the SPS increases the additional amount paid through a supply reducing effect. Since 2005 farmers only need to keep their land in good agricultural condition to receive payments. Hence, instead of quitting and renting out their land, pensioners without successor hire labour to keep their land in good agricultural conditions and they can activate their entitlements on the land.

Next to the factors that influence the additional payments there is also the increase in the seasonal contacts and informal contracts, which are related to the low official tenancy prices, the introduction of the direct payments and the uncertainty on zoning regulations.[35] Because of data paucity it is impossible to quantify the evolution neither of additional payments nor the number of seasonal contracts.

Figure 34 in the Appendix reports the evolution of the reported average rental prices of arable land and permanent grassland in Belgium. The data are expressed in constant 1989 prices. According to, the real rental prices in Belgium are almost stable over time, especially after 2000, and are evolving for the two types of land in a similar way. In the beginning of the 1990s the biggest increase in real prices was reported, namely approximately 10% between 1992 and 1995.

Given that the prices are determined per agricultural district, there are also regional price differences between provinces (see Figure 35 in the Appendix). The average prices in Flanders are 38% (arable) and 30% (permanent grassland) higher than in Wallonia. Prices also increased in Flanders at the end of the '90s, but remained stable in Wallonia. These price differences can be explained by differences in soil quality, which are reflected by differences in the KI (cadastral income), and mainly in profitability, which are reflected by differences in the tenancy coefficients.

In Italy data on land rental prices are less systematic than those concerning land prices. For this reason aggregates from INEA data are not generally considered to be sufficiently accurate. Average values for arable crops in the North plain are between 400 and 900 EUR/ha. However, reported land rents in 2006 vary between 15 EUR/ha (contracts for grazing land in the south) and above 15.000 EUR for flower production in Liguria (North-west). Comparing farmland rental rates in different years, rental prices look more stable than land prices in the long term. However, there are faster and more evident adaptations in the short run and across different areas.

In the Netherlands the rental prices show very high autocorrelation (see

Figure 67 in the Appendix). For the period 1993 through 2001, the Dutch Central Bureau of Statistics (CBS) provides a time series for all rents, and sub-series for grassland and arable land. Unfortunately, the CBS terminated the collection of rental

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[35] Both trends will be especially important in Flanders where the concurrence for agricultural land is higher than in Wallonia.

information in 2001. We received the data for the missing years 2002-2006 from country experts.

In the heavily regulated first years, rent controls kept rents artificially low. After the introduction of more liberal contract types in 1995, rents immediately caught up to their economic levels. Whether higher rents drive up land prices in these years, or whether higher land prices let landlords require higher rents, or whether both rents and land prices are driven by the same underlying factors still needs to be investigated in future research. Rents levelled off after the land price peak in 2001.

Similar to land values, rents of grassland are lagging the rents for arable land, indicating that the expected revenues from growing crops are higher than profits from grassland. Especially rents for arable land have been held back by the historic regulation, as the increasing spread after 1996 reveals. Again, converting grassland to arable land is favourable from a landlord's perspective, whenever soil and topography allow it.

In Spain average rental prices in 1998 were 120 euros/ha in current values, and they managed to reach 165 euros/ha in 2006. But once again, important discrepancies appear in terms of crops and communities. Per AC, the highest values in 2006 were given to the Canaries (1,042), Murcia (511) and Andalusia (370), while the lowest went to the Balearics (91) and Aragon (109). Lands with irrigation crops were leased at an average of 487 euros/ha in the same year, followed by olive groves at 410 euros/ha, and the lowest renting price was paid for pasture lands (52 euros/ha).

Therefore, while land prices have been characterised by a continuous increase at 6.86% a year in the period 1998-2006, it has been verified that renting in current euro have scarcely grown in the same period, (4.09%) which, in real terms, means that they have practically been maintained. The highest average increase took place in 1999, this being 8.33%, due to the spectacular increase of renting olive groves which was 30.52 %. However in 2004, the average increase was only 0.65%.

We may see how the highest annual average increase in renting were seen in olive groves (9.44%) and in the pasture lands (8.41%) in 1998-2006, but always in a lower proportion to land prices. In all the AC, the rate increased in the same period, fundamentally in Cantabria and R. Murcia where the annual average was 7.55% and 5.85%, respectively, whereas in la Rioja it only increased by 0.98%.

This corresponds to the universal trend owing to agriculture becoming less important in developed countries as a consequence of the lower profitability obtained from agriculture in comparison with other sectors. Thus, the average profitability of land has gone from 2.01% in 1998 to 1.25% in 2006.

In Sweden, agricultural rental prices have increased since 1990 (Figure 77 in the Appendix). Rental prices were increasing at a faster rate in the late 1990s than in the beginning of the 2000s. During the last two years in the studied period, i.e. after the SPS had been implemented, there are only small changes in rental prices. In 1994 rental prices were 87 EUR per hectare on average compared with 118 EUR on average in 2006.

Land rents have increased by 38% between 1994 and 2006. On average, the rents have been increasing by approximately 3% per annum for several years. Recently, however, the growth has slowed down. The rents stagnated between 2004 and 2005 and rose by 1.7% between 2005 and 2006. In recent years, the rents have increased in areas with low rents and decreased in regions with high rents.

Information about rental prices presented separately for arable land and grazing land is limited. In the year 2000 the average rental price for arable land was 128 EUR per hectare compared with 45 EUR per hectare for grazing land.

As with land prices, variations between different parts of the country are large. To rent land in the plains in the south of Sweden costs about 8.5 times as much as to rent land in Northern Sweden. Rents have increased over the whole time period in all regions except in the most northern part of the country. During 2000-2004 rental prices decreased in northern Sweden. However, in 2005, when the SPS was implemented, rental prices in the north increased as much as 76 percent. A similar effect in 2005 can not be seen in other regions; in the western part of south Sweden rental prices even decreased in 2005. Land rental prices increase especially in regions where cattle payments are redistributed from cattle to arable land due to decoupling.

5.2.2.2. Share of the rented area

In this section we analyse the rented share in the total agricultural area. Figure 7 plots the evolution of the rented share in total area agricultural area in EUSC in the period 1992-2006.

There are at least two possible means of classifying countries based on Figure 7: (i) according to changes in the share of rented area; and (ii) according to the share of rented area. The FADN data for the farmland rental market transactions suggest that the rented share of farmland is particularly high (>70%) in Belgium, France and Germany, whereby in the latter two the share of rented area is slowly, but continuously increasing. According to the interviewed experts, a correlation between policy changes and the share of the rented farmland could be established in none of the sample countries.

In terms of changes the development in Benelux countries seem to be different than in the rest of the EUSC – in the period 1992-2006 the share of rented area has been slightly decreasing both in Belgium (-1.7%) and the Netherlands (-2.9%). In three countries there has been a weak increase in the share of rented area: +14.2% in France, +13.6% in Sweden and +12.7% in the United Kingdom. In the remaining countries the share of owned farmland has decreased more significantly. In the period 1992-2006 the share of rented area increased by 47.8% in Finland, 47.8% in Germany, 44.9% in Greece, 49.2% in Ireland, 34.1% in Italy and 36.0% in Spain.

Countries with high share of rented area (>70%)

The share of rented farmland in total UAA is particularly high in Belgium, France and Germany. Moreover, the share is further increasing (though at a decreasing rate) in France and Germany.

In Belgium the share of rented land (all types of rents) is relatively stable at approximately 68% of the total utilised agricultural land. There are some historical regional differences in the share of rented land, but in all provinces more than 50% of the land is rented. The differences between the regions are rather small: in Flanders approximately 66% of the land is rented, whereas in Wallonia 68%.

The landowners, who rent out their land, are, in most cases, farmers, who also rent in agricultural land. The reasons for the extent of the fragmentation of agricultural land in Belgium, are Belgian inheritance law and the zoning regulations which - particularly in Flanders (due to high population density). Hence, in the presence of positive transaction costs, it is possible that is more profitable to rent out plots that are far from the main farm buildings and rent in plots that are close by, if the plots of a farmer are dispersed.

The agricultural organisations and experts report an important increasing trend in the evolution of the number of "seasonal tenancy contracts" and informal tenancy contracts between pensioners and young farmers. This relates to the low legal tenancy prices and is enforced by the introduction of the direct payments. From the introduction of the direct payments the support was no longer distributed through the market prices to farmers, but was now linked to the hectares that a farmer or tenant had. In case of a "seasonal tenancy" contract or an informal tenancy contract the support was received by the owner of the plot and not by the tenant. Pensioners therefore preferred renting out their land by such a contract instead of renting it out by an official contract or selling it. Another reason why such contracts are prefered is speculations on a change in the zoning regulation. Where the zoning regulations changes and the owner want to sell the plot, the tenancy legislation determines that he has to pay the tenant a compensatory payment. In case of a season tenancy contract or an informal contract this is not the case. The agricultural organisations argue that an increase in the legal tenancy price could motivate farmers to rent out land to young farmers under the tenancy legislation (VILT 2008a).

In France 75.8% of the UAA of FADN farms were rented in 2006.[36] The share has been strongly increasing since 1990, where it was 59.9%. In Bretagne 72.5% of the UAA of FADN farms were rented in 2006. The share has been strongly increasing since 1990, where it was 56.4%. In the Centre region 85.2% of the UAA of FADN farms were rented in 2006. The share has been strongly increasing since 1990, where it was 72.2%.

In Germany the reallocation of agricultural land takes place mostly on the rental market. In 2007, the share of rented land in total utilised areas was 61.7 % (10.4 million ha), with regional differences ranging from 44.6 % in Bavaria to 89.9 % in Saxony. In 2007, 46,500 farms (approx. 13 %) operated on rented land only**.** The average share of rented land has been regressing slightly, but this trend is only due to sales transaction by the BVVG (Bodenverwertungs- und Verwaltungs GmbH) in East Germany. In West Germany the share of rented land is constantly increasing (from 42.5 % in 1991 to 60 %

[36] There is no official data about the rental market, except for the share of land rented available in the Farm Accountancy Data Network (FADN) database and the Agricultural Censuses.

in 2007). In East Germany, the originally high share of rented land is steadily decreasing. When the economic situation allows, purchasing land is considered a reasonable option to renting land. Despite this development, the rental market (over 60% nationwide and over 80% in East Germany) continues to play a key role on the German land market.

At the aggregate level, the share of rented areas in total agricultural land has been almost unchanged in the last 5 years. With regard to the trend since 1991, the share of rented areas slightly dropped for the first time in 2005. The changes in the share of rental agreements have continued in the opposite direction in both parts of Germany, though the differences have not diminished over that time. While the share of rented areas has been rising in the West German regions, the share of owned land has been increased in the East regions (Figure 54 in the Appendix).

In Bavaria the share of rented land of the total UAA is on the lowest level of all federal states. In 2005, about 83,100 farms rented 1,455,400 ha UAA, which equates to 44.6 % of the total UAA. This total rent share breaks down to 40.2 % of the rented area in full time farming, a low 25 % of the rented area in part time farming and 52 % of the rented area in legal entities. The rent share in the case study region South East Upper Bavaria is at the low level of 33.9 %. The rent share rose from 35.7 % in 1999 up to the present value of 44.6 % (BAYERISCHER AGRARBERICHT 2006) in the entire federal State of Bavaria and from 28.9 % up to 33.9 % in the case study region. The reason for the small volume of the land market in Bavaria is the naturally grown farm structure with the predominant type of individual family farms. The farmers are concerned with traditional values. One of their main aims is to maintain family property. Because of this, they prefer to run their farm in part time, even if it is not the most profitable way to spend their labour force, instead of renting or selling the land. If they quit the farm business, they will usually rent out their land but they will not sell it.

In Lower Saxony the share of rented land of the total UAA is the third lowest among all federal states in Germany. In 2005 about 35,818 farms rented 1,089,050 ha UAA, which equates to 52.7 % of total UAA. The rented land share in the case study region Weser Ems is at the low level of 48.3 %. The rent share in Lower Saxony fluctuated from 52.2 % in 1999 up to 55.7 % in 2003 and down again to the present value of 52.7 % (SITUATIONSBERICHT 1999-2008). In the case study region of Weser Ems the rent share rose from 42.6 % up to 48.3 %. In summary, in the period from 1999 to 2005 the land rent market in the case study region is characterised by increasing share of rented land (total growth rate 13.4 %).

The relatively high rental prices in Lower Saxony can not only be linked to the specific farm structure of the region but is at least partly policy induced. One reason for the increasing rental prices is the fact that farms with high stocking densities increasingly need land in order to comply with the restrictions for organic nitrogen application of the Nitrates Directive. With decoupling and cross compliance this restriction became for the first financially relevant for intensive diary farms. Furthermore, farmers are concerned with traditional values. One of their main aims is to maintain family property. Even if farmers quit the farm business, they will let their land for rent but they will not sell it.

Countries with medium to low share of rented area (<50%)

In Finland the share of rented area has been steadily increasing since 1974. The relative increase of rental share can be partially explained by the future expectations of land ownership, which are considerably higher than for the renting market.

In Greece the share of rented land is rather small, because usually agricultural land is cultivated by landowners and to a lesser extent by lessees or tenants. The owners usually rent out their property for just one farming period. Sometimes, but not that often, rental contracts last up to 4 years.

State-owned land is also rented. In the past, farmers used to pay in kind (about 20-25% of total production), but there were some problems in terms of applying this method of payment. As a result, now farmers have to pay the value of the production that had to give as a rent. Cooperatives that redistributed or rented state-owned land to farmers who did not have any properties were also created for the facilitation of this system's operation.

In Italy the rented land share was about 25% of the total UAA in 2005. This amount is very different between regions, varying from above 45% (Val d'Aosta, Lombardia, Friuli Venezia Giulia) to below 15% (Trentino Alto Adige, Puglia, Calabria and Sicilia).

The amount of land rented is growing remarkably (25% in 2005 against 17.9% in 1990); however percentages are very variable from year to year and show a major responsiveness to policy and market prices. Renting land is now a very important component of structural change of farms. Land rent can have very different profiles depending on the regions. However, even in regions where renting is less prevalent, it can be very important at local level for specific crops. Renting land has practical importance in some instances, for example in the case of livestock production (manure spreading and/or forage provision) or vegetables production (tomatoes) that has important rotation limitations.

In the Italian region of Puglia the share of rented land is rather small and is often concentrated on very specific crops, such as tomatoes.

In the Netherlands the total newly rented area is declining each year, as landlords hesitate to lease again after rental contracts have expired. Figure 68 in the Appendix plots new rental contracts and total newly rented area. The big spike in 1996 is caused by many renegotiated rental contracts after the first round of rent liberalisation in 1995.

In Spain, 30% of UAA is rented or farmed as a share-cropping activity. This implies that depending on the contract specification the SPS benefits may accrue to both the land owners and land users (farmers).

In Sweden the information on how much of the agricultural land that is rented is only available for five years (see Table 35). The share of rented land in the total utilised agricultural area is about 40-45 percent. This share has decreased somewhat after the 2003 reform.

In the United Kingdom the proportion of English farmland that is leased has remained relatively stable since 2000 at about 36% after a period of decline up until 1995, suggesting that the ATA was successful in stimulating more land for lease in England (see Figure 90 in the Appendix). This figure also shows the significant variance in rental value of less favoured area grazing and cropping land which fully reflects the earning potential of the different types of land. These trends are also shown for full agricultural tenancies in Figure 90 in the Appendix.

Most farms in Northern Ireland include some rented land with only about 7% of farms entirely rented or leased with 48% having a mixture of owned and rented land with 45% wholly owner-occupied[37].

Figure 94 in the Appendix shows that the amount of land leased (hectares) in Northern Ireland has remained relatively stable at around 70% since 1999. There was, however a 4% fall between 2000 and 2003 before recovering slightly post 2004 to 69% in 2007.

In Scotland there is a continuing downward trend in the proportion of Scottish farmland that is leased, falling from 40.6% in 1982 to 28.9% in 2007 (see Figure 96 in the Appendix). This is a long term trend and the introduction of new types of leases in 2004 (see above) to stimulate the lease land market have failed to bring more land forward for leasing. In particular landowners specifically do not like the fact that new leases are for a maximum of 5 years or a minimum of 15 years with no scope for leasing arrangements for between 5 and 15 years (10 years was the average lease length under the former Limited Partnership for of renting land in Scotland). As such, coupled with the introduction of the SPS, many landowners have chosen to (where possible) take the land in-hand and farm the land themselves and gain the benefits of the SPS.

Box 3. The specifics of land market in the East Germany

An important specific of the land market in East Germany is the state trust holding BVVG (Bodenverwertungs- und Verwaltungs GmbH) as an additional actor. BVVG is an exclusive state run trust initiated in 1992, after the German Reunification, to manage and privatise 1.4 million hectares of the former nationally-owned agricultural land areas in East Germany. By the end of 2007, nearly half of those land areas have been privatised through reassignment or sales to private persons or corporate bodies. With the current volume of 909,000 hectares of agricultural land, the BVVG is still the biggest land owner in the New Laender. Land areas rented by 2008 represented 524,100 ha; 415,100 ha (or 79 %) of them were rented within long-term agreements. Average rents for existing contracts accounted 127 EUR /ha. Rents for newly rented 33,320 hectares rose by 33 % (from 124 to 186 EUR /ha) against 2006. As an intermediate step toward the final privatisation the long-term rental contracts between BVVG and tenants act stabilising on land market in East Germany.

By the end of 2007, 61 % of the privatised land was sold at reduced price (65 % of the current market value) as a result of the Compensation and Indemnity Act (EALG)[38], which has kept land prices in the East German regions at the relatively low level. At the same time the

[37] DARRD (2008) Statistical Review of Northern Ireland Agriculture 2007.

[38] German: *Entschädigungs- und Ausgleichsleistungsgesetzt.*

BVVG intensified the use of invitation bids as its key instrument, which caused an average rise in market prices by 22 % (ranging from 42 % in Saxony-Anhalt to 4 % in Thuringia) in 2006-2007. Since expiring rental contracts can not be renewed, it creates an additional compulsion to buy as more land as possible to be able to continue farming activities.

Taking into account long-term rental contracts, the BVVG currently has about 600,000 ha of agricultural land in its possession. It is estimated that 42 % (250.000 ha) of this land will be needed for sales at reduced prices according to the Compensation and Indemnity Act. The respective buyer's options are bound to long-term rental contracts, and therefore will end with the expiry date of those contracts, which is between 2010 and 2014. Remaining land areas (approx. 350,000 ha) will be sold at market value, but not exceeding 25,000 ha annually. That means that the privatisation of land managed the BVVG, and therewith its direct influence on land market, will last until 2020.

Source: BVVG (2008).

5.3. Drivers of land values

Land values are driven by economic factors that can be classified as demand driven, competing uses for land, agricultural productivity, hedge against inflation, or amenity values. Supply factors also play a role by employing the quantity of land placed on the market relative to demand. Land values are especially sensitive to spatial factors since access to markets is as important for farmers as is access to urban goods and services for non-farmers.

Factors known to influence the sale price include presence or absence of buildings, access to roads, and other factors such as arable land or meadow, irrigated or non-irrigated, suitability for the use of machinery, and vacant possession or tenanted. Small areas of land have often been found to command a higher price per hectare than large areas, particularly where farm buildings and dwellings are included in the sale. It is not usually known in the statistics whether an area of land sold has a milk quota attached. The information on the effect of a quota on land price is incomplete. Land is very heterogeneous and average land price series which reflect varying proportions of different kinds of land through time are difficult to interpret.

The distance to towns and cities can have several influences on agricultural land prices. First, as pointed out by J.H. von Thünen in 1826, farmland nearer markets would tend to fetch higher prices because transport of products to market would be shorter, and hence easier and cheaper. Secondly, the price of agricultural land near urban centres might be influenced by factors unrelated to agricultural value, such as access to schooling or sources of employment for farmers' children, or access to urban amenities. Thirdly, such land might command a higher price due to the expectation that land would be re-zoned as building land. Even when known sources of variation are taken into account, much variation in the price of agricultural land remains.

Regarding supply and demand on the land market, a certain amount of land comes on the market every year for reasons such as the retirement or death of the owner, although only a small proportion of land is sold in any year. High land prices have been reported to attract more land onto the market, increasing supply. In addition to being a factor of production, land is a store of value. There may be additional demand in times of high inflation or economic uncertainty.

In this section we discuss the key drivers of agricultural land values in the EUSC. Given that data paucity does not allow us to perform a quantitative analysis, the findings presented in this section are based on a survey of national land market experts. This qualitative data allows us derive rather detailed insights about the relative relevance of different drives within countries.[39]

5.3.1. Drivers of sales prices for agricultural land

The key drivers of prices on the EUSC agricultural land markets are reported in Table 7. The first column lists drivers, which according to the land market theory and national expert assessment are important determinants of agricultural land prices. Columns 2-12 indicate the relative importance of particular drivers in each country.

The results reported in Table 7 suggest that the drivers of farmland sales prices are highly heterogeneous across countries. The key drivers of farmland sales prices are agricultural commodity prices, infrastructural expansion, urban pressures, the SPS, farm size and coupled subsidies.

5.3.1.1. Agricultural commodity prices

As suggested by the land market theory and in line with previous studies, we found that agricultural commodity prices are one of the most significant drivers of agricultural land prices (see Table 7). However, in France, where agricultural land prices are heavily regulated, there is practically no commodity price impact on agricultural land values.

Prices of agricultural outputs, i.e. of the commodities produced, can change farmers' decisions whether to invest in more land or not. Rising commodity prices can make farms more profitable and the general experts' opinion is that commodity prices are an important driver of land prices.

Turning to country specific results we found that in Belgium both the input and output prices are decreasing in agriculture (see Figure 41 in the Appendix). During the period 1990-2005 the real output prices decreased by 33%, whereas the input prices decreased only by 12%. Since 2005 both input and output prices are increasing and in 2007 they again reached the level of 2001.

The prices for arable crop products increased more than for livestock products and fruit and vegetables. More precisely, in 2006 the crop and milk product prices started to increase and by the end of 2007 they reached the level of the beginning of the 1990s

[39] A cross-country comparison of the presented results should be done with a certain portion of caution, as the performed qualitative analysis does not allow controlling for country fixed effects.

(see Figure 42 in the Appendix). The prices for meat products did not follow the recent upward price trend.

In France the revenue from farming is fluctuating considerably fluctuating over time. As shown in Figure 52 in the Appendix, despite the CAP 1992 reform which reduced institutional prices for cereals and beef meat, real farm incomes per worker increased between 1991 and 1998 mainly due to the compensation of support price cuts by direct payments and high productivity gains (see for example Boussemart et al., 2007).

Off-farm employment is increasing among French farms. In 2003 part-time farms accounted for 32% of French farms, while they were only 25% in 1997. The share of non-agricultural income in the total farm household income increased from 25% in 1997 to 40% in 2003.

The German data show that prices for agricultural commodities were continuously falling between 1991 and 2005 and then rose significantly, among other reasons, because of the soaring word-wide demand for agricultural commodities. According to the expert interviews, the increases in commodity prices led to an increase in the sales prices for agricultural land. However, the effect of agricultural commodity prices on land prices was assessed as rather weak (though positive).

According to the national expert interviews, in 2005-2006 the decisions of land market participants in Italy were heavily affected by the continuing low prices for agricultural products which reduced agricultural profitability. The relative importance of agricultural commodity prices decreased in 2007 and 2008 when the world market prices for food products rose significantly.

In Emilia Romagna the increase of agricultural commodity prices have recently (2007) had a strong effect in the direction of price increase; however, low prices in years 2004-2005 did not have an analogous effect of reducing land prices.

In the Netherlands the most important source of income for Dutch arable farms is agricultural production, which accounted for 77% of farm income in 2007 (LEI BINternet, 2008). Expectations on the profits from farming crops should therefore be the key to farmers' investment decisions. Figure 69 in the Appendix shows the dynamics of prices for all crops and cereal compared to land prices. In the 1990s, land values are appreciating much faster than crop prices, suggesting that land prices are dominated by other factors such as the general pace of the economy, and not so much by revenues from agriculture. The most recent evidence however suggests that the 2007 surge in land prices is to a large extent caused by high current and expected future commodity prices.

In Sweden the three most influential drivers are farmers' belief in the future, increasing agricultural commodity prices and that it is profitable to increase farm size. These drivers had a clear positive impact on Swedish agricultural land prices during 2003-2007, according to the respondents (see Figure 78 in the Appendix).

The strongly falling incomes in agriculture in the beginning of the 1990s due to the reform of the agricultural policy as well as uncertainty about the future contributed to falling land prices. The increase in incomes immediately after the accession to the EU has contributed to increasing land prices. Entrepreneurial income has not changed much during the last decade.

In Sweden prices for most cereal and milk products have been decreasing during the time period studied. According to the interviewed experts, the observed increase in commodity prices in 2006 and 2007 contributed towards rising farmland prices in Sweden.

5.3.1.2. Agricultural productivity

According to expert assessment, the role of agricultural productivity is weaker in driving agricultural land prices (see Table 7). On average, the agricultural productivity impact on agricultural land values is negligible to weak. Only in Spain the impact seems to be more significant, which is mainly due to relatively low productivity level in the base period and hence higher technological progress.

In addition to firm characteristics, the two key determinants of agricultural productivity are the available technology and soil quality. Soil quality has a direct influence on the productivity of farmland, and consequently, is an important determinant of farmland prices. Since the soil conditions required for production of food crops may be different from those required for other species, they are imbedded in farmer's decision on what, and to which extent, should be produced on the land. In turn, soil productivity is affected by farming intensity. Due to historical land use and the geographical situation agricultural farms are not always situated in areas where benefits in terms of yield would be high. Despite major changes in land use, the strong linkage between land use and soil type seems to continue.

Turning to country specific results we found that in Belgium yields have increased steadily until 1996 with an average yearly rate of 3-4 % for all main crop products (wheat, barley and grain maise).[40] The technological progress, which was among the main drivers of productivity growth, slowed down after 1996.

In France the real farm incomes per worker decreased between 1999 and 2005, due to lower productivity gains, output supply stagnation, higher intermediate consumption prices as well as an unfavourable development of direct aids relative to product prices.

In Germany changes in agricultural productivity have a stronger impact on rental prices than on sales prices. Compared to the impact of commodity prices, growth in agricultural productivity was estimated to have a weaker impact on land prices.

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[40] There are no significant differences between the two Belgian regions.

In Sweden there is a strong connection between profitability of agriculture, especially expectations about future profitability, and land prices from a longer term perspective. Profitability is related to productivity; the more each input can produce the larger is output per input and hence profitability. Productivity of agriculture can be measured as agricultural output per hectare or agricultural output per labour input. Figure 80 in the Appendix shows both measures together with the entrepreneurial income of agriculture as well as the price index of land. High productivity encourages farmers to invest in additional land.

Falling productivity in the beginning of the 1990s is related to the reform of 1990 which also led to falling land prices. Output in values per hectare decreased as well as output values per labour input. In the mid 1990s productivity measured as output per hectare increased again and remained relatively stable between 1997 and 2004. This measure of productivity does not follow land prices as there is no increasing trend.

In Sweden output value per worker is moving along with land prices except for a decrease in 2005 not observed for land prices. The year when the SPS was implemented shows a decrease in both measures of agricultural productivity. In 2007 this seems to have changed again.

5.3.1.3. The Common Agricultural Policy

We find that the Common Agricultural Policies both coupled and decoupled do affect land values in the EUSC. Whereas for coupled payments this result is in line with the underlying land market theory, the positive relationship between SPS and farmland prices is counterintuitive. These results find some support for market imperfections and transactions as suggestion by Ciaian and Swinnen (2006, 2007). However, data limitations do not allow us to prove this hypothesis formally in the present study.

Turning to country specific results, we note that the relationship is more heterogeneous across countries compared to other drivers. For Belgium the evolution of the different types of subsidies is reported in Figure 39 in the Appendix. Compared to 1994, the total income from subsidies received by farmers decreased in real terms by approximately 40%. This decrease is due on a sharp fall in the “other subsidies”, mainly intervention prices (80% decrease since 1994), which was partially offset by an increase in the direct payments and subsidies from the rural development funds. Since the introduction of the SPS in 2005 the total level of subsidies decreased by 6% in 2006 and in 2007 there is also a decrease of the total level due to a reduction of the “other payments” (lower expenses for intervention payments because of the high market prices), that was larger than the increase in “direct payments” (see Figure 40 in the Appendix).

Besides the income effect of direct payments, which may increase farm willingness to bid for land, the introduction of the SPS had also an effect on the market supply of plots. The interviewed experts consider the impact on the sales markets less important than on the rental markets. Due to the minimum land maintenance requirements, retired farmers have an incentive to keep their land and to hire workers to perform the minimum maintenance or rent the land out by using a seasonal or an informal contract and collect the SPS payments.

Based on the interviewed experts' opinions, the key impact of the SPS on the land markets is the emergence of two markets for land: land that is eligible to the SPS and land that is not, with a difference in price and attractiveness (non-eligible land being cheaper, but of course depending on the land type; for example, vineyards are much more expensive than any land although they are not eligible). Moreover, this difference should fade away in the future as more and more land is becoming eligible for the SPS.

Germany decided to decouple all direct payments completely except for tobacco and hops. Hence, there are almost no coupled payments which can influence land values. Less favoured area payments, environmental payments have no impact on land values as experts stated.

The new support mechanism of decoupled payment is intended to break the links between the amounts paid to farmers, their level of production, and market prices. In 2007, 5,687,259 thousand EUR were transferred as de-coupled direct payments to eligible producers. Their average value of distributed entitlements (ca. 17 Mio) accounted for 335 EUR per entitlement. The average market price of transferred entitlements was 425 EUR. Only the transfer of 200.000 entitlements could not be linked to farm succession, or changes in the farmed area. Only 22 % all 1,006,000 transferred entitlements were traded within market transactions.

According to the interviewed experts, land sales prices are not affected by decoupling. One explanation might be that for land purchase decisions long-term developments (such as hedging against economic risks or speculative aspects) are more important than the value of direct payments. In addition, it is also expected that the rising need for building land will entail the shortage of agricultural land and therewith an additional rise in demand for eligible land. Given this projected surplus of entitlements, farmers with more payment entitlements than the eligible area, will be willing to pay higher rents or sales prices in order to activate their entitlements[41]. The land requirement for activation of entitlements is expected to keep the land prices at a high level.

Based on these results, it may be concluded that in Germany land sales prices are not affected by changes in the SPS. Qualitative assessments, collected by expert surveys, suggest that the implementation of the SPS initially resulted in uncertainty on the land market, but did not entail any discernible effect on land value. However, experts also emphasised that due to data limitations the impact of changes in the SPS could be neither isolated nor estimated at the moment.

According to the interviewed experts, any evaluation of the SPS impact in Italy should be undertaken with some caution. Due to the late assignments (end of 2005), and the

[41] At present, entitlements allotted to farmers tend to exceed the number of eligible hectares. In Germany, their current surplus is estimated to amount to approx. 1-2 %.

increase in world food prices in 2007, only 2006 provides observations in a context similar to the pre-reform period. Compared to other drivers, the SPS seems to have a minor role in determining the land values. Figure 33 in the Appendix reports the effects of SPS on land sales markets in Italy.

The most pronounced effect brought by the policy reform is some reduction in market activities due to the effects of policy uncertainty. This seems to be associated with stable prices, but the judgement of the interviewed experts is that this effect is not particularly relevant.

During the transition phase the shift to the SPS brought different reactions in terms of normative and institutional arrangements, mostly aimed at maintaining previous commitments. In particular, entitlements are normally sold with land. Because of the need to have land to benefit from payments caused some additional market activity. However, this looks more as a transitory aspect.

In Italy one of the dominant drivers of land purchase is uncertainty about the future policy development that makes operators cautious and conservative. A number of related effects can be connected to the reform that are not primary in the focus of land market, such as extensification in some areas, or the reduction of cultivation in marginal areas (but good practices); more effects are due to livestock, tomato and fruit decoupling.

The shift to the SPS is changing the approach to the land market, because it is causing uncertainty for farmers. It is difficult to estimate the profitability of land investment in the long run, and hence the number of transaction is stable. The agricultural land price is mostly unchanged, because there isn't any important impact of the SPS. However a market segmentation of land with entitlements and land without entitlements emerged (INEA 2008).[42]

In Puglia compared to Emilia Romagna, land market seem to be more strongly driven by agricultural factors, including policy, rather than non-agricultural drivers. The role of the shift to the SPS is strong but unclear: it is likely that the experts intended to remark the importance of the payment in land profitability, rather than a true effect of SPS in the direction of increasing land prices. The connection between the SPS and land is very different between cereals, vegetables and olive production. In most cases the SPS causes small changes in the transactions and farm production structure; entitlements are connected to land property or renting, and farm strategy is mostly oriented towards keeping the property and the use of their assets. In the case of tomato and vegetables, the situation is different, with important dynamics produced by the SPS and titles detached from land property and rental.

In the Netherlands, the effect of the introduction of the SPS is difficult to quantify as other factors dominate land prices. The real option value, for instance, accounts for at

[42] "I Risultati dell'Indagine 2003-2006" http://www.inea.it/progetti/mercato_f.cfm

least half of the (in the European comparison) extremely high Dutch land prices. Strong growth in the prices for agricultural outputs and the pressure caused by high revenues from receiving manure further reduce the share of land values depending on subsidies. The implementation of the European nitrate directive has probably a higher impact on Dutch farmland prices than the move towards SPS, as it created a new source of cash flows for both landowners and renters.

Nevertheless, because of data limitations it is impossible to conclude that there is no effect of the SPS on land values. Further research based on micro-data is needed to test for the exact impact. Aggregated data cannot provide the answer, as only two years of observations are available. Furthermore, the historical model implemented has the goal of avoiding frictions in farmers' income - possible effects on land markets are therefore will be observable only in several years from now. Generally, market participants confirmed that the new CAP does not have a large footprint on prices in the Netherlands.

In Sweden the SPS has a weak positive impact on the development of agricultural land prices in 2003-2007 (see Figure 78 in the Appendix). However, the SPS seems to be one of the most controversial drivers where the interviewed experts disagree most in their judgement of the impact.[43]

5.3.1.4. Other policies[44]

The expert interview data, which is summarised in Table 7, suggest that other policies, such as rural development and environmental policies affect agricultural land prices only in selected countries, such as Finland, where the LFA and environment payments coupled to the land, requirements for manure spreading area and investment subsidies significantly drive up land prices.

Next we turn to country specific results. In Belgium the European Nitrate Directive was implemented in 1991 with the objective to stop and reduce the pollution of surface and ground water with nitrates form agriculture (European Council 1991). According to the Directive, the level of nitrates must not be higher than 50 mg nitrate/ l, otherwise the area must be indicated as vulnerable zone and only 170 kg N/ year (including the direct excretion of N) could be applied on 1 hectare of land. Each member state needed to develop an action plan and implement the "Code of Good Agricultural Practices" in the vulnerable zones.

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[43] The variance of the judged impact of the SPS is greatest among all the drivers. Hence, it is difficult to make a clear conclusion on the impact of the introduction of the SPS. Other drivers where the respondents strongly disagree are public opinion and profitability in livestock production. The answers regarding livestock profitability range from 2, a medium decrease, to 7, a strong increase.

[44] Strictly taken several policies discussed in this section, e.g. rural development policies, are part of the CAP. However, in order to decompose the aggregate agricultural policy impact on the land values, we decompose them into coupled, decoupled (SPS), and other policies.

The region of Flanders is the largest manure producer in Belgium, as there is located 95% and 85% of the total pig and poultry production, respectively. The first "Manure Action Plan" (MAP I) in Flanders was implemented in 1995. In the third manure decree of 22nd of December 2006 (MAP III) the whole area of Flanders was declared as a vulnerable zone and, hence, the corresponding manure norm of maximum 170 kg N per ha per year was introduced.

The Manure Action Policies forced the intensive animal producing farmers without (or with insufficient) land to make arrangements with landowners to internalise the environmental costs they cause. Due to the manure spreading policy, which was the most important approach of the MAP I and remained important in the other MAP's, intensive animal breeding profits were captured in the farmland prices (le Goffe and Saliné 2005).

Intensive animal farms, who have traditionally higher incomes compared to other agricultural activities in Belgium, bought land specifically for spreading of the manure in order to avoid the levies or the processing duty. The impact of increasing land demand is not limited to the price of land in the granivores breeding regions, it exerts upward pressure on agricultural land prices in the whole Flanders.

In Finland changes in investment support programmes, regulations in generation transfers and farmers' predictions about changes as well as uncertainty over the continuation of the temporary early retirement programme lead to an increasing number of land sales in 2005. Uncertainty about future policies has encouraged farmers to exit farm and sell their agricultural land before the expiry of the current programmes. This might have exerted a downward pressure on agricultural land prices in Finland.

In 2005 Finland introduced start-up support grants for new farmers: EUR25,000 for crop farm and EUR55,000 for livestock and dairy farms. This remarkably boosted inter-generation transfers, i.e. sales between relatives, in 2005. Because land transactions related to the generation transfers are typically larger in hectares than transactions related to additional land sales, the average transacted area also peaked on 2005.

In France an important driver of farmland prices is environmental regulations. Following the 1991 European nitrate directive, since 1993 livestock farms have to conform to pollution standards (PMPOA, “Programme de Maîtrise des Pollutions d’Origine Agricole”); farms that implemented changes in order to comply with the standards became more expensive, while farms that did not conform became non-usable for agriculture and were sold as residences. Moreover, the environmental regulation constrains livestock producers to have a minimum area where they would spread the manure; this increases the competition for land and thus prices. This is particular the case in intensive livestock regions such as Bretagne, where environmental regulations are as strong a driver of land prices as demographic pressure. Using data on individual agricultural land transactions in Bretagne between 1994 and 2000, Le Goffe and Salanié (2005) showed that the spreading “quota” has been capitalised in land prices, pushing them up.

In East Germany, the current dynamics on the sales market are still largely influenced by the active role of the BVVG. For example, on 1st January 2007 BVVG changed the procedures by which they award land. This means that expiring rental contracts cannot be renewed; instead, the land is awarded for sale or with exception, for rental by public announcements. This practise creates an additional incentive for farms to buy land.

In the East German region Saxony an important political driver is the BVVG's land sales practices. The BVVG offers land for sale which will be free from rental contracts within two years, and sell this land for the highest price. This creates incentives for farmers to keep the land which they previously rented.

Another regulation which in some areas has an impact on rental prices is the Harz IV law, which regulates aid for unemployed people. An important part of this law is that unemployed people receive no aid as long as they own any property. In regions with a high unemployment rate this law leads to a situation where unemployed people must sell their land. The prices that such people receive for their land are very often low, because they cannot wait for a better offer.

In East Germany the stocking densities are very low compared to West Germany. Therefore, the compliance with the Nitrates Directive is a bigger issue in West than East Germany.

In the Netherlands the implementation of the third European nitrates directive limits the amount of manure farmers can dispose on their land, as lower concentrations of nitrates in the groundwater are prescribed. Dutch livestock farms' production of manure, however, increased to 69.4 million tons in 2007, putting pressure on the market for manure disposal. According to the interviewed experts, the prices shot up to 20 EUR/ton of manure in 2007/2008.

There is a significant regional variation in the amount manure produced per area suitable for disposal. Due to limited own disposal area and substantial transportation costs, the regions specialised in livestock production like Brabant and Twente face large costs of disposal.

5.3.1.5. Bio-energy

With the exception of the Netherlands, parts of Germany and Spain, bio-energy does not seem to have significantly affected agricultural land prices in the sample countries over the last twenty years (see Table 7). However, because of comparably high (and still rising) energy prices, the situation may change in the future. More precisely, in the period of the analysis, world market prices for crude oil fluctuated between 15 and 25 dollar per barrel. In June 2008 the world market price for crude oil has reached 140 dollar per barrel. This makes bio-energy production much more profitable (even without any subsidies). As a result, rising demand for energy crop land may exert upward pressure on agricultural land demand and hence prices.

Turning to country specific results we find that in Germany an important determinant of the current land value is the steadily increasing competition for agricultural land, which in turn is correlated with increasing worldwide demand for food and energy. Competition on land markets is especially high in areas with high stocking densities particularly in West Germany's regions.

The impact of the advanced bio-energy production on land sales prices and rents was assessed as strong in West Germany but as very small in East Germany. This disparity is mostly due to the different average farm size in West and East. Biogas producers in East Germany obtained the required amount of substrate by renting or buying large size land and/or by closing supply contracts with farmers. In contrast, West German bio-energy producers are forced to rent or buy additional land, which makes them influential actors on the land market.

An example of the impact of non-agricultural sectors is the growing competition for agricultural land between food and energy crops producers. While in 2004, energy crops covered 890,000 ha of agricultural land, two years later that number amounted to 1,5 Mio hectares (+ 40 %). Although this still makes up about only 9 % of the utilised agricultural areas, the increase in areas under energy crops accounted for over 40 % in this short period of time.

The impact of non-agricultural investors, for example from the bio-energy sector, is less important in the Saxonian Loess Region than in West Germany or the rest of East Germany, because the agricultural ministry of Saxony is very restrictive in its use of the Law on the Sale of Agricultural Land (*Grundstücksverkehrsgesetz*). The aim of this law is to support existing agricultural structures and it is possible to prohibit land sales to non-agricultural investors if a farmer is interested in this land. However, this special situation might change in future; because of administrative reforms the agricultural ministry will lose its responsibility to oversee land sales.

5.3.1.6. Urban & infrastructural pressure

Urban pressures, such as growing housing demand, is an important driver for agricultural land prices particularly in densely population EUSC (Belgium and Netherlands) and fast growing economies (Ireland and Spain) (see Table 7). The same applies to the role of infrastructural expansion in driving up land prices. Generally, infrastructural expansion is a more important driver of land prices in the EUSC.

Turning to country specific results we find that in France the demographic pressure, in terms of urbanisation and tourism is an important driver of land prices. Prices of agricultural land in coastal areas and around large towns are much higher compared to rural inland.

In Bretagne the demographic pressure (urbanisation, tourism on coastal land) is a major driver of land prices (besides environmental regulations) due to the large coastal area (although the extent of urbanisation is less critical than in other French coastal areas).

In Germany the impact of infrastructural expansion and urban pressure is high in regions with a high population density and good economic conditions. This is especially the case for regions in West Germany. However, it is impossible to draw a conclusion on the aggregate level about the impact of other factors, such as infrastructural expansion and urban pressure (caused by population growth) on farmland prices, as these factors are region-specific.

In contrast to the agricultural demand for land the demand for construction sites is independent of the soil quality. Since conversion of agricultural areas reduces the available supply of land for agricultural land, this non-agricultural demand influences the value of agricultural land. Therefore one can see that the sales price of land is more strongly related to the degree of urbanization of a given area than the average soil quality.

In Ireland the main drivers of agricultural land prices over the last decade have been related to the large increase in house building observed over that period and the large increase in public infrastructure projects particularly motorway and other road building programmes.

In Italy non agricultural and non policy factors are among those mostly related to land values. Among others, infrastructural and urban development are considered as important drivers although they have mainly a local effect.

In Emilia Romagna urban growth and infrastructural development are perceived as very important, though localised to areas where the expansion takes place (urban expansion involves a large share of the Emilia Romagna's territory).

The Netherlands is a highly urbanised country and extremely densely populated. As a result land prices are highly influenced by the implicit call option that is embedded in the land price: the option to develop agricultural land outside agriculture. It is therefore not surprising that urban pressures push land prices in the Netherlands higher than in any other country of the European Union, with the exceptions of Malta (EUR/ha 128,116) and Luxemburg (EUR/ha 164,340) (see Figure 70 in the Appendix).

The value of the embedded option depends on the probability that transformation becomes possible. Land close to urban centres should carry a higher premium than the peripheral land. Dutch zoning regulation classifies land into sectors with regard to future land use, ranging from land ready for development (red label) to regular agricultural land without development (green label). According to the interviewed experts, the option value follows along the lines of this classification.

The real option value estimates suggest that real option value is bigger than 50% of the total land value, implying that the urban pressure is the single most important driver of land values in the Netherlands. [45]

[45] The option value is estimated by assuming the average value in rental contracts (e.g. EUR 466 in 2006), discounted by the risk-free rate (~3.8% in 2006) plus a credit spread of at least 100 basis points, adjusted for inflation (~1.8% in 2006). Plugging in average land prices (EUR 31,000 in 2006) on the left hand side of the Net Present Value equation, the option value can be solved for (at least EUR 15,500).

In Spain the most significant drivers of farmland prices are the pressures of tourism and urban development. The former is only present in tourist areas while the second exists in the whole of Spain. Pressure through tourism has a significant and positive effect on both prices and rental rates. In contrast, urban pressure affects only prices but not the rental market.

Indeed, we may observe how the land value has followed the same trend in recent years as the value of housing, except for a slight time lag, and it is possible that the present reserve of the housing market affects the land market in future years since the rest of the market drivers will possibly offset this effect.

5.3.1.7. Interest rate, inflation and macroeconomy

According to Table 7, the impact of interest rate, inflation and other macroeconomic factors on agricultural land prices is highly heterogeneous across the EUSC, there is no common pattern. However, on average the impact is rather weak compared to other drivers of farmland prices.

We start the country specific results with Belgium. The evolution of the interest rate is reported in Figure 43 in the Appendix.[46] The interest rate in the studied period was historically low and has declined over the period 1993 to 2007 from approximately 8% in the beginning of the period to 5% in 2008.

In Finland an important driver of land prices is macroeconomic development. Between 1991 and 1994 Finland faced economic recession. The recession also contributed to declining real land values.

In Ireland one of the main drivers of agricultural land prices has been the growth of the wider Irish economy.

In Italy non agricultural and non policy factors are among those mostly related to land values. This concerns in particular interest rates and market trends.

In the Netherlands the required return on capital was falling dramatically in the period 1990 to 2007 (see Figure 71 in the Appendix) putting an upward pressure on land prices and most other asset classes. The lower cost of financing and the perceived low inherent risk of the investment were reflected in falling discount rates when calculation present values of expected future cash flows.

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[46] Data from 1993-2003 were available from the survey "RIR (Retail interest rates)" executed by the "National Bank of Belgium" (variable "Hypothecaire kredieten") and data from 2004-2007 from the "MIR (MFI Interest rates)" survey, also executed by the "National Bank of Belgium" (variable "Rentetarieven op leningen aan huishoudens voor andere doeleinden: initiele rentebepaling voor meer dan 5 jaar"). The methodology, used to calculate the weighted average of the interest rates charged by different credit institutions, can slightly differ between the surveys, meaning that there is a small break in the series between 2003 and 2004.

Traditionally, land purchases were financed with bank mortgages. The largest provider of agricultural mortgages in the Netherlands is Rabobank with a market share of approximately 85%. In addition, sale-lease back contracts become more popular in which a financial institution is buying the land and rents it out to farmers. At the end of the contract term, the farmer has the option to buy back the land. For farmers this type of financing makes it possible to increase the size of cultivated land, while keeping debt services at relatively low levels in the first years of the contract. Regular mortgages usually have a constant or decreasing debt service over time, which leaves less room for investments in the first years. New mortgage forms are evolving, however.

For financial institutions, the sale-lease back is attractive, as it offers exposure to the agricultural land returns. From an investor's point of view, land as an asset can serve as a diversifier in a mixed asset portfolio and as a source of steady cash flows. Due to the success of its sale-lease back business, Fortis bank is currently one of the largest landowner in the Netherlands, owning about 30,000 hectares or agricultural land.

Despite the positive effect of low financing costs have on land values, the interviewed experts do not see indications of a "wall of capital" looking for investment opportunities and pushing up prices. The interviewed experts report that financial investors do not acquire significant portfolios of land for speculation purposes. Demand for land comes mainly from farmers.

In Spain the key macroeconomic drivers are salaries, the consumer price index, return on debt, and the unemployment rate. They all affect land prices but not renting.

In Sweden investment in property such as agricultural land is closely related to the price of borrowing money, i.e. the interest rate. Although the interviewed Swedish land market experts did not believe that interest rates had affected land prices as much as other factors there seem to be a relationship between land prices and interest rates. Figure 81 in the Appendix shows the relationship between the repo rate of interest and land prices in Sweden from 1994 to 2006.

Falling interest rates encourages investments in agricultural land. In fact, falling interest rates encourages any investment in property. Real estate indices of different types of property show that prices of other types of property are increasing at similar rates to the price for agricultural land (see Figure 82 in the Appendix).

In the early 1990s prices for agricultural estate were developing slowly compared to prices for other types of estates. Possible, this is an effect of expectations of the sector development after the 1990 reform. However, during the last fifteen years prices for agricultural estates increased at a somewhat faster rate than prices for private houses and summer houses.

5.3.1.8. Other factors

In addition to the land price drivers analysed above, there are other factors which affect land prices but these are difficult to classify. Finland opened negotiations about accession to the EU in the beginning of nineties. This raised uncertainty in relation to future farm policy. Because future profits are capitalised on the basis of current expectations, agricultural land values dropped sharply in the first half of nineties. This happened well before the actual entry into the EU (1995).

Also in Finland the recreational value of agricultural land is an important reason to own, agricultural land, which bids up demand and hence the price.

In Germany a significant factor that impacts reservation prices of land buyers/tenants and therewith land value, is the different prevalent employment structure in West and East Germany. This leads to different levels of rental and sales prices in West and East Germany. The average rental price for West Germany is 227 EUR /ha and the average sales price around 16,000 EUR /ha. Whereas in East Germany farmers pay in average 119 EUR to rent one hectare land and around 4,000 EUR to buy one hectare. In East Germany, vast majority of farms are corporate large-size farms with hired labour forces. For those farms, labour costs of employees are expenses which reduce farm's liquidity. For small individual (family) farms, which is the prevalent farming form in West Germany, entrepreneurial profit and salaries of family members are not expenses but imputed costs. This implies that labour costs do not reduce liquidity of small family farms as it is the case for corporative farms. Consequently, farmers in West Germany have a higher reservation price for land than farmers in East Germany.

In Germany the nationwide trend in the decreasing number of farms is accompanied by an increase in the average farm size (see Figure 8). The influence of farm size on sales prices and rents differs across the regions. In Bavaria and Saxony land sales prices are not correlated with the farm size, because almost all farms are small. In Weser Ems the farm size development entails a weak increase of land sales prices. However, this statement only applies to the grass land, while in livestock intensive farming no correlation between land price development and farm size could be observed.

In Greece non-economic factors significantly affect land market. For example, the state ownership of land, multi-activity of owners, Greek culture and mentality, abandoned land, etc. are know factors which impact on land prices.

5.3.2. Drivers of rental prices

The key drivers of rental prices in the EUSC' agricultural land markets are reported in Table 8. The first column lists drivers, which according to land market theory and national expert assessment are important determinants of agricultural land prices. Columns 2-12 indicate the relative importance of particular drivers in each country.

5.3.2.1. Agricultural commodity prices

Similar to the impact on agricultural land prices, agricultural commodity prices affect land rents in almost all studied countries (see Table 8). However, on average, the impact on land rents is less pronounced than the impact on agricultural land prices.

Turning to country specific results we find that in Belgium, for example, one of the most important determinants of the legal rental prices is the profitability of agricultural production. An often used indicator for measuring farm profitability is income. Figure 36 in the Appendix reports the evolution of the deflated entrepreneurial income per annual working unit (EUR / AWU) in constant 1989 prices. In the period 1983-1985 the average deflated entrepreneurial income per annual working unit was EUR 15.565 and it decreased to EUR 12.157 in the period 2004-2006. The maximum rental prices depend on the profitability of the agricultural sector during 2 successive periods of three year. The coefficients, determined in 1989 will thus depend on the profitability of the periods ’83-’85 and ’86-’88. The increase in the average profitability in the period ’89-’91 can be an explanation for the 10% increase in the rental prices in the period 1992-1995. In 1992 the tenancy coefficients increased on average by 11%, nevertheless there is a big variance in the increase as in some agricultural districts the coefficients remained the same, whereas in other districts the coefficients increased by more than 20%.

According to the expert interviews in Germany, the increases in commodity prices led to an increase in the rental prices for agricultural land. From the long term historical perspective, however, trends in land rents diverge considerably from commodity price developments. This fact is mostly due to high share of long term rental contracts which do not reflect contemporary price development.

In the German region of Bavaria a steady rental price increase can be observed. The experts interviewed stated that in the long-run, increases in the agricultural productivity influence the rental prices. However, the actual increases in commodity prices led and will lead to additional increases in the rental prices.

5.3.2.2. Agricultural productivity

The results reported in Table 8 suggest that on average the impact of agricultural productivity on agricultural land rents is similar to the impact of agricultural commodity prices. Generally, both drivers together determine more than 50 percent of agricultural land rents in the EUSC.

However, there are some differences in the relative importance of the two drivers between countries. For example, in Spain the variables which influence greater land productivity are: temperature, rainfall and irrigation, among others, all of which are linked with farming performance. In statistical terms, it has been verified how both irrigation and temperature positively affect the land value in such a way that the value is higher in regions with higher temperatures and irrigated lands due to the possibility of incorporating certain tree crops (citrus fruits and banana plantations) or protected crops (greenhouse production). On the other hand, the land value does not vary from other dryer regions in those regions with greater rainfalls. Furthermore, the rental share is also higher in regions with higher average temperatures and in irrigated land than in non-irrigated areas, which was also observed for land prices. However, rainfalls have a negative effect on the value of land rents. Therefore, the highest rents are observed in the driest regions due to the greater presence of irrigated land, which increases land productivity. This implies that intensive crop-growing is linked to irrigated land and good temperatures (the Balearics, the Valencian Community, the Canary Islands and Andalusia).

5.3.2.3. The Common Agricultural Policy

We find that both coupled and decoupled agricultural policies affect farmland rents in the EUSC (see Table 8). Comparing rows 5 and 8 in Table 8 suggests that the impact of SPS on agricultural land rents is even stronger than the impact of coupled subsidies. This result contradicts the theory even more that in the case of land rents, suggesting that market imperfections and transaction costs may indeed play a significant role in the seller and buyer decision behaviour. In addition, the relatively small role of coupled payments in determining land values can explain the tiny share of coupled payments in the total subsidy value at the time of the SPS implementation.

Country specific analysis suggests that in France, where the farmland rental market is highly regulated, the SPS significantly affect neither land rents nor farmers' preference of renting or purchasing land. Hence, the SPS have no direct impact on the rental market.

In Germany the effect of the introduction of the SPS on land values is estimated as being low. As there is a shortage of eligible area in relation to the number of entitlements, rental prices should increase if the late coupled payments were not capitalised in land rents. With the decoupling the average payment levels in marginal grassland increased. Since 2007 an increase in rental prices for grass land could be observed (see Figure 57 in the Appendix, which plots farmland rents in Germany 1991-2007).

This change towards a market orientation gave rise to increasing rental prices. Nearly 1/3 of the interviewed experts supported this conclusion. However, the effect of decoupled payments on rental prices for grass land and arable land is not the same. Statistical data show a significant increase of the average rental price per hectare for grass land by EUR 4 from 2005 to 2007, while they remained stable at a level of 121 EUR /ha from 2001 to 2005. This increase is due to fact that there were no direct payments for grass land before 2005. The average rental price for arable land increased by EUR 6 per ha in the period of 2005-2007, which is less than the average two-years growth values for the period of 2003-2005. A further reason for the recent upward trend of rental prices that resulted from expert surveys is that the rents are more determined by the market factors than by regulatory measures.

According to Figure 57 in the Appendix, the positive trend in average rents for agricultural land is mostly determined by increasing rents for arable land. In the period 1991 to 2007, rents for arable land continued to rise, while for grass land the upward trend stared beginning from 1999. Since 2003, these positive trends of rents for arable and grass land flattened. Since the implementation of SPS in 2005, no change in the general trend could be observed. Based on this development of land rents, the correlation between the changes in SPS and land rents is not evident. For the most part, this is due to the long term rental contracts (with an average duration of 10-12 years).

With respect to the newly closed rental contracts, however, the interviewed experts estimated that rents for newly rented areas are significantly higher than average rents for the currently existing rental contracts. Although these qualitative data suggest that expectations for rent rise have been raised, there is still no evidence for any effect of changes in SPS on current or expected land value.

In Bavaria the interviewed experts agree that if decoupling, influences rental prices at all it, will be for marginal grassland (especially in the mountain pastures). In these areas rents may increase, since these areas received hardly any 1st pillar payments prior to decoupling and the introduced payments will even increase from 89 EUR /ha to 340 EUR /ha until 2013 (Situationsbericht 2008).

In Saxony only two out of eight experts said that decoupling had or will have an influence on rental prices. The influence could be especially on rental prices for grassland, because no payments for grassland existed before decoupling and the introduced payments will even increase from 111 EUR /ha to 359 EUR /ha until 2013 (DBV 2008).

In Italy the SPS adoptions has not had big impacts on agricultural land rental prices. There is some impact on land rental price that is increasing, above all, in the land with entitlements (Terra e Vita, 3/2008; Marco Casali). An overview of the main drivers of land market in Italy is given in Table 30.

Differences in the rental prices reported by the interviewed experts, range between 10% and 30%. The SPS introduction affected land rent more than purchases, but the general impact was rather moderate. Table 32 in the Appendix reports the impact of SPS on land rental markets in Italy.

A number of different aspects of land rents are touched by the reform. This concerns in particular all contract formalisation and rental prices.

The most pronounced effect brought by the SPS reform seems to be some reduction of market activities due to policy uncertainty. This effect seems to be associated with stable prices. However, according to the interviewed experts, this effect is not very important. During the transition phase, the shift to the SPS induced different reactions in terms of normative and institutional arrangements, mostly aimed at maintaining previous commitments.

A number of related effects can be related to the reform that are not primary in the focus of land market, such as extensification in some areas, or the reduction of cultivation in marginal areas (but good practices); more effects are due to livestock, tomato and fruit decoupling.

The adoption of the SPS in Italy contributed to the emergence of two ‘separate’ rental markets specialising in eligible and non eligible land. The SPS subsidies increased the rental price of the eligible areas. Unfortunately, no statistical figures on the two types of land values are available yet. Moreover, evaluating the interviewed expert opinion we came to a conclusion that the survey responses often mix the higher land value due to eligibility with the higher value due to the fact that entitlements are sold with land. Given that the survey results suffer from the identification problem, they are not sufficiently reliable to be used for quantifying the price differences of eligible and non eligible land.

In Emilia Romagna the introduction of the SPS has slightly contributed to an increase in rental prices due to higher demand for eligible land to benefit from the payments. According to the interviewed national experts it gives raise of land rent between 10% and 30% compared to land without entitlements.

The adoption of the SPS did not have big impacts on agricultural land rental transaction in Emilia Romagna. Usually land rent includes "land" and "entitlements" for the eligible areas; land rental price with entitlements is about 20-40% higher compared to rental without entitlements (60-70% is land price). The variability from 20 to 40% depends on the zone where the SPS are assigned and consequently from the value of the entitlements.

In Emilia Romagna, after the introduction of SPS, the agricultural land rents are increased. However, causes other than the SPS, could also have played a role (agricultural prices in particular).

In the Netherlands there is no information available on how the SPS affect land rents. There is however a Court case on lease-expiration, where the tenant was requested to hand over the entitlements to the land owner. However, this is in conflict with the current legislation and the final outcome is unknown, as the tenants might appeal to the higher Court (see Box 13).

In Spain the value of entitlements per region increases the value of land, except for the average value of the special entitlements in the AC which do not affect the land value because they are not directly linked to the owned land.

In Sweden the SPS is judged to have a stronger impact on land rents than on land prices, and respondents are more concordant in their judgement of the SPS's impact on land rents then they are with respect to land prices.

5.3.2.4. Other factors

Among other rental price drivers the most important are bio-energy, farm size and non-economic factors.

In Germany the intensive animal production is often accompanied with the production of bio-energy, e.g. biogas. Accordingly, the impact of advanced bio-energy production on land rental prices was assessed by experts as being strong in West Germany, but rather low in East Germany.

In Germany a weak increase in rents in conjunction with the farm size was stated in all case study regions. This positive correlation applies to arable land, grass land, and livestock holding. A further significant factor that affects reservation prices of land buyers/tenants and hence land value, is differences in the employment structure in West and East Germany. This leads to different levels of rental and sales prices between West and East Germany. The average rental price for West Germany is 227 EUR /ha and the average sales price around 16,000 EUR /ha. Whereas in East Germany farmers pay in average 119 EUR to rent one hectare land and around 4,000 EUR to buy one hectare. In East Germany, the vast majority of farms are corporate large-size farms with hired labour. For those farms, labour costs of employees are expenses which reduce farm's liquidity. For small individual (family) farms in West Germany, the entrepreneurial profit and salaries of family members are not expenses but imputed costs. This implies that labour costs do not reduce liquidity of small family farms as it is the case for corporative farms. Consequently, farmers in West Germany have a higher reservation price for land than farmers in East Germany.

In Germany the impact of the advanced bio-energy production on land sales prices and rents was assessed as strong in West Germany but as rather limited in East Germany. This disparity is mostly due to the different average farm size between the West and East. Biogas producers in East Germany assured the needed amount of substrate by renting or buying large size land and/or by closing supply contracts with farmers. In contrast, West German bio-energy producers are forced to rent or buy additional land, which makes them influential actors on the land market.

In East Germany the current rental market dynamics is still largely influenced by the active role of the BVVG. For example, on 1st January 2007 BVVG changed the procedures by which they award land. This means that the expiring rental contracts cannot be renewed; instead, the land is awarded for sale or with exception, for rental by public announcements. The interviewed experts agree that this practise raises prices.

In East Germany an important characteristic is worker migration to West Germany, where the labour market situation is better. Thus, there is low urban pressure. Only in the big centres in the Saxonian Loess Region, such as Leipzig or Dresden the urban pressure is measurable.

In the East German region of Saxony a steady rental price increase can be observed since the reunification in 1989. One reason for this is the initially low average rental price of 65 EUR /ha in 1991. The average rental price for West Germany was at that time 217 EUR /ha. High GDP growth rates and general wage increase raised rental prices for land in East Germany. The interviewed experts agree that in the long-run increases in inflation influence the rental prices.

In Greece non-economic factors significantly affect the land market. For example, the state-owned land, multi-activity of the owners, Greek culture and mentality, abandoned land, etc. significantly affect the rental rates for agricultural land.

In the Italian regions of Emilia Romagna and Puglia farm size is among the key drivers that have contributed to rental price increase in recent years. In particular, the trend towards expansion by a restricted number of large farms has contributed to demand for land renting.

In Spain we may see how both land prices and land renting are higher in regions with less farming surface area and whose farms are of a smaller average size. This might be owing to the fact that large farms have undertaken less intensive crop-growing, and that areas with smallholdings require more share of work. To this end, we may add individuals' larger financial resources to acquire small rural properties as opposed to larger properties, which leads to the price of land increasing in areas with smallholdings.

For Sweden the relative impact of different drivers on agricultural land rental prices during 2003-2007 is mapped out in Figure 79 in the Appendix. Results regarding land rents are to some extent different from land prices. The three most important drivers are however the same. On average, the respondents think that the profitability of increasing farm size, farmer's beliefs in the future and increasing commodity prices were the factors with the strongest positive impact on land rents (see Figure 79 in the Appendix). Increasing farm size is the driver with the strongest positive impact on agricultural land rents during the period.

According to the interviewed experts, the most important driver of land rents in Sweden was farm size. The average farm size in Sweden has increased over time. The trend of increasing farm size seems to have started in 1997.The decrease in 2005 is solely due to the emergence of small units, which previously were not registered. The introduction of the SPS changed the renting incentives, as also small grazing land plots became eligible for the support. The long term growth trend towards bigger farm size resumed thereafter.

6. THE COMMON AGRICULTURAL POLICY

The beginnings of the CAP date back to the period of formation of the European Economic Community (EEC, 1957). The emphasis of the early CAP was on encouraging agricultural productivity, ensuring stable supply of affordable food to consumers, and ensuring a viable agricultural sector. The support to farmers was implemented predominantly through price support system by which farmers were guaranteed high prices. This early CAP had an important impact on agricultural markets. Most importantly, it led to high rise in farm productivity and created large surpluses of the major farm commodities in EU market, some of which were exported (with the help of subsidies), others of which had to be stored or disposed of within the EU. These measures had a high budgetary cost, and distorted world markets. At the same time there were increasing concerns about the environmental sustainability of agriculture.

To circumvent these developments, some important changes to the CAP were made in the 1980s but, more particularly in the beginning of the 1990s. The first substantial reform of the CAP occurred in 1992, known as the MacSharry reform, followed by the Agenda 2000 reform. In order to reduce market imbalances, domestic prices were reduced and the income loss to farmers was compensated through compensatory direct payments. The level of payment depended on historical rather than current production. These reforms therefore cut the link between support to farmers and production. However, farmers were still obliged to produce certain agricultural commodities in order to obtain direct payments. At the same time, a ceiling was put on subsidy expenditure to keep the costs of CAP under control.

In 2003, EU farm ministers adopted a substantial reform of the CAP. The 2003 CAP reform decoupled most of direct payments. However, Member States were allowed to maintain certain subsidies coupled to production. The direct payments under the new system are linked to compliance with certain environmental, food safety and animal welfare standards, as well as to the requirement to keep land in good agricultural and environmental condition (i.e. cross-compliance requirements).

7. IMPLEMENTATION OF THE SPS

7.1. Models of the SPS implementation

Until recently most of the CAP subsidies were coupled to farm production. The CAP was fundamentally re-organised in 2003, when it was decided that farm subsidies should be determined as a fixed set of payments per farm, the so-called single payment scheme (SPS). Under the SPS, the farmer is entitled to a yearly payment depending on the number of the "payment entitlements" and eligible hectares he possesses (see Table 20 for more details).

The member states could choose between three SPS implementation models: the *historical model*, the *regional model*, and the *hybrid model*. Under the historical model, the SPS payment is farm-specific and equals the support the farm has received in the "reference" period. This is the most common implemented SPS model (see Table 10). Under the regional model, an equal per hectare payment is granted to all farms in the region.

The hybrid model is a combination of the historical and regional models. The member states can choose between dynamic and static hybrid models. If a member state implements the dynamic hybrid model there is a gradual move to a fully regional model. The historical component gradually decreases while the regional component gradually increases over time. For example, England, Finland and Germany implement the dynamic hybrid SPS model. On the other hand, if a member state implements the static hybrid model then the regional and the historical shares do not change over time (e.g. Northern Ireland and Sweden) (Table 10).

7.2. Explaining the SPS model choice

According to the country studies, political economy factors explain the choice of the implemented SPS model in the EUSC.[47] In most countries covered in this study the chosen model represents the interests of farmers. Concern over the redistribution of subsidies was by far the most important factor that led most EUSC to choose the historical SPS model instead of the regional model (Table 21). It appears that countries with hybrid model, particularly Germany and Sweden, took into consideration not only political factors (e.g. redistribution issue), but also the transaction costs of implementation (regional model is less costly), as well as the potential future transaction costs of changing the current SPS model to the regional model, as the historical model was perceived not to be politically sustainable in the long-run and hence a shift to a regional model might be required. In addition, an important factor which motivated England, Finland and Germany to choose the dynamic hybrid model instead of directly implementing the regional model was to smooth the adjustment of agricultural sector at

[47] This section draws from the country study analyses which are predominantly based on interviews with government and local officials, market expert and farm organisations.

the start of the SPS implementation. In Belgium the choice was also influenced by the application of the historical model in neighbouring countries of France and the Netherlands. Belgian farmer unions contended that implementing a different model from France and the Netherlands would disadvantage farmers in Belgium. France is one of the most conservative EU countries in terms of implementation of the 2003 CAP reform. France chose to retain the maximum coupling rates in order to minimise unpredictable adjustment costs in the farming sector (Box 5).

Northern Ireland (UK) adopted the static hybrid model because it was perceived to be the fairest, in particular with respect to the relationship between beef suckler producers and finishers. If a historical SPS had been adopted the finishers would have received the vast majority of the SPS benefits and the hybrid approach offsets this to some extent.

France alongside Spain decided to keep coupled subsidies for a significant number of sectors. On the other hand, Germany, Ireland, Sweden and the UK decoupled most of their subsidies (Table 12 and Table 22). The main concerns of EUSC regarding decoupling was land abandonment, change in production structure and abandonment of extensive farming practices. In Spain various coupled subsidies were maintained to avoid abandonment of farming due to low productivity of dry crops and extensive cattle rearing. There were concerns that a full decoupling would lead to cultivation of monocultures (cereals); particularly rice, protein crops and hard wheat production would likely be abandoned. On the other hand, Greece took an opposite view. Decoupling was perceived to eliminate the distortions arising out of coupled subsidies and allow farmers to produce the most profitable commodities and thus reduce the threat of land abandonment. In the case of Ireland, all subsidies were decoupled to ensure a full use of support payments. It was expected that production would decline even if payments were to remain coupled and this would have reduced the future level of support to farmers in Ireland.

Box 4. The SPS model in Germany

Germany has implemented the hybrid dynamic model from 2005, which is a combination of the historical model and the regional model. Starting in 2010, the hybrid scheme will be transformed stepwise into a pure regional model until 2013.

In addition, Germany has implemented a regionalised version of the hybrid dynamic model which is obligatory for a member state with more than 3 million hectares. The regions are the same as the federal states, with the exception of Hamburg, Berlin and Bremen, which where assigned to the surrounding federal states, thus resulting in 13 premium regions. In 2005 a national ceiling for payment entitlements was set at EUR5.148 billion. From this amount, 1% was used to set up a national reserve.

The distribution of SPS ceiling among regions based on payments received in the reference period was expected to create large differences in the values of the entitlements. To avoid this imbalance, 35% of the payments were distributed according to the eligible area of a region and only 65% according to actually received payments during the reference period. This share was chosen in a way that allows no region to lose more than 5% of its premium payments, and at the same time the payments per hectare do not differ more than 100 EUR between two regions.

Box 5. Choice of the SPS model in France

France is one of the most conservative EU countries in terms of implementation of the 2003 CAP reform: i) France has implemented the historical model; ii) with the maximum allowed rates of coupling of direct payments; iii) France delayed the implementation of the reform until 2006, rather than beginning at the earliest opportunity.

Analysis conducted by the French Ministry of Agriculture had shown that more regionalised options would lead to important changes in incomes among farmers with producers of field crops (cereals and oilseeds) being net losers.

Before implementation of the SPS, the main Farmers' Unions (i.e. "FNSEA" and "Coordination Rurale") were pressing for a historical model in order to avoid a change in the distribution of support. However, the "Confédération Paysanne" (left wing Farmer's Union) was in favour of a regionalised implementation, benefiting extensive agricultural systems.

With the recent agricultural price increases, internal divisions within the FNSEA appeared. More specifically prices of cereals and oilseeds are very high; as a consequence, animal producers claim for a redistribution of first-pillar direct aids in their favour, but field crop farmers resisted, arguing that the future of CAP direct support is not secure. Finally, it should also be noted that there is division among regional directions of the FNSEA; regions where average subsidies are rather low are in favour of more redistributive SPS model.

Finally, it is interesting to mention the position of the French administrative NUTS2 regions. All NUTS2 regional governments but one are now on the opposite political side to the French national government: regions are asking for an application of the SPS using the regional SPS model, but here also each region plays its own card.

As for landowners, they were unhappy about the reform in itself, claiming that giving the SPS to farmers and not landowners was a way to dispossess landlords of their ownership titles.

7.3. Empirical evidence on the implementation of the SPS

The total value of the SPS ceiling was around 30 billion EUR in EU-15 in 2006 (Table 11). The largest recipients of the total EU-15 SPS payments are France, Germany, the UK and Italy. The average value of the SPS ceiling is 226 EUR pre hectare in EU-15; with Portugal having the lowest value (97 EUR/ha) and Greece with highest value (513 EUR/ha).

The decoupling rate of direct payments varies among member states. For the EUSC for which the data are available, the largest decoupling rate in 2006 was in Ireland, Germany and UK followed by Sweden (see Table 12 and Table 22).

7.3.1. Activation of SPS entitlements

Table 13 shows data on entitlements in the EUSC (see Table 23 for study regions). In most countries the number of activated entitlements and the eligible area is smaller than the total UAA. Only in Germany and Finland the number of activated entitlements is roughly the same as the UAA.[48] Figure 24 shows that the share of activated entitlements on UAA tends to be larger in countries which implement hybrid SPS model, than in countries with historical SPS model. This is because with the historical model the total number of entitlements corresponds to the number of hectares, which generated subsidies in the reference period while with hybrid model (or regional model) the total number of entitlements is equal to all eligible land declared at the time of SPS implementation.

The total number of distributed entitlements compared to the total eligible area is quite high in all EUSC except in Greece and Spain. In Finland the total distributed entitlements even exceeds the eligible area. Based on theoretical results presented in the previous section, this may create pressure for capitalisation of the SPS in land prices. Similarly, in Belgium, France, Germany, Northern Ireland and Scotland there may be pressure of capitalisation of the SPS in land values as total distributed entitlements is almost equal to the total eligible area.[49]

The share of non-activated entitlements in the total distributed entitlements is relatively low. For most EUSC it is less than 3%. The exception is Belgium where approximately 7% of entitlements were not activated in 2006. This is due to the declining livestock sector in Belgium. As a result, more special entitlements tend to remain un-activated than regular entitlements. In 2005 73% special entitlements and 97% of regular entitlements in total distributed entitlements were activated in Flanders. Similar developments are observed in Wallonia, however no exact data are available. Table 14 shows un-activated entitlements by region in Germany in 2005. The variation ranges between 0.2% and 3.4% of the total distributed entitlements. In the same time, the value of non-activated entitlements tends to be lower than the value of activated entitlements (on average lower by 25%). The main reason why farms do not activate some of their entitlements in Germany is insufficient availability of eligible area and costly search for new entitlements especially when farms want to trade only a small number of entitlements, as at least part of the search cost are fixed and do not depend on the number of traded entitlements. Similarly, mostly very low-valued entitlements were not activated in the Netherlands mainly due to the administrative burden as well as due to insufficient eligible area.

[48] One may not expect that the number of activated entitlements is higher than the UAA. Greater number of activated entitlements than the UAA may occur in the case when farms use fallow land to activate entitlements. For example, in 2006 total fallow land on the UAA in Finland and Germany was 11% and 4%, respectively. However, this may also depend on the quality of data sources. In calculations provided in Table 13 and Table 23 we use UAA from Eurostat, while for the activated entitlements the sources are country studies.

[49] Non-activated eligible land for which SPS was not claimed represents "naked land". The total "naked" land tends to be smaller with hybrid model (or regional model) than with historical model because with the former model the total number of entitlements is equal to all eligible land at the time of SPS implementation, while with the later model the total number of entitlements corresponds to the number of hectares which generated subsidies in the reference period. As a result, the hybrid model is expected to lead to stronger pressure of capitalisation of the SPS in land values.

The Spanish data show that overall the share of un-activated entitlements is relatively low. However, there is some regional variation in non-activated entitlement with the highest in Valencia region representing around 10% of the total available entitlements in 2006 and 2007. In particular they refer to the entitlements assigned to the olive sector (mid Spain, Valencia region) and livestock (Cantabrian coast), and correspond to small farms (with size less than 1 ha) who have not applied for SPS as the farming activity is not their main source of income.

In France several factors led to the non-activation of entitlements, among which the most common are: i) a lack of land due to a smaller utilised area today as compared to the area in the reference period; ii) non-eligible crops (or plant cultivation) on the area; iii) a gap between declared areas and monitored areas during controls.

In Sweden unused entitlements were not activated mainly due to the fact that landowners have taken the land back, while their former tenants could not activate their entitlements. Another reason could be that some farmers have applied for land plots which turned out to be too costly too keep in Good Agricultural and Environmental Condition (GAEC).

In the UK common reasons for non-use of entitlement are the loss of land or death without succession, sale of land for horse paddocks (the land was split and the buyers did not want SPS entitlement), when there is a very small payment to be received[50], and to avoid set-aside regulations.

7.3.2. Value of SPS entitlements

Table 13 shows that there is variation in the average value of entitlements among MS. This is determined by commodity structure as well as by productivity differences among MS. In the same time, there is significant variation within MS. Two important factors lead to variation of the value of entitlement within MS. First, SPS model creates strong differences in entitlement value among farmers. The historical SPS model leads to stronger variation than the hybrid model because under the historical model the entitlement value depends on the subsidies farm received in the reference period and the area that generated these payments. This is illustrated in Figure 25 for the Netherlands and Sweden. The figure shows the distribution of the value of entitlements. The Netherlands implements historical model and the variation in the value of entitlements is higher than in Sweden which implements static hybrid model. In Sweden the regional component is on average around 82% of the value of entitlement. In Sweden most land receives average value of entitlement. More than 2% of land in the Netherlands has an entitlement with a value around 5 times larger than the average value, while around 9% of land has entitlement value 20% of the average value.

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[50] This was particularly the case of fruit vegetables and potatoes farms in England because these farmers expected to receive smaller SPS in the early years of the hybrid scheme implementation. Fruit vegetables and potatoes farms did not receive subsidies in the reference period hence their historic component of the SPS value was zero while the regional component was small.

Second, the variation in the value of entitlements within EUSC is due to farm and regional specialisation and due to productivity differences. In general more fertile lands tend to have entitlements with a higher value. For example in Sweden the most valuable entitlements are in region with the most fertile land in the southern Sweden (299 EUR/entitlement). The least fertile areas in northern Sweden have the lowest value of entitlements (191 EUR/entitlement). In Finland the hybrid SPS model seems to reduce the variation. The regional component was around 80% of the total entitlement value at the start of SPS introduction. The regional variation of the value of entitlements is from EUR 50 to EUR 100/ha in Finland.

Cattle farms have the largest entitlement value (318-333 EUR/entitlement) in Ireland. Larger, more intensively operated farms in the Southeast region have higher SPS per holding than the smaller, more extensive farms in the West and Border regions. The recipients of the largest SPS are mostly located in the Leinster region. Payments per farm here range from EUR 15,000 to EUR 90,000 per farm. This reflects the intensive nature of farming in these regions as well as the larger than average farm size.

In particularly, there is a strong variation in the value of entitlements in big countries, as there are strong differences between regions in terms of production specialisation, productivity and land fertility. For example, the variation in the value of entitlement between regions in Italy is from 58 EUR/entitlement to 445 EUR/entitlement. Plain regions have substantially more valuable entitlements than mountainous regions (Figure 26). Most of the payments in the study region Emilia Romagna (IT) derive from arable crop area payments. For this reason differences are not as strong as in other regions. In contrast, the value of entitlements in the study region Puglia (IT) is very variable compared to other regions, ranging from 300 to 3500 EUR/entitlement. Differences are due to the fact that some farms cumulate payments for cereals, olive and tomato.

Significant differences in the value of entitlements exist among regions in Spain. The value ranges from the top value in Andalusia at about 70% above average value and 40% below average value in Madrid.

In France, regional variation of the SPS value mimics the product specialisation of the region, combined with the associated rate of decoupling. Thus, within regions, the variation among farms is high in very heterogeneous "départements" (e.g. Indre in central France, and Vaucluse in southern France), and low in "départements" with homogenous productions (e.g. Marne around Paris).

The standard deviation from the average value of entitlement between farms in Germany ranges from 75 EUR in Sachsen-Anhalt to 180 EUR in Rhineland Palatine. Large differences could be especially observed in regions with pastoral animals due to the impact of the farm specific component in the entitlement value.

In the UK the SPS payments vary either due variation in historical intensity of production and/or regulations concerning the implementation of the SPS. For example, in Scotland and Wales the application of historical model means that payments are determined by the intensity of production in the reference period. In England, even though it is moving to a regional model, current levels are largely determined by the historical distribution of production and even when the regional model is fully implemented variation will occur because of the regionalisation of SPS within England (between non-SDA, moorland SDA and non-moorland SDA).[51] In Northern Ireland the use of the Static Hybrid model means that there is a variation between the area based entitlement and the historical entitlement.

Some policy measures tend to reduce the variation of entitlements particularly entitlements with low value. For example, in France farms owning low value entitlements can upgrading them through the NUTS3 reserve programmes. In Belgium young farmers are also eligible to upgrade low value entitlements from the national reserve.

7.4. Tradability of entitlements

The tradability of entitlements can be constrained by two types of constrains: regulatory constrains and market imperfections.[52] Both types of tradability constrains may have distributional implications of the SPS benefits.

In general entitlements are tradable but certain constraints are imposed generally in the EU as well as each MS has some flexibility to introduce additional country specific restrictions.

The SPS entitlements are tradable but only within the EU member states (not among them) and only under certain conditions. EU regulations specify that the transfer of entitlements by rent without land is not possible. The transfer by rent and similar market transactions with entitlements are allowed only if the transferred entitlements are accompanied by an equivalent number of eligible hectares of land. A farmer may transfer his SPS entitlements without land by sale only after (s)he has used at least 80% of his payment entitlements for at least one year or, after (s)he has voluntarily given up to the national reserve all the payment entitlements (s)he has not used in the first year of the SPS application. If more than 20% of the value of SPS is allocated from the national reserve then the entitlement cannot be transferred for 5 years.

EU member states can impose additional restrictions on the transfer of entitlements. For example, a member state may decide that payment entitlements may only be transferred or used within the region. Member states may also require that in the case of sale of payment entitlements without land up to 50% and in the case of sale of payment entitlements with land up to 10% must be reverted to national reserve. In the case of sale of payment entitlements with an entire farm, member states may require up to 5 %

[51] In England in 2005, holdings classified as "mixed" and "cereals" receive the greatest payment rates per hectare. "Pig, poultry and horticulture", "LFA grazing livestock" and "other" farm types have received the lowest SPS payments per hectare.

[52] Full tradability of entitlements implies that that trade is not constrained by regulations or market imperfections.

must be reverted to national reserve. Table 15 summarises the tradability of entitlements by the EUSC. Spain, Italy, and France are the most restrictive countries in terms of entitlement tradability.

In addition to regulatory constraints, the tradability of entitlements may also be constrained by market imperfections - for example, because of imperfectly functioning rural credit markets or transaction costs and imperfect information. Given that the SPS accords the right to a future stream of subsidies, in competitive markets a potential buyer would need to pay the net present value of the future stream of subsidies to the seller. If the buyer is credit constrained then his/her ability to pay this price is reduced. The effect is a lower market price of entitlements which reduces the owner willingness to sell their entitlements. Hence, imperfect credit markets may affect trade in entitlements.

Similarly, if there are transaction costs and imperfect information on the entitlement market this will also constrain the entitlement trade. Transaction costs and imperfect information impose search costs (which make it more difficult to match the seller and buyer), negotiation costs, enforcement costs, and uncertainty. In the presence of transaction costs and imperfect information a participant on the entitlement market must search for other parties interested in trade (i.e. must search for suitable land or entitlement owner), must negotiate the price and the quantity traded. In addition, it may be difficult to enforce the payment or the rental contract if the land used for the entitlement activation is rented. Moreover, with the uncertainty about the future of the SPS, some market participants may be discouraged from participating in the land market. In general, transaction costs reduce the benefits from trading entitlements and hence lead to lower participation on the market. Sufficiently high transaction costs may even lead to failure of the entitlement market.

7.5. Cross-compliance

Granting of full support under the SPS is subject to cross compliance. A farmer receiving the SPS support must respect Statutory Management Requirements (SMR) (i.e. public, animal and plant health, environment, animal welfare requirements) and maintain land in Good Agricultural and Environmental Condition (GAEC). The SMRs are based on pre-existing EU Directives and Regulations, such as the Nitrates Directive. Maintaining agricultural land according to the GAEC is a new requirement, which aims to prevent abandonment and severe under-management of farmland. Member States must also ensure that the extent of permanent pasture (as at a specified reference year) is maintained and that a comprehensive advisory system to support cross-compliance is established. Farmer failure to respect these conditions can lead to reduction or complete cancellation of the SPS.

According to the European Commission, the cross-compliance requirements do not introduce substantive new obligations to farmers. Its main objective is to enforce the existing EU and national legislation. However, before the 2003 CAP reform, farmers were expected to comply with environmental protection requirements as a condition for benefiting from the CAP support. The 2003 CAP reform made cross-compliance compulsory and extended the coverage of requirements in the fields of environment, public, animal and plant health and animal welfare (European Commission; Alliance Environnement 2007).

Member States are required to set up a farm advisory system by 2007 to advise farmers on land and farm management. It could be public or private company. The advisory activity must cover at least the statutory management requirements and the good agricultural and environmental condition. Farmers may participate in the farm advisory system on a voluntary basis. Flanders (BE) and Sweden have established private farm advisory system. Finland and Greece have established public farm advisory system. France, Germany, Ireland, Wallonia (BE) have combination of public and private farm advisory system. In Spain the farm advisory system is still in the process of being set up. In Italy farm advisory system is designed and implemented at regional level.

7.6. National reserve

Member States must create a national reserve by a linear percentage reduction (up to 3 %) of their SPS national ceiling. There are additional other financial sources which are reverted to the reserve. For example, unused entitlements for three years as well as non-attributed entitlements are transferred to national reserve. If Member States impose restriction in tradability of entitlements in terms of reducing total numbers of entitlements for traded entitlements, these reductions are reverted to national reserve.

The national reserves can be used to allocate entitlements (*i*) to farms in a special situation, (*ii*) to new entrants, and (*iii*) to farmers in regions subject to restructuring and/or development programs in order to avoid abandoning of land and/or in order to compensate specific disadvantages.

Based on available data for Finland, Germany and Spain, the size of entitlements allocated from the reserve is small at 0.02%, 0%, and 2.4%, respectively, of total distributed entitlements. For example, granting of SPS to new entrants after 2005 is irrelevant in Germany. For instance in 2006 and 2007 only 10 farms applied for SPS from the national reserve in Bavaria but only 2 applications were accepted.

In Flanders (BE), if the value of the entitlement is lower than 90% of the average value in the region, young farmers of no more than 40 years of age, who activated all their entitlements the year before, can from 2007 on replace these entitlements with entitlements from national reserve with value equal to the average in Flanders. The same holds in Wallonia form 2008. However, in Wallonia farmers of no more than 30 years of age can do the same and all entitlements lower than the average are eligible to be replaced for a higher value entitlement from the reserve.

8. IMPACT OF THE SPS ON LAND MARKETS

This section analyses the effect of SPS on market with entitlements, land transactions, land values, and structural change. Given that none of the countries in our sample implemented the regional SPS model, the analysis mainly focus on historical model and hybrid model.

8.1. Market with SPS entitlements

Table 17 shows the size of the entitlement market in the counties coved by this study. According to Table 17, the entitlement market is quite sizable in Belgium, the Netherlands and Sweden. The yearly transactions range from 0.1% in Northern Ireland to around 12% in Sweden on the total activated entitlements.

Trade with entitlements is most often conducted directly between farmers or with using services of market agents or services of farm organisations (Table 18). Spain appears to have set-up well organised entitlement trading system similar to an auction (see Box 6 for more details) however activity on this market is small. Information from Germany confirms that most entitlement trade takes place at local level. There are no many transactions between regions (see Box 7 for more details).

Most trade of entitlements is through sale. Renting of entitlements is small.[53] Other types of entitlement transfer are also important such as inheritance, farm succession or other circumstances.

In general there is no observed unofficial entitlement market because entitlements holders need to be identified in order to receive payments. However, unofficial “trade” may occur among members of the same family (in the sense that money is transferred by the official beneficiary to another member). This is in particularly reported to be the case in Italy, Greece, and Northern Ireland.

Consistent with theory regional variations in the market price of entitlements follows the variation of the face value of entitlements. This is reported to be the case in most EUSC.[54]

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[53] Evidence from Belgium shows that renting of entitlements is not attractive for entitlement owners because of principal-agent problem. If the tenant doesn’t activate entitlements during a period of three successive years the entitlement goes to the national reserve and is lost for both tenant and the owner. Entitlement owners prefer to make a definitive transfer of entitlements to tenant and after the end of the tenancy contract the entitlement is transferred back to the original owner. This behaviour is also explained by rigidity of land tenancy markets in Belgium. The land tenancy market is strongly regulated. Most rental contracts are of duration 9 years.

[54] In England there is observed variation in the value of entitlements. Lower value entitlements tend to trade at higher multipliers than the higher valued entitlements. This is partially because tenants who did a deal with their landlords to return land with entitlement are buying lower value entitlements to give back to the landlord (keeping the higher value entitlements for themselves). In addition people appear to be willing to pay more for entitlement that is rising in value (to the flat rate in 2012) than entitlement which

Box 6. Organisation of SPS entitlement market in Spain

A private company *MercoPac* in collaboration with banks, administers the market for SPS entitlements. *MercoPac* facilitates information transmission between buyer and sellers and oversees all of the transaction process between the seller and the buyer.

Farmers who wish to sell entitlements must prepare a written warrant for sale with the collaborating banks. The seller temporarily makes his/her entitlements available to *MercoPac* until the offer is settled or until the warrant of sale expires.

On the other hand, buyers draw up a written warrant of purchase with the collaborating banks where among others the bid is set for entitlements offered by sellers.

Subsequently, before a notary, the offer is awarded to the highest bidder provided the offered price equals or exceeds the minimum price set by the seller.

8.1.1. Explaining transactions with entitlements

Based on the theoretical results presented in section 2 and appendix 3, three main factors may lead to trade of entitlements: (i) dynamic effect with structural change (ii) when farmers own more entitlements than they have eligible area, and (iii) decoupling[55].

There are important differences between the historical model and the hybrid model. Especially at the beginning of SPS the implementation, the entitlement trade in countries which implement the historical SPS model is likely to be driven by structural change, because entitlements were allocated based on land allocation in the reference period (2000-2002) whereas the SPS was implemented in 2005-2006. This may be reinforced by decupling which accompanied the introduction of the SPS.

Based on the theoretical results presented in previous section, in a static environment there is no incentive to trade entitlements because farms do not have incentive to adjust land use. Trade with entitlements may occur in dynamic situation with structural changes. This also holds for the situation when the allocation of the SPS entitlements among farms is not based on the land allocation at the time of the SPS introduction, but on a past land allocation equilibrium. Indeed, the SPS was implemented between 2005 and 2006 depending on the country, whereas the allocation of entitlements with historical SPS model was based on eligible land farms operated in the reference period 2000-2002. With hybrid model, the allocation of entitlements was based on the total eligible area in the first year of SPS application. As a result, if structural changes occurred between period 2000-2002 and 2005-2006, then one would expect more trade

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is falling in value (where there is a strong historic element) but some commentators suggest this is a often a false economy due to failure to adequately discount future SPS income streams.

[55] Decoupling of direct payments may lead to adjustment in production structure and land allocation and hence leading to trade entitlements. This effect is expected to be stronger in countries higher rate of decoupling such as Germany, Ireland, Sweden, and UK (Table 22).

of entitlement with historical model than with hybrid model in the first years of SPS implementation.

Because under the hybrid model entitlements were allocated based on the land used at the time of the SPS introduction, the entitlement trade will not emerge due to the structural change as in the case of the historical model. Under the hybrid model trade may emerge at the beginning of the SPS implementation only as a result of decoupling. The decoupling of subsidies from production may lead farms to relocate land and entitlements with it. Additionally, the entitlement trade will likely be affected by the fact that more entitlements were allocated with this model than with the historical model. Therefore, it is more likely that a situation may emerge where reallocated land induced by the decoupling is used for activation of entitlements which stimulates entitlement trade. In this case the entitlement will accompany land.

Given that under the hybrid model more entitlement were allocated than under the historical model, it is more likely that farms will own more entitlements than the eligible area under the hybrid model. Again, this may stimulate the trade. In this case the entitlement will not accompany land. However, if farmers trade entitlement without land, under the hybrid model the size of the entitlement trade depends on the availability of entitlement buyers having “naked” land. If there are few or no buyers with “naked” land relative to the number of sellers with extra entitlements, then the entitlement trade will be small but the pressure on entitlement sellers to trade entitlements will be reflected in the higher land prices and lower market price for entitlements (see next sections for more details on the impact of the SPS on land values and market price of entitlements).

The evidence from country studies partially confirms this explanation. In Germany which implements hybrid model the market with entitlements is smaller in relative terms then in countries with historical model such as France, the Netherlands or Belgium (Table 17). Indeed the main reason which leads farmers to trade entitlements in France and the Netherlands is to match area change since the reference period with the number of entitlements they received. On the other hand, in Sweden with hybrid model the market is large which is against theoretical expectation. However, the value reported in Table 17 is over-estimated due to double counting.[56] On the other hand, this could be the effect of decoupling in Sweden which may have induced land use adjustment and hence trade with entitlements. In the same time Finland with hybrid model has also relatively large trade with entitlements which is again against theoretical predictions.

Greece appears to confirm static effect of the theoretical results. The land markets are rigid in Greece, particularly sale markets, due to social value attached to the

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[56] Since transferred entitlements in Sweden as reported in Table 17 include all different types of transfers one single entitlement could be transferred twice. It could, for instance, be sold and then rented the same year. Thus, it is not possible to estimate how many of the entitlements were traded. That is, the number of entitlements that have been objects of exchange in the total number of activated entitlements is smaller than indicated in Table 17.

landownership (see Greek country study for more details). There are no many land transactions taking place. As a result, there is also not reported significant market with entitlements. Trade takes place mostly among family members. Transfers are also the result of early retirement, and other unexpected circumstances (inheritances) in Greece.

Spain also implements historical model. The relative small trade could be due to the relative strong constraints in entitlement trade (see Table 15) and due to lower rate of decoupling.

Further, because trade in entitlement is a result of dynamic effects (structural changes and decoupling) the sellers of entitlements normally are exiting farmers or farms in decline while buyers are expanding or new farms.[57] For example, in Sweden non-farming landowners who re-enter agricultural activity and farmers, mainly young, who start, are common buyers of entitlements. The sellers are often retiring farmers and exiting tenants. In Italy generally entitlements are sold by retiring farmers and bought by large farms. In Germany SPS are sold by exiting farms and large farms (larger than 25 ha) buy SPS entitlements.

Box 7. Transfers of Entitlements in Germany

In 2006-2007 most of the entitlements were transferred in the course of farm successions (roughly 40%) or market transactions (40%). At least half of the market transactions were induced by changes in the farmed area of the respective farms. The rest of transactions (around 20%) were rental exchanges. The trade with entitlements decreased from 2006 to 2007 especially after it became clear that set-aside and OGS (non permanent fruits, vegetables and starch potatoes) are abandoned (ZID).

Trade with entitlements takes place predominantly at local level. The distance between the location of buyer and the location of seller was less than 10 km only for over 90% of the traded entitlements. Consequently, a significant reallocation of entitlements could not be observed across municipalities. Set-aside entitlements are slightly more frequently traded than normal entitlements.

According to the expert survey conducted by Röder and Killian (2008) and by the German team, the market value is predominantly between 1 and 1.5 times the face value of an entitlement (Table 1). This is much lower than the net present value of an entitlement. Regarding regional variation, the survey shows that there is very low regional variation in general, whereas market value is a little bit higher in Eastern Germany compared to Western Germany.

Table 1. Market value of traded entitlements in Germany

Region	Market price of entitlements / Face value of entitlement
(Face value of entitlement=1)	
SH	1.5
NS & HB	1.3

[57] This also implies that in general entitlement ownership concentration follows structural changes. This was observed in most EUSC, particularly in Belgium, France, Finland, and Germany.

NRW	1.3
HE	1.3
RLP	1.0
BY	1.4
SN	1.8

Source: Röder and Killian (2008) and the German report.

At the same time, one would expect trade with entitlements when farmers own more entitlements than they have eligible area. Figure 27 shows the correlation between “naked” land and trade with entitlements. The higher is the share of distributed entitlements relative to the total eligible area (the less there is “naked” land), the higher is trade with entitlements. With less “naked” land, it is more likely that some farms may end up with more entitlements than eligible area. This may also be induced by structural changes or decoupling. This stimulates farms to sell entitlements in order to be able to benefit from the SPS.[58]

Further, restrictions on entitlement trade constrain trade. Figure 28 shows that in countries with more restrictions (e.g. France and Spain) the entitlements trade tends to be lower compared to countries with fewer restrictions (e.g. Belgium, Finland and the Netherlands). In Germany the entitlements trade is low eventually due to the adopted hybrid model which leads to less entitlement trade at the beginning of the SPS implementation. In the UK selling fees charged by market agents for transfer of entitlement does appear to make the entitlements trade less viable.[59]

In Northern Ireland the entitlement trade is very small probably due to the possibility to consolidate entitlements. Farmers were permitted to consolidate their historical component of the entitlement value onto a lesser area to increase the unit value of their entitlements. This reduced farmers’ surplus entitlements. A similar development is expected in Ireland but data are not available to confirm this (see Box 9)

When trade in entitlements is induced by structural changes and decoupling, then entitlement transfer will be always accompanied by land. This is because for example if a farmer becomes less profitable due to structural change (s)he is willing to relocate land and entitlements with it. In the case when farmers own more entitlements than they have eligible area, transferred entitlements normally will not be accompanied by land. A farmer with extra entitlements is willing either to sell entitlements or acquire additional

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[58] When analysing the data presented in Figure 27 one must take in consideration the quality and consistency of data. The entitlement trade data include various types of transactions and data come from various national sources which poses problem of consistency and comparability among countries. In the same time, it is difficult to draw statistical robust conclusions from few available observations.

[59] The ranking of restrictions presented in Figure 28 take in consideration only regulatory restrictions. Other non-regulatory restrictions (e.g. credit constraint, underdeveloped entitlement market, etc.) are not taken in consideration as consistent information is not available. This information could considerably improve the analysis.

land without entitlements to be able to activate all entitlements. The evidence from country studies shows that entitlements are most often traded with land - when land is sold or rented by another farmer - in most EUSC. Based on the available information, a significant difference cannot be identified between the hybrid and the historical model. This confirms the fact that structural changes and decoupling tend to be important drivers of market with entitlements.[60] In Spain, where entitlements are traded both with and without land, the entitlements traded with land slightly exceed the entitlement trade without land.

However, in Belgium transfers without land are the most frequent transaction with entitlements because it is administratively the least costly. Similar holds in the study region Saxony (DE). Saxony is an exception from the rest of Germany as here land and SPS are bought and sold via different channels and transfer of entitlements without land are most frequent. In France high restrictions on entitlement trade (e.g. in the case of entitlements sold without land 50% of traded entitlements are reverted to the national reserve) has discouraged trade in entitlements without land. Also, in Scotland the transfer of land and the SPS entitlement are two separate transactions. This could be explained by the fact that many farmers own more entitlements than the eligible area. This is confirmed in Table 13 which shows that there is no "naked" land available in Scotland.

8.1.2. Explaining market price of entitlements

With perfect markets one would expect that the price of entitlement equals the net present value of future stream from the entitlement. For example, with a discount rate of 10% and if we assume that the SPS runs until 2013, the market value of an entitlement in 2007 should be 4.4 times higher then its face value, while if SPS runs indefinitely then the market value of an entitlement in 2007 should be 10 times higher then its face value.[61]

Table 18 shows that market price of entitlement in most EUSC is between 1 and 3 times higher than the face value of entitlement. This is significantly less compared to the theoretical expectations. Three factors may explain the observed gab in the entitlement price between theory and empirical evidence.

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[60] However, one should be careful in interpreting these results. In the case when farmers own more entitlements than they have eligible area, farmers are willing either to sell entitlements or acquire additional land without entitlements. Particularly, land transactions induced by farmers who own extra entitlements cannot be exactly quantified based on available data. There is some evidence that hybrid model, where this problem most likely occurs, tends to stimulate land transactions (see next sections for more details).

[61] With a discount rate 5% the market price of entitlement in 2007 should be 5.1 times higher than its face value if SPS runs till 2013, and 20 times higher than its face value if SPS runs indefinitely. We note that these calculations do not take into account the impact of modulation (expectations of an increased rate of modulation) and farm administrative costs or other additional costs which SPS may induce.

First, there is uncertainty about the duration of the SPS. In general farmers' expectation are that the SPS will run until 2013. Additionally there is uncertainty about further reforms of the historical model which further reduces the market price of entitlements. For example, according to expert estimates the market price of entitlements was up to 6 times the face value in France in 2006 but it declined to between 1 to 1.5 time mainly because of the uncertainty about the post-2013 SPS. In England due to the fact that modulation rates were unknown in England until 2007, there was considerable uncertainty in the market concerning the potential income streams from entitlement. Moreover, uncertainty in the market is also caused by the EUR/£ exchange rate and also because of the CAP health check. These uncertainties are some of the reasons why the entitlement market is small in England.

Second, the value of entitlements is reduced due to imperfections in credit markets. If potential buyers face financial constraints, then they cannot afford to pay the net present value of entitlements even in the case they have perfect expectations.

A third factor that leads to reduced market prices compared to theoretical expectations is due to the additional cost of the SPS, which may be induced by cross-compliance[62], administrative costs, as well as by taxes and fees imposed on entitlement transactions. Anecdotal evidence in the Netherlands indicates that in cases when both land and entitlements are rented in combination, approximately 5-10% of the nominal entitlement value is deducted from the rental price. This discount can be partially explained by a) the administrative costs of applying for the payment, or b) by an implied interest rate as rental contracts are signed in November, but the related subsidies are paid out a few months later in spring, or c) by a risk discount.

The retail price for entitlements in the study region of Emilia Romagna (IT) is in the range of 30-50% of the annual payment. Based on a survey of over 1000 farms in five different regions in Germany, the rental price for entitlements is between 0% and 20% of the face value of the SPS. This may also indicate the presence of high additional costs, as rent is an annual payment and is affected to a lesser extent by traders' expectations about the future continuation of the SPS. In Greece there are still mistakes in the administration of the SPS system, which constrains the entitlement market.

In summary, the low price of entitlements may indirectly indicate the existence of market imperfections and rigidities in the market for entitlements and hence its

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[62] According to the EU regulations, all land utilised by farm must respect cross-compliance criteria irrespective of whether it is used for activation of entitlements or not. If a farm buys an entitlement without land and activates the entitlement using land which was at farm's disposal already before the purchase of the entitlement, it is not expected to incur additional cost to farmer. This is because the cross-compliance requirements must be respected with or without using the land for activation of the purchased entitlement. However, if the farmer buys entitlement and land, then it may happen that cross-compliance may lead to additional costs to farmer. Particularly this is the case of low fertile land, which farm may purchase together with the entitlement just to keep it in GAEC in order to benefit from the purchased SPS. Studies have shown that the burden of cross-compliance tends to be positive but relatively small (e.g. European Commission, 2007c).

underdevelopment. With better functioning markets one would expect higher prices and larger traded volumes than reported in Table 17 and Table 18, respectively.

On the other hand, the low price of entitlements may indicate their capitalisation in land values. Based on theoretical results, SPS land capitalisation may accrue with dynamic effects, with new entrants being eligible for entitlements, and in the case where the total eligible area is smaller than the total number of entitlements (i.e. with low level of "naked" land).

Figure 29 show the correlation between "naked" land and the market price of entitlements. The higher is the share of distributed entitlements relative to the total eligible area (the less there is "naked" land) the higher is the market price of entitlements. This is against theoretical expectations. One would expect the opposite relationship between "naked" land and entitlement price. This could be due to the fact that as "naked" land is still substantial in most reported countries in Figure 29, there is no strong SPS land capitalisation, especially in countries which implement historical SPS model.[63] Quality of data may also affect the results since many prices presented in Table 18 are expert estimates. At the same time new farmers eligibility also is not expected to be strong driver of SPS land capitalisation as a significant number of entitlement to entering farmers were not granted. However, the low price of entitlements could be indeed due to rigidities in the market of entitlements combined with dynamic effects which may induce land capitalisation of SPS (see next section for more details on SPS land capitalisation).[64]

There is some evidence that in countries with the historical model, the entitlement prices are higher than in countries with the hybrid model. For example in the UK, the entitlement prices are substantially higher in Scotland (historical model) that in England (hybrid model). Similarly, in Belgium, Ireland and the Netherlands (historical model) it appears that the entitlement prices are higher than in Germany (hybrid model) (Table 18). Theoretically, the historical model leads to lower capitalisation of SPS than the hybrid model. As a result, the entitlement buyers are willing to pay a higher price for entitlements in countries with historical model than in countries with hybrid model.

8.2. Impact of the SPS on land markets

This section analyses the impact of the SPS on sale and rental markets of agricultural land. We examine separately on the impact of the SPS on land transactions (trade), and

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[63] In the same time, fallow land could reduce the pressure of low level of "naked" land on entitlement market prices. For example, in Italy there was a huge abandonment of land in some parts of Italy between 1982 and 2000. This land can easily be brought into cultivation, or used to activate entitlements. According to Eurostat data the share of fallow and green manure land on UAA represents around 0% in Ireland; 1-5% in Belgium, Germany, Greece, France, Italy, and the Netherlands; 10% in Finland and Sweden, and 14% in Spain.

[64] When analysing the data presented in Table 18 and Figure 29 one must take in consideration the quality of data. In several countries entitlement prices are based on market experts' estimate. In the same time, it is difficult to draw statistical conclusions from few available observations.

to what extent the SPS becomes capitalised into land values. This section also analyses the distribution of benefits from the SPS between farmers and landowners and the effect of shifting the SPS to a regional model.

8.2.1. Impact of SPS on land transactions

In a static environment the SPS does not affect land transactions (sale and rental). The same holds in the dynamic context with structural change in the case when entitlements are fully tradable. Theoretically land transactions induce entitlement trade and not visa versa. Land transactions emerge if there is structural change, decoupling, and due to farm exit. These factors lead to land reallocation between farms. If the relocated land is used to activate entitlements and if entitlements are fully tradable then entitlements will accompany land transactions.

However, if entitlement trade is constrained, then land transactions may be affected. In this case the SPS constrains land transactions. With constrained entitlement trade, farms who want to relocate land and dispose of an equivalent number of entitlements cannot sell their entitlements for a desired price. For this reason, these farms may reduce the total size of relocated land in order not to lose the benefits from the SPS entitlements.

Additionally, the SPS may stimulate land transactions when farms have smaller eligible area than the total allocated entitlements. To be able to activate entitlements, farms search for land either on the sale or rental markets. This effect increases the total number of land transactions.[65]

At the same time, administrative regulations regarding the implementation details of the SPS may affect land transactions as well as the type of sale and rental contracts. For example, landowners interested in obtaining SPS entitlements may cancel their contracts and apply for the SPS entitlement themselves instead of farmers. If implementation of SPS requires a proof that farm uses land this may lead to more written rental contracts. These effects however depend to what extent land markets are developed and regulated, and on the SPS model.

In summary, the overall effect of the SPS on land transactions (trade) is ambiguous. Constrained tradability of entitlements combined with structural change reduces land transactions while smaller eligible area than the total allocated entitlements stimulates land transactions[66]. In the same time, administrative regulations may affect land

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[65] In this case SPS may affect the use of abandoned land. Farmers may use fallow land to activate entitlements.

[66] However, this depends on the availability of the "naked" land. If there is little or no "naked" land available relative to the number of farms with extra entitlements who want to buy or rent land, then the effect of the SPS on land transactions will be small but the pressure will be reflected in higher land prices and lower market price for entitlements (see next section for more details on the impact of the SPS on land values). Table 13 shows that in several countries there is available quite a substantial amount of "naked" land, particularly in countries with the historical model. In countries with the hybrid model, there is less "naked" land available.

transactions in either direction. However, one should expect that the historical SPS model decreases the total number of land transactions because one of the main drivers of land transactions are structural changes. Under the historical model entitlements are allocated based on the subsidies farms obtained in the reference period 2000-2002, while the SPS was implemented in the period 2005-2006. If in this period structural changes occurred (combined with decoupling), this may lead, for example, to reallocation of land and farm exit but maybe constrained by the SPS if entitlements are not fully tradable. Hence in this case the SPS reduces land transactions. On the other hand, the hybrid model is expected to stimulate land transactions. Compared to the historical model, there are more entitlements allocated under the hybrid model, while the effect of structural changes on land relocation is smaller at the beginning of the SPS implementation.

Next, the evidence on the impact of the SPS on land transactions is discussed. Sale and rental transactions are examined separately. However, one should keep in mind the data limitations. Particularly, data on land transaction are scarce for the period since the SPS implementation. At the same time, during this period agricultural prices increased which may have affected land transactions. This price effect reduces the possibility to identify the SPS impact on land transactions.

8.2.1.1. Sale transactions

In general, the evidence from the study countries shows that the SPS has small or no impact on land sale transactions. Particularly this is confirmed by survey data from France (see Box 8 for more details) which show that there is no significant impact of SPS on farmers' preference regarding land purchases. Also in Germany and Sweden there is no evidence that SPS affects land transactions. In the Netherlands and Northern Ireland it is difficult to identify the effect of SPS on land sale transactions as other factors are much stronger drivers.

Consistent with theoretical model, the SPS provides some incentive to own land in Finland which implements hybrid model. This could be due to the low level of "naked" land (Table 13) which motivates farmers to own land in order to be able to activate all entitlements they own. Germany and Sweden also implement hybrid model, hence also a positive effect of SPS on land sale transactions should be expected. However, the level of "naked" land is higher in these two countries (especially in Germany) than in Finland. This mitigates the SPS effect on land transactions. The evidence shows a small or no impact of SPS on land sale transactions in these two countries.

There is some evidence that in countries which implement the historical model, the SPS tend to constrain land sale transactions (e.g. Belgium). Exiting farms prefer to keep land in order to receive the SPS payments. The low market price of entitlements reduces the incentive of exiting farmers to sell the entitlements. In Spain also many sale transactions were delayed until the exact entitlement transfer procedures were known.

In Italy two effects were observed. First, the uncertainty brought by the CAP reform reduced land sale transactions, while the requirement to have land to activate entitlements increased activity in land sale market. However, this second effect appears to be temporary.[67] In the study region Emilia Romagna (Italy), the SPS impact on agricultural land sale transactions is very low, though plots with entitlements are more commonly traded than plots without entitlements.

In Scotland, there was a significant decline in the traded area in 2004, perhaps due to the uncertainty in the rules relating to the SPS implementation.

In Ireland there is no clear tendency as to whether the SPS affects the incentive to own agricultural land. One can only speculate that the effect of the SPS may have led to a freezing of land ownership, at least at the beginning of the SPS implementation. This could be particularly the case for farms, which consolidated their SPS entitlements. Consolidation could not be applied to farmer who disposed of land by sale or lease (see Box 9).

The SPS has also led to adjustment in land sale contracts. Clauses were added in the sale contracts to regulate who gets entitlements which accompany land, or specify whether entitlements are sold together with land (e.g. France, Germany). Further, the SPS led to land market segmentation between land traded with entitlements and land traded without entitlements with price differences between them (e.g. France, Italy).

Box 8. Impact of the SPS on land transactions in France

There is no significant impact of SPS on farmers' preference regarding renting or purchasing land in France. This is confirmed by the survey conducted within the FP6 research project IDEMA. The results are shown in Table 2. Results indicate that the number of French farmers intending to purchase or rent in land is similar under the three scenarios considered: (*i*) continuing Agenda 2000; (*ii*) real implementation of the 2003 reform; and (*iii*) full decoupling (Douarin et al., 2007).

Table 2. Number of farmers intending to decrease or increase their current farm area (average number of ha envisaged in brackets)

	Scenario 1: Continuing Agenda 2000	**Scenario 2: Implementation of 2003 reform**	**Scenario 3: Hypothetical full decoupling**	
Decrease their current farm area by:				
Selling land	0 (-)	0 (-)	0 (-)	
Reducing land rented in	0 (-)	0 (-)	0 (-)	
Increasing land rented out	0 (-)	0 (-)	0 (-)	
Passing on land to a successor	2 (60 ha)	2 (60 ha)	2 (60 ha)	
Converting land to non-agricultural uses		2 (5 ha)	3 (4 ha)	3 (4 ha)
Increase their current farm area by:				
Purchasing land	28 (42 ha)	26 (44 ha)	26 (44 ha)	

67 This is also indicated by the fact that in most cases entitlements and land are traded together. The entitlement trade withhold land is rather small.

Increasing land rented in	65 (33 ha)	66 (33 ha)	57 (33 ha)	
Decreasing land rented out	1 (60 ha)	1 (60 ha)	0 (-)	
Converting land from non-agricultural uses		1 (10 ha)	1 (10 ha)	1 (10 ha)

Note: the total number of respondents is 281.
Source: Douarin et al. (2007), table 8-26.

However, due to the complexity of the SPS, it seems that older farmers who were not eligible for SPS, exited the farming sector earlier than they would have done if the Agenda 2000 had continued. This may have led to a greater amount of trade in land, shortly before and during the first years of SPS implementation. At the same time, some farmers may have postponed their exit in order to benefit from subsidies that are certain for the next few years. Thus the net overall impact of the SPS on the number of sale transactions is not clear.

Box 9. The consolidation of entitlements in Ireland

The requirement that individual farmers have to have 100% of the average land area that they had in the reference period would have resulted in serious problems for those farmers who, for specific reasons, declared less land in 2005 or in subsequent years, than the average area of land that they cultivated in the reference period.

Under the provisions of the EU Regulations a Member State may make use of its National Reserve in order to consolidate payment entitlements for certain categories of farmers on the actual number of hectares of land farmed in 2005. This entails surrendering the original entitlements to the National Reserve in exchange for a lower number of entitlements with a higher unit value. Note that the overall value of the Single Payment is not affected.

The farmer must declare the entire agricultural land available to him in 2005 and the total area declared must be equal to at least 50% of the average area declared during the reference period. The farmer may apply for the concession in a particular year provided that he continues each year to declare at least 50% of the land area farmed during the reference period.

The concessions relating to consolidating entitlements cannot be applied to farmers who declare fewer hectares than entitlements, because the remaining land has been sold or rented out. One exception is where land is purchased by a public authority for non-agricultural use (e.g. for road construction). In such cases the consolidation of entitlements is possible.

According to the Irish Department of Agriculture, Fisheries and Food, the entitlement consolidation provisions may be applied to the following categories of farmers:

- Farmers who have afforested some of their land since the beginning of the reference period;
- Farmers who have disposed their land to a Public Authority for non-agricultural use;
- Farmers who had land leased/rented in during the reference period but the lease/rental agreement has since expired, and ;
- Farmers who declared land situated in Northern Ireland during the reference period.

Where a farmer benefits from this concession all of his/her consolidated payment entitlements will be regarded as having come from the National Reserve. The entitlements concerned cannot be sold or leased out for at least 5 years from the year of allocation and the farmer must use all his/her entitlements himself/herself each year for a period of 5 years otherwise all unused entitlements will be reverted to the National Reserve.

8.2.1.2. Rental transactions

The evidence from the EUSC suggests that the impact of the SPS on rental transactions with agricultural land is stronger than on land sales transactions. However, there are also important differences in terms of the SPS effects. Particularly, there is a difference between the historical and hybrid models. The hybrid model has some important impact on land rental markets. The specific implementing features of the hybrid models allow non-farming landowners to get hold of the SPS entitlements with the hybrid model while this is possible to a lesser extent under the historical model.

In several countries which have implemented the hybrid model, non-farming landowners succeeded in obtaining entitlements and thus benefit from SPS. With hybrid model the number of entitlements which farmers received is equal to the total eligible area in the first year of SPS application. This feature of the hybrid model allowed some non-farming landowners to obtain entitlements. Landowners who rented out land prior to the SPS introduction could get access to entitlements either by cancelling rental contract and hence applying themselves for entitlements or by adjusting rental contract which ensures that entitlements are returned to landowner after the expiration of the contract.

For example, in Sweden which implements the hybrid model, the total rented area decreased between 2003 and 2005 by around 10%.[68] Previously, renting had exhibited a long-term upward trend. There is considerable regional variation. This effect is much more pronounced in the southern, fertile regions than in the North. One possible explanation is that the landowners in the South have been living close to the land, which they previously had put on lease, and could, consequently, return to farming or land management and thus obtain entitlements. In northern Sweden, absentee landowners consist of farmers who have quit farming and have moved to the south as alternative income opportunities are scarce in the region.[69] Further, it appears that the ultimate beneficiaries of the SPS are the landowners. New land rental contracts that are being written nowadays, always include a clause stating that the entitlements will go back to the landowner when the contract is terminated.

In Finland (hybrid model), based on interviews with local officials, the common procedure is that the SPS entitlements are returned to landowner when the rental contract expires. With the introduction of the SPS, most of the rental contracts have been renewed with the modification that entitlements will be returned to the

[68] The introduction of SPS created an initial turmoil on the rental market in Sweden but the market has eventually adjusted to the new institutional framework. The reason was that the entitlements were allocated to those who cultivated the land at the time of introduction of the SPS, while some landowners desired to terminate rental contracts to receive payment entitlements.

[69] Hence SPS introduces distortions. Landowners who before SPS implementation did not farm enter farming and replace incumbent farmers.

landowner.[70] The level of the rent has typically stayed the same. Some landowners did not renew contracts which expired in 2005 so as to ensure that they get the entitlement in 2006 when the SPS was introduced in Finland (see Box 12).

In Northern Ireland (hybrid model) non-farming landowners could, in certain circumstances, apply to establish entitlements relating to the land they own (the regional component at 78.33 EUR/ha), even if they had never received historical direct support payments. To do so, they had to apply for a Business Reference Number on or before 16 May 2005 and submit a 2005 Single Application Form by that same date. By establishing and claiming entitlements non-producing landowners must assume the responsibility for meeting the cross-compliance obligations about their entire land, even if this land is cultivated by a tenant.

In England (hybrid model) rental arrangements between farmers and landowners were made to return land with entitlement. Data are not available to quantify the share of the area covered by such arrangements. Decoupling had also some effect on rental transactions in England. Under the old extensification scheme land that was rented was often not grazed as farmers sought to maximise subsidy payment, under the old coupled CAP support system. Under the SPS less grazing land is rented, since there is no requirement under extensification rules. In England, there was also a significant swapping of land to ensure that the entitlement was not lost (e.g. potatoes and peas being ineligible meant that parcels of land needed to be swapped to ensure farmers renting land for potatoes and peas did not lose out under entitlements). This also had an impact on tenancies and specifically grazing agreements (i.e. people were effectively selling grass and not leasing land, in order to be able to claim the entitlement).

However, in Germany which also implements the dynamic hybrid model there are no landowners observed with such behaviour. The results of surveys conducted in three case study regions, suggest that the number of non-farming landowners who applied for the SPS entitlements is marginal. This is due to two reasons. First, this is constrained by the prevalence of long-term rental contracts with an average duration of 7-12 years. Second, the existence of a clear regulation on ownership to entitlements after expiry of rental contracts does not allow non-farming landowners to obtain entitlements. According to the decision of the Federal Court of Justice from 24 November 2006 (reference number LwZR 3/06), tenants can retain entitlements even after the expiry of rental contracts. However, there are indications that big land owners (e.g. the Protestant Church in Lower Saxony) use their strong bargaining position to obtain entitlements in Germany (e.g. by obligating farmers to accept the reassignment of entitlements after the expiry of rental contracts). Though not representative for all regions, such phenomena may be highly significant at the local level in some regions.

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[70] This involved around 30% of entitlements which is equivalent to the share of rented land in Finland. The rest of entitlements (around 70%) are owned by landowning farmers and hence there was no issue of rental contract adjustment.

In countries which implement the historical SPS model, the numbers of entitlements which farmers received depend on the subsidies and the eligible area in the reference period (2000-2002). For this reason only those who were farmers in the reference period and received subsidies could become owners of entitlements. This reduced the power of non-farming landowners to acquire entitlements through change or cancellation of rental contracts. The non-farming landowners did not have farming record and could not prove the receipt of subsidies in the reference period. The evidence from several study countries which implement historical model suggests that the SPS had small or no effect on land rental transactions (e.g. France, Italy, the Netherlands).

In Belgium and Spain which have also implemented the historical model there is some evidence that the SPS constrains land rental transactions; similar to what was observed on land sales markets. This effect is due to structural changes and imperfect tradability of entitlements, which results in low market price for entitlements. The low market price for entitlements reduces the incentive of farmers to relocate land if the respective land is used for activation of entitlements. Farmers who want to reallocate land and entitlements with it (e.g. retiring or exiting farmers) prefer to continue using land and benefit from the SPS, because otherwise some benefits from the SPS may be lost. This is most strongly evident in Belgium, where the SPS reduces land rental transactions and reinforces the effect induced by rigid rental market regulations (see Box 10 for more details).

In Spain the exiting farmers prefer to continue renting land in order to receive the SPS payments. Low market prices for entitlements and high transfer taxes reduces the incentive to sell the entitlements. In some cases farmers who are also landowners and own entitlements prefer to rent the land out through an unofficial market for free or at a very low rate in exchange that the tenant maintains land in GAEC. Thus, the landowner uses land to activate the entitlement while the farmer uses the land for production. This allows the landowning farmers to benefit from the SPS. In Spain the share of “naked” land is high (Table 13) which ensures that tenants can find sufficient eligible area for activation of their own entitlements.

The effect of the SPS on land rental transactions is very small in Ireland. This is mainly due to the possibility of consolidating entitlements on a smaller area than the area used in the reference period (see Box 9). This reduced pressure on land rental markets (or on land markets in general). The possibility to consolidate entitlements on a smaller area could accommodate the pressure of structural changes which took place between the reference period 2000-2002 and the time of SPS introduction (2005), as well it could accommodate the pressure from low level of “naked” land. Farmers instead of being forced to search for land in order to activate entitlements, could reduce the number of entitlements without reducing the total value of subsidies. A similar situation is observed in the Northern Ireland, where the stacking facility is also applied.

An important impact of SPS is the increase in formalisation of rental contracts (e.g. Germany, Italy, Spain, Sweden). In general, to benefit from the SPS, farmers are required to provide documentation to support that they farmed the area used for activation of entitlements. This requirement induced many farmers to change oral rental contracts to written contracts. The shift from oral to written rental contract is particularly strong in Spain. Before SPS, most rental contracts were oral. The SPS led to legalisation of most rental contracts.

In most countries the evidence shows that the duration of rentals contract was not affected by SPS. Only a few country studies show an impact of SPS on the duration of rental contracts.

In Sweden tensions between the landowners and the tenants over the lengths of the contracts seem to have increased in recent years as reported in farmers' professional magazines. There is a clear tendency for shorter (one year) contracts on the market for rented land. Most probably this can be attributed to the introduction of the SPS.

In England because of the SPS (and tenants claiming entitlement) many tenants were encouraged to increase their leases until 2012 to ensure entitlements were enabled, so everybody had some subsidy on land.

Box 10. The impact of SPS on land markets in Belgium

Land rental markets are strongly regulated in Belgium. In general there are two types of tenancy contracts: *regular contracts* and *seasonal contracts*. Regular contracts can be of a duration not shorter than nine years and a maximum rent is set which landowners can charge from tenants. Seasonal contracts are shorter than one year and the rent can be set freely.

On the one hand, regular contracts provide security to farmers. On the other hand, they constrain the restructuring process as the dynamic farmer (e.g. young farms) has more difficult in accessing land (as land is locked in long-terms rental contracts). Seasonal contracts give flexibility in terms of rental rate setting but provide low security to farmers. To avoid regulations informal transactions take place (e.g. payment of a premium in excess of the official maximum rent allowed under regular contract) or seasonal contracts are preferred by landowners.

The SPS is an additional factor which may constrain restructuring. Retiring or exiting landowning farmers prefer keeping land with them in order to be able to activate entitlements. The low market price of entitlements reduces the incentive to retiring or exiting farmers to sell entitlements. While to benefit from the SPS it is sufficient to hire services just to keep land in good agricultural conditions. This further reduces the available land on the rental market. Expanding farms are therefore willing to bid more for rents to get access to land. The effect is that farmers engage more in seasonal and/or informal contracts by which landowners can get higher rent or higher premiums are paid (above the maximum rent allowed) for the regular contract.

Additionally, due to long term tenancy contracts, some farmers may have difficulty in finding available land to activate their entitlements. This will create further pressure on higher land rents in seasonal contacts or on higher premiums for regular contracts.

The SPS affects sale market in similar way as rental market. However, the effect is weaker because sale market is less regulated and there are other stronger drivers of land sale prices.

In summary, the SPS reinforces the problem induced by rigid rental market which constrain restructuring. At the same time the SPS may become partially capitalised in land rents.

8.2.2. Impact of SPS on land values

This section analyses the extent to which the SPS gets capitalised in land sale prices and land rents. The evidence presented in section 8.1.2 showed that the price of entitlements is relatively low in the study countries (Table 18) which could be due to the presence of constraints in tradability of entitlements (market imperfections, restrictions imposed on the entitlement trade). The main objective of this section is to show whether the low price of entitlements could also be due to their capitalisation in land values. According to theoretical results, if the SPS is capitalised in land values then the market price of entitlements declines. With full capitalisation of the SPS in land values, the market price of entitlements is zero.

Based on the theoretical results, capitalisation of the SPS in land values occurs when:

i. the total number of allocated entitlements is larger than total eligible area,

ii. if new entrants are eligible for SPS entitlements, and

iii. with asymmetric structural change (including with farm exit and decoupling) and with non-tradable entitlements.

Capitalisation of the SPS in land sale prices depends on the extent to which land rents are correlated with land sale price. If the land sale price incorporates in full the discounted sum of future rental values then the effect of the SPS on sale price is equal to the effect of SPS on land rents. However, if the land sale price does not fully incorporates the discounted sum of future rental values, then the capitalisation of SPS in land sale prices is smaller than in the case of land rents.

Next, the evidence on the impact of SPS on land sale price and land rents is presented. Short time span since the implementation of SPS combined with low quality of available data do not allow performing consistent econometric analysis. In the same time, it is more difficult to identify the impact of SPS on land sale prices than on land rents because land sale prices are driven by several non-agricultural factors and market expectations are important drivers. For land rents this is less of a problem. However, rental markets tend to be more regulated than sale markets (particularly in Belgium and France) and tend to be of longer duration. These factors may delay or mitigate the capitalisation of SPS in higher land rents if the effect is present.

Moreover, if previous area payments introduced by the 1992 CAP reform and by the Agenda 2000 were capitalised into land values then the SPS could be difficult to observe.[71] The literature estimating the impact of previous subsidies on land values is

[71] For example if one assumes that previous subsidies were capitalised in land values while SPS is not than land prices should decline with the SPS introduction. However, during the period of SPS implementation agricultural prices increased which could offset the effect of SPS. Hence, to identify the effect of SPS on land values one need to have, among others, good knowledge of the effect of previous subsidies and market prices on land values.

almost non-existent. To our knowledge, only three studies cover EU countries (Trail, 1980; Goodwin and Ortalo-Magné, 1992; Duvivier, Gaspart and de Frahan, 2005) with first two studies estimating the effect of the pre-1992 CAP polices. Duvivier, Gaspart and de Frahan (2005) estimate the impact of the 1992 and subsequent CAP reforms on arable farmland price in Belgium. Depending on the year and region considered, the elasticity of arable farmland price to compensatory payments ranges from 0.12 to 0.47.

8.2.2.2. Land sale prices

Particularly for land prices it is difficult to identify the effect of the SPS because other factors are stronger drivers than the SPS (such as urban pressure, agricultural prices and farm productivity, etc.).[72] Compared to other drivers of land sale price considered in this study (see section 5.3.1), the impact of SPS proved to be the most complicated to be identified and there was high variation among market experts in their estimates (between countries and between regions within country) on the SPS effect on the land sale prices. These factors make it difficult to provide a clear conclusion on the impact of the introduction of the SPS on land sale prices.

Taking in consideration these limitations, in general, the evidence shows that the impact of SPS on land sale prices is relatively small. At the same time with few exceptions there is no significant change in land prices occurring after the implementation of SPS.

The main drivers of SPS land capitalisation appear to be the result of small amount of "naked land" and structural changes (including decoupling and farm exit). New entrants' access to SPS entitlements was not identified in any of the study country as an important determinant of SPS capitalisation in land prices. This is due to the fact that a significant number of entitlements was not allocated to new entrants in any of the study country in the period covered by the study.

There are important differences between SPS models. The evidence shows that hybrid model tends to lead to stronger capitalisation of SPS in land prices than historical model.[73] Most of the countries with hybrid model report land capitalisation of SPS, while there is not observed a significant effect of the SPS in several countries which implement historical model is not observed. The evidence indicates that land capitalisation of SPS is driven by low amount of "naked" land in countries with hybrid model and by structural changes in countries with historical model. This confirms theoretical expectation. However, the differential effect between models could be also due to under representation of countries implementing the hybrid model.

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[72] On the other hand, this may suggest low capitalisation of the SPS into land prices or low contribution of the SPS in the total price of land. However, one should be cautious when interpreting these arguments, as they cannot be generalised.

[73] However, one should note that only five countries coved by this study implement hybrid model. Most countries and regions implement historical model (Table 10). One should be careful in generalizing these results for all EU.

At the same time, if both the SPS and the previous subsidies are capitalised in land values at same rate, then one should expect less changes in land prices with the historical model than with the hybrid model. This is because the historical model did not affect subsidies each farm received, while the hybrid model redistributed subsidies between farms, sectors and regions thus affecting land prices in some regions, particularly of low fertile lands. Second, agricultural commodity prices increased in parallel with the SPS introduction which could have offset the potential land sale price decline caused by the SPS. Third, decoupling gives more production flexibility allowing farms to react to market signals, and hence increasing profitability and potentially also land prices. This makes the impact of the SPS difficult to identify.

Based on an expert survey, the SPS had a weak positive impact on the development of agricultural land prices between 2004-2007 in Sweden (hybrid model). The most visible impact of the introduction of the SPS is the increase of (semi natural) grass land prices in Sweden. The prices increased substantially in 2005 and 2006. More importantly, grassland prices increased faster than arable land prices in 2005 and 2006 (Figure 30). One may expect that non-agricultural drivers of grazing land are weaker because they tent to be located in less accessible areas. Also the agricultural drivers may have small impact on grassland price because with decoupling this land may become abandoned. In the case of arable land, both non-agricultural and agricultural factors affect the land prices and hence it is difficult to identify what caused the changes in the prices. If this holds, then the strong increase in grazing land in recent years may be the effect of SPS driven by farmers' demand for land in order to be able to activate entitlements. Indeed the evidence shows that the value of the entitlement represents as a lowest threshold of market price, reduced by the costs for GAEC. The same effect of SPS holds for land rents.

A similar effect is observed in Finland (hybrid model). Statistical evidence shows that land sale prices were affected by the introduction of SPS (see Finish country study for more details). In Germany (hybrid model) the SPS effect is small. The impact of the SPS on the land sale price varies from low to medium effect. Compared with the agricultural commodity prices and the agricultural productivity, the SPS is unimportant.

In Northern Ireland there is complete lack of land for sale which means that when land comes on market attracts very high price.[74] Factors other than SPS are therefore driving the market.

In a number of countries which implement historical SPS model, there is no or small impact of SPS on land sale prices (e.g. Greece, Ireland, Italy, the Netherlands[75]).

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[74] Despite the high sale values of farmland in Northern Ireland in recent years, many land owners choose not to sell land because of their desire to carry on a family tradition, where land is passed down from generation to generation.

[75] Other drivers dominate land values in the Netherlands. The effect of the introduction of the SPS is difficult to quantify as other factors dominate land prices much more. The real option to convert land to non-agricultural use, for instance, accounts for at least half of the (in an European comparison) extremely

Greece confirms the static effect of the theoretical model. With limited activity on the sale market there is no effect of SPS on land sale prices and hence no land capitalisation of SPS.

In Spain statistical analysis shows that there is positive correlation between land price and the value of SPS entitlements. However, this could be due to the historical model and due to the fact that past subsidies were linked to productivity. This correlation may just reflect the policy bias, i.e. more productive land has higher price and received higher subsidies in the reference period hence also received SPS entitlements with a higher value.

Probably the strongest effect of SPS on land sale prices in a country with the historical model is in Belgium. The SPS land capitalisation is driven by structural changes and partial tradability of entitlements. The low market price of entitlements reduces the incentive for retiring or exiting farmers to sell entitlements. For this reason exiting landowner farmers prefer keeping land with them in order to be able to activate entitlements. This behaviour reduces land available on the market and leads to some capitalisation of SPS in land values (see Box 10).

In Scotland, the SPS is not expected to have a large impact on the land prices for two key reasons: (1) it is widely believed that the historical values of the CAP subsidies, on which the SPS is based, are already capitalised within the existing land prices; (2) the size of the SPS will remain relatively constant and comparable to the historical subsidy levels until 2012.[76]

The other extreme appears to be Ireland, were almost no SPS is capitalised into land values (at least at the start of SPS implementation). Ireland also implements the historical SPS model. The possibility to consolidate entitlements reduces the pressure of the SPS on land markets and the capitalisation of the SPS is minimal.

An important effect of the SPS, as already mentioned in the previous section, is land market segmentation. In Italy the land market is segmented between land sold with entitlements and land sold without entitlements. The evidence from Italy shows that land sale prices may increase as much as 10-30% if entitlements are soled with the land compared to the price of land without entitlement. Depending on the region, either land

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high Dutch land prices. Strong growth in the prices for agricultural outputs and the pressure caused by high revenues from receiving manure further reduce the share of land values depending on subsidies. The implementation of the European nitrate directive has probably a higher impact on Dutch farmland prices than the move towards SPS, as it created a new source of cash flows for both landowners and renters.

[76] The SPS entitlements may have caused some changes in the regional price of land. For example, farmers with entitlement to the SPS owning good quality agricultural land may transfer the entitlement elsewhere. The movement of entitlement to poorer quality land could have increased demand for poor quality land, thereby increasing its value and decreasing the price differential across Scottish farmland. However, despite witnessing larger (proportional) increases in poorer quality farmland in Scotland in recent years this, according to most of the interviewed experts, is a result of increased demand for livestock type land from "lifestyle" buyers and sporting (estates) purchasers.

without entitlements had stable prices while land with entitlement increased, or land without entitlements had price reductions while land with entitlement had stable prices. However, the observed higher prices for land sold with entitlements, is not direct evidence of the capitalisation of the SPS.[77] For example, the observed higher prices for land with entitlements may just reflect the price of the entitlement attached to land with benefits going to entitlement owner (seller) who happens to be a farmer who sells land.

A similar effect is observed in France. The evidence shows that the SPS created two types of land on the market: eligible land and non-eligible land. Based on experts' opinion, non-eligible land seems to be sold at lower price than land that is eligible (but of course this depends on the land type; for example, vineyards are much more expensive than any land although they are not eligible). However, there is no empirical data to confirm it. Moreover, as more and more land is becoming eligible, the discrepancy should fade away. This price difference between eligible and non-eligible land reflects the SPS land capitalisation. This is different to Italy. In the case of France the price difference is not the price of entitlement because both prices are for land without entitlement.

8.2.2.3. Land rents

The evidence confirms that the impact of SPS on land rents appears to be stronger than on land sale prices.[78] But this is the case mostly for countries which implement hybrid model. In countries with historical model there is some evidence on the capitalisation of the SPS in land rents but it is not valid for all countries covered by this study. This is consistent with the effect of SPS land rental transactions presented in section 8.2.1.2. However, we must note again that the differential effect could be the result of identification problem, similar to land sale prices.

The strongest evidence of capitalisation of the SPS in land rents appears to be in Sweden (hybrid model) (see Box 11 for IDEMA modelling results on the impact of SPS on land rents). This is most likely the effect of the low amount of "naked" land. Increased rents are particularly observed for low fertile land. The evidence shows that the value of entitlement (reduced by the costs of GAEC) represents the lower threshold for land rental prices. Land rental prices increased especially where cattle payments are redistributed from cattle to arable land due to decoupling. Land rental prices increased by 38% between 1994 and 2006. Recently, however, the growth has slowed down. There is variation in terms of rental price changes. In recent years the rents have

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[77] The observed price difference between land with entitlement and land without entitlement suggests that landowners do not expect a full capitalisation of entitlements in the price of agricultural land, because with full capitalisation they would not have to care about who owns the entitlements as the benefits would accrue to them anyway. If the SPS is fully capitalised into the land values, then the price of entitlement would be zero and there would be no price difference between land traded with entitlement and land traded without entitlement.

[78] This could also be due to the fact that other drivers have smaller impact on land rents compared to land sale prices. This makes easier to identify the impact of the SPS on land rents.

increased in areas with low rents and decreased in regions with high rents. This could be due to reallocation of subsidies from more productive to less productive regions induced by implantation of the hybrid model. In the same time, before the introduction of SPS it occurred to some extent that rents were not paid for marginal land in the northern regions. This has ceased after the introduction of the SPS.

Also in Germany (hybrid model) there is evidence of capitalisation of the SPS in land rents. This is much stronger than in the case of land sale prices. Again this is more evident for less fertile land (e.g. grassland). Data show a smaller decline of grass land real rental price in 2005-2007 as compared to 1999-2005. This change in trend is due to fact that there were no direct payments for grass land before 2005 and most likely is driven by SPS.[79] The average real rental price for arable land decreased after 2003 while in the period 1997-2003 it increased (Figure 31). Additionally, based on interviews conducted with land market experts, there is evidence that on average rents for newly rented areas are significantly higher than average rents for the rental contracts signed before the SPS implementation.[80]

In Finland with the introduction of the SPS most of the rental contracts were renewed with the modification that entitlements are returned to landowner when the rental contract expires. This adjustment of rental contract did not affect the rent. To a large extent they remained unchanged (see Box 12).

In England (hybrid model) the regional flat-rate component of the SPS appears to tie the subsidy to the land, which is particularly evident in the rental value of land. The SPS appears to have put a floor on rental values. At the introduction of the SPS on average 80% of the rental value was set by CAP subsidy, whereas now on average only 50% of the rental value is attributable to the SPS as land market participants have adjusted their behaviour, and uncertainty behind the SPS has disappeared. In addition, the increase in land rents reduced the contribution of the SPS to the total rental prices. However, non-farming landowners to certain extent could also benefit from SPS by applying directly for SPS entitlements themselves. This was especially the case of land which was under short-term rental tenancy contract, share-farming and for land involving production of fruit, vegetables and potatoes.[81]

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[79] Under the coupled subsidies fertile land received more subsidies. The hybrid model led to reallocation of subsidies from fertile land (e.g. arable land) – particularly from areas with a mixed production structure characterised by intensive crop production on fertile soils and intensive dairy farms – to less fertile land (e.g. grass land) – particularly to farms which operate on grazing land with a stock of cattle or sheep below the average level, very extensive cattle farms, horse farms and extensive hobby farms extensively using natural grassland. The dynamic hybrid model in Germany, leads to a small redistribution of payments at the beginning but a strong redistribution at the end of the reform.

[80] The SPS had a bigger impact on land rents in Bavaria than in Saxony and Weser-Ems. In Bavaria 5 of 9 market experts thought that the SPS leads to an increasing land rents. In Saxony and Weser-Ems only 5 of 19 thought that SPS has an effect on the land rents.

[81] In England, the farmer who was in occupation of land in 2005 held the right to SPS entitlements whether they were the landowner or tenant. Where there were short-term tenancies or licences (but for at least 10 months) the right to claim the SPS in 2005 in England could have belonged to either to the

In Northern Ireland (hybrid model) it appears that landowners obtained the regional component of the entitlement value (currently at 78 EUR/entitlement against average value of the entitlement at 355 EUR/entitlement). Northern Ireland has an unusual rental system within the UK in that virtually all rents are for a period of less than one year, conacre[82], the entitlements stay with landowner and not with the person renting the land. SPS also led to adjustment of rents to accommodate the value of regional component of entitlements.[83]

In countries with the historical SPS model, the impact of the SPS appears to be significantly weaker. Only in a few countries is there evidence of some capitalisation of the SPS in land rents (e.g. Belgium, Italy).

The strongest evidence of capitalisation of the SPS in land rents with historical model appears to be in Belgium. The SPS reinforces the problem induced by rigid rental market which constrains restructuring. At the same time the SPS partially gets capitalised in land rents (see Box 10).

In Italy there is some evidence of capitalisation of the SPS in land rents. The presence of the SPS increased the rental price of the eligible areas, leaving rent of non eligible areas unvaried. In the study region of Puglia (Italy) the SPS and farm size are the two main drivers that have contributed to rental price increase in recent years. In particular,

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landlord or tenant depending on the agreement. Short term cropping leases (contracts) made it harder for landowners to claim the SPS. The contractor in contract-farming agreements had no right to land in a proper agreement, so entitlements were established by the landowner/farmer. Share-farming agreements were more difficult since only one person could claim the rights to the entitlements and meet the conditions.

Producers growing fruit, vegetables and potatoes (FVP) were allowed to claim SPS entitlement despite having historically not received CAP support. They were able to claim entitlements, broadly, on the area they grew in 2003. However, only the person responsible for growing FVP in 2003 (2004 or 2005 in some circumstances) would be eligible for claiming entitlement and this lead to some confusion and difficulties as the landowner may not be the grower meaning it may have been difficult for them to secure the entitlement claim. However DEFRA did relax this rule so that landowners and growers could agree between themselves who was the "grower" for purpose of the entitlements.

[82] Most of the rented area is leased through the "conacre" system in Northern Ireland where land is let on a seasonal basis (nominally for 11 months or 364 days) without entering into a long-term commitment.

[83] In Northern Ireland there was a problem with the conacre rental system when the SPS was first introduced. This was because thousands of farmers inadvertently claimed entitlement on the same field as their landlords. The introduction of a regional component (*Area Reference Amount*) in the hybrid system encouraged landowners to submit claims for entitlement. However, because of the conacre system of short-term rents, many active producers also claimed on that land, without conferring with their landowners.

Additionally, there were cases when landowners owned land but no livestock. In this case the person who owned the livestock got the payment under the historic system but the landowner was able to activate a payment under the area based part (thus duplicate registration). Some landowners own the area based component of the SPS while farmers own the historical SPS component - this is not standard - but largely due to individual owners. If the landowner receives the historic SPS, he gets an extra 78 EUR compared to before. Land rents have already adjusted to consider this additional payment.

the trend towards enlargement of large farms has contributed to demand for land renting. This structural change combined with an imperfect entitlement market has slightly contributed to an increase in rental prices. At the same time, land rental price with entitlements are about 10-40% higher compared to rent without entitlements. As explained earlier, this is not an evidence of capitalisation of the SPS in land rents. The difference in rents is just the price of entitlements.

In the Netherlands there is not evidence of SPS affecting land rents. However non-farming landowners may get access to the SPS entitlements through regulatory reason. A recent court ruling decided that after the expiration of a rental agreement the SPS entitlements should be split in equal parts between the farmer and the landowner (see Box 13).

In Ireland concerns were raised that the SPS would push up agricultural rents. However, the possibility to consolidate entitlements referred to earlier has offset this expected development. Since the introduction of the SPS Irish agricultural land rents have not increased.

Also in France there is no evidence of capitalisation of the SPS in land rents. However, the reason is because rental markets are strongly regulated in France. In Spain the effect could not be identified due to missing data. In Greece due to rigid rental markets the SPS does not affect land rents which confirms the static effect of the SPS.

Box 11. Impact of the SPS on land rents using IDEMA modelling tool: The case of regions in Sweden

The AgriPoliS model from the IDEMA project was used to simulate the impact of SPS on land rents in two Swedish regions (Jönköping county in the forest areas in Southern Sweden (Götaland) and Västerbotten county in Northern Sweden). The following three scenarios were simulated: 1) scenario AGENDA assuming no reform and coupled polices in place; 2) scenario REFORM with current SPS system in place; and 3) scenario BOND with a hypothetical bond scheme representing phasing out of the SPS. The simulations were performed for the period 2001-2013.

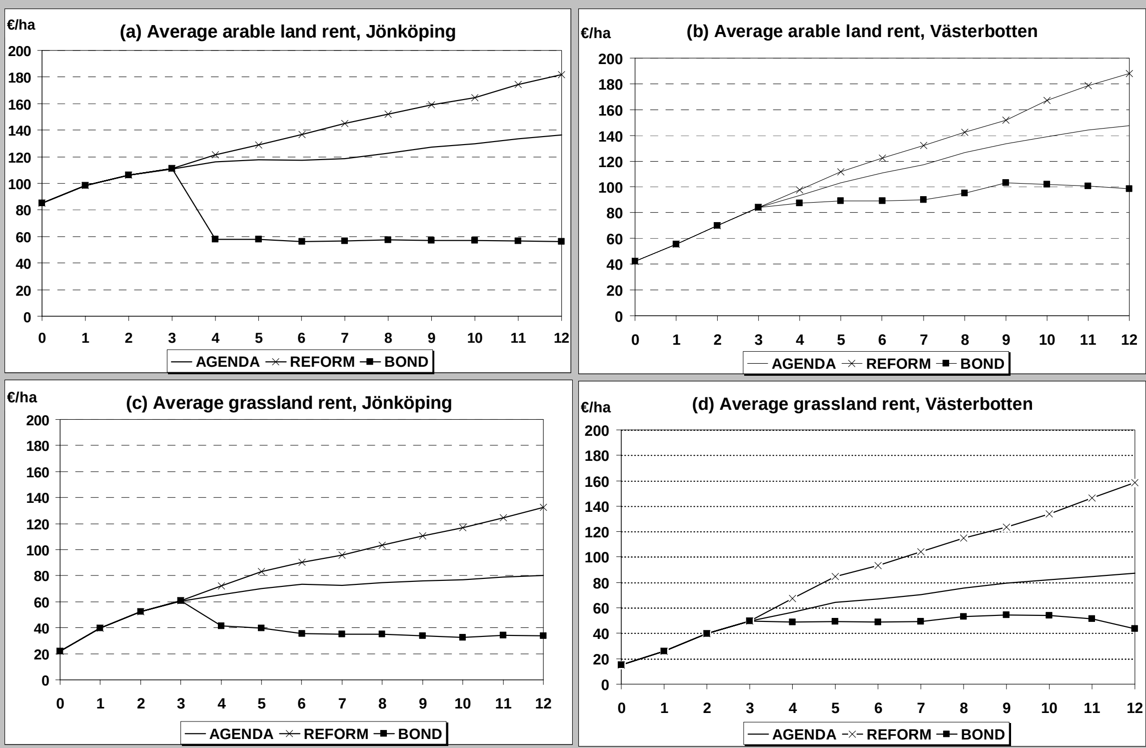

Figure 1. Simulated results for Jönköping and Västerbotten regions in Sweden

The AgriPoliS results illustrated in Figure 1 show that the introduction of the SPS (i.e. decoupling of support) leads to higher land rental prices, particularly for grazing land. There are several reasons for this result. Profitability increases because decoupling gives farmers more freedom on the choice of production structure, on the choice of whether to cultivate land as well as because product prices at the European level are expected to increase with decoupling. Land rental prices also increase due to redistribution of cattle payments from cattle to land with the introduction of the SPS. However, it should be noted that the impact of decoupling on land prices may not be as strong in other regions. In regions with favourable conditions for crop production the introduction of the SPS does not influence the farmers' decision to cultivate land or not. The impact is also lower in regions with little livestock that was eligible for direct payments before decoupling.

Phasing out the SPS would lead to reduced land rents. AgriPoliS results for many different types of regions indicate that land rents in many cases fall by 50%, and even more in some regions. The reason is that the SPS payments are capitalised in land prices and land rents. Apart from the lower land prices and land rents, the main effect of phasing out the SPS is that structural change in the agricultural sector would speed up considerably.

Box 12. Frictions between farmers and landowners over entitlements ownership in Finland

There was significant media attentions and intensive discussion in the Parliament, going back to 2002, concerning entitlement ownership in Finland.

A lot of uncertainty, extra workload and fears were accompanied with the reform. Local officials underline that this reform has raised a lot of uncertainty or anger among farmers and landowners and a lot of extra effort has been made to smooth things out.

The critical point in the public debate was who should obtain entitlements for land which was rented out at the time of SPS implementation. Based on FADN data around 30% of land was rented in Finland in 2005.

Initially, based on the Finnish 'Act on the Implementation of the Single Payment Scheme' the SPS entitlement was granted for eligible hectares declared by farmers in 2006. A farmer is defined as a person who has a right of possession to land. Right of possession could be based on ownership, land leasing, inheritance, or similar arrangement. This regulation basically gave right of ownership to farmers.

However, the Committee of the Constitution in the Finish Parliament ruled that entitlements granted based on area under rental contract concluded before 2006 should be transferred to landowners after termination of the rental contract. This ruling ensured the landowner's rights to entitlements.

Currently, Finland is in a situation where national and EU legislation are in conflict. Despite this legal conflict, the common procedure is that the SPS entitlements are returned to landowner after the expiration of the rental contract.

Currently most of the entitlements are owned by landowners. Around 70% of entitlements were fixed to landowning farmers. The remaining 30% which were linked to rented land and initially allocated to farmers were also returned to the landowners through the adjustment of rental contracts. Most of the rental contracts were renewed with the modification that entitlements are returned to landowner when the rental contract expires. This adjustment of rental contract did not affect the rent. To a large extent the rents remained unchanged.

Box 13. Court ruling on distribution of SPS in Netherlands

In a recent Dutch court case, the rental court of Zwolle decided that after the expiration of a rental agreement the SPS entitlements should be split in equal parts between the farmer and the landowner. The judge motivated the verdict by comparing the entitlements to historical production quotas for e. g. milk or sugar beets. In fact, the court hereby partially linked farm subsidies to land. The Dutch administration and the National Farmers Association LTO are of opinion that this is not correct and encourage the tenant to appeal to a higher court.

8.2.3. Who benefits from SPS?

This subsection summarises the effect of the SPS on land values and discusses to what extent landowners benefit from the SPS.

First, in general the impact of the SPS on land markets is not strong, though there is significant variation among countries. This could also be due to the fact that the number of countries which implemented hybrid model is lower relative to countries which implement historical model.

Second, the evidence shows a stronger SPS impact on land rents than on land sale prices. The main reason is that particularly for land prices it is difficult to identify the effect of SPS because other factors are stronger drivers than SPS.

Third, landowners tend to benefit more with hybrid SPS model than with historical model. Landowners benefit more with hybrid SPS model through two channels. First channel is through capitalisation of the SPS in land values. This is mostly driven by low amount of "naked" land which pushes land values up. Second channel is through implementation specifics of the hybrid model. With the hybrid model the number of entitlements which farmers received is equal to the total eligible area in the first year of SPS application. This implementing feature of the hybrid model allowed some non-farming landowners to obtain entitlements either by cancelling rental contract and hence applying themselves for entitlements, by adjusting rental contract which ensures that entitlements are returned to landowner after the expiration of the contract, or by other similar arrangements.

Fourth, evidence shows that the historical model leads to low SPS land capitalisation. Where they occurs the drivers tend to be structural changes combined with constrained entitlement trade.

This observed low level of capitalisation of the SPS in land values with historical model could be due to the fact that it is more difficult to identify the effect in countries which implement this model. If the previous subsidy system was capitalised in land values[84] and since the shift to SPS had marginal or no impact on land values this may indicate that both subsidy systems lead to the same land capitalisation. However, parallel with the SPS introduction, there was a significant increase in agricultural commodity prices. If SPS indeed is not capitalised in land values and would lead to a reduction in land values with the SPS introduction, the unchanged prices after the SPS introduction could be just due to the offsetting effect of higher commodity prices.

On the other hand, the hybrid model redistributed subsidies between farms, sectors, and regions. This could be the reason why the impact of SPS is easier to be identified even though both models lead to the same capitalisation in land values. Particularly the impact of SPS is the most visible in marginal less fertile lands where other drivers are less important. The hybrid model tends to redistribute subsidies in favour of less productive lands as the previous subsidies were highly correlated with productivity.

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[84] Literature estimating the impact of CAP subsidies on land values in EU is almost non-existent. For this reason it is difficult to quantify their impact on land values.

Table 19 summarises the landowner benefit from the SPS in the EUSC based on the analysis provided in this section. Landowners tend to benefit the most from SPS in Finland and Sweden while the least in Greece and Ireland.[85] In the rest of the countries examined, landowners' benefits from the SPS are low or medium.

However, whether the SPS is channelled outside agriculture or not, depends on whether landowners are also farmers or not.[86] Figure 32 shows the share of land renting on UAA in EU member states in 2005. The importance of land renting varies significantly among EU countries. Comparing countries covered by this study, the farms in Belgium, France, and Germany are the top renters (more than 70% of used land). In Sweden farms rent approximately 50% of used land. In Ireland land renting is the lowest in EU (17%). In the rest of the countries covered by this study, farms rent between 34% and 43% of used land.[87]

This implies that in Belgium, Germany, Northern Ireland and Sweden, an important share of SPS benefits will be channelled to non-farming landowners.[88] This finding also holds for England and Finland but to a lesser extent since farms rent around 30-36% of land. However, one must note that in some cases non-faming landowners enter farming to benefit from SPS. This is particularly the case of Sweden where some landowners which before the introduction of SPS did not farm, started farming with the introduction of SPS. In the rest of countries less SPS benefits will go to non-farming landowners either because land renting is less important and/or because SPS land capitalisation is small. In these countries farmers gain the largest share of SPS.

8.3. Effects of the SPS on structural change

This section analyses the effect of SPS on structural changes in agriculture. Structural change, may be caused by among other things, productivity change induced by either technological or institutional innovations, or by the presence of imperfect rural credit markets. The SPS itself may reduce farms' credit constraints and thereby increase productivity (see Ciaian and Swinnen, 2007). This changes lead to the reallocation of land and farm exit and entry. At the same time, the decoupling introduced with the SPS may stimulate structural changes in agriculture.

Based on the theoretical results presented in the section 2 and appendix 3, if entitlements are fully tradable, then the SPS does not affect structural changes in

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[85] Land values were not significantly affected with the introduction of the SPS in Scotland. Since there is around 70% owner-occupancy in Scotland the benefit lies with the producer because of its historic nature - as such, landowners who are not actively involved in production do not benefit.

[86] The effect of SPS on rural economy in general depends whether landowners leave in rural or urban area. Consistent data are not available on this; hence we cannot address this issue in this study.

[87] In England, Northern Ireland and Scotland land renting represented, respectively 36%, 69%, and 30% of UAA in 2007.

[88] This may not be the case in situations when a farmers rent land from another farmer rather than from non-farming landowner. For example, this could be the case for Northern Ireland.

agriculture. Structural changes may be constrained by the SPS if entitlements are not fully tradable. In this case the SPS constrains land transactions and the reallocation of land from less productive to more productive farms. For example, with constrained entitlement trade farmers in decline are less willing to reallocate land as they loose benefits from SPS. Similarly, if the SPS affects farms' credit, the SPS directly causes changes the agriculture. However, now more farm credit stimulates investments and input use which increases productivity and stimulates land transactions (Ciaian and Swinnen 2007).

Next we discuss the evidence on the effect of SPS on structural change in agriculture based on country studies. Structural change is a long term process. For this reason, it may be too early to asses the developments observed in the few years available since the start of the SPS implementation. Furthermore, substantial other structural changes which were unrelated to SPS occurred in agriculture in last few years. Particularly, there was strong increase in agricultural output and input prices and expansion of bioenergy production. This makes problematic the identification of SPS impact on structural changes in agriculture in the study countries and regions.

The decoupling of previous subsidies with the introduction of SPS was identified by most country studies as the strongest factor effecting structural changes in agriculture. Decoupling led to changes in production structure, changes in input use and to a certain extent it stimulated farm exit. With the SPS, farmers' decisions are predominantly driven by market incentives, while prior to the introduction of the SPS, farmers' decision were also affected by direct payments.

An important effect of the SPS is on farm exit. Specifically, evidence from several country studies (e.g. Belgium, Finland, Ireland, Sweden, UK) indicates that the SPS may constrain farm exit. This effect of the SPS works in combination with imperfect tradability of entitlements. With the presence of imperfect tradability, the entitlement price is depressed which reduces the incentive to sell entitlements. This reduces farmers' incentive to exit and thus farmers do not reallocate land because in order to benefit from the SPS they need land to activate entitlements. In general, these types of farmers have low off-farm opportunity benefits relative to benefits from SPS.

One of the strategies of the potential exiting farmers is a shift from full to part time farming (e.g. Belgium, Germany, Italy). This effect appears to be stronger in marginal areas. In order to receive SPS payments, it is not necessary to produce; but land must be kept in GAEC. Part time farming allows the potential exiting farmers to reduce non-profitable farm activities, while it ensures benefiting from the SPS.

In Belgium the practice is that farmers rent out their plots and some sell land after exiting farming. The effect of the SPS is that exiting farmers (aged farmer) stay longer on their plots and they often hire labour to maintain their land in GAEC.

In Greece the SPS tends to act as an incentive for the rural-population (and especially new farmers) to stay in the countryside, as farmers can receive the payments under minimal obligations.

In Germany the evidence shows that the SPS affects the decision as to whether a farm is operated on a full-time or part-time basis. There was a significant increase in the number of part-time farms in Germany in the period 2005-2007 (Figure 33). There are two possible explanations. The first possibility is that small businesses or hobby farms, which did not apply for CAP payments before the introduction of SPS, began to operate as part-time farms to facilitate applying for the SPS. The second group could be full-time farms who extended their land use to the minimum requirements and thus probably switched to part-time farms. Because the area share stays constant or is even decreasing, the first line of reasoning seems to be more likely. This result is confirmed by the expert surveys in the case study regions.

Further, it is expected that the structural change in marginal grassland regions (e.g. mountain pasture) will be decelerated in Germany due to the increasing entitlement payments in these regions induced by the gradual shift from hybrid SPS model to regional model (Bavaria, Germany).

In the UK many farmers' exit decisions appear to have been delayed until 2012 as they know the SPS will run at least until then.

The impact of SPS on hired labour is small. There is insufficient evidence to be able to identify patterns of SPS effects on agricultural labour developments.

The hybrid model has some impact on land rental markets. More precisely, it stimulates farm entry and creating uncertainty in rental markets. This development was observed in all countries with the hybrid model, except Germany, while it was not observed in any country implementing the historical model. With the hybrid model, the allocation of entitlements is based on the current land use (i.e. land use at the time of SPS introduction) and not on the land use in the reference period. This stimulates farm entry because non-farming landowners have the possibility to obtain entitlements if they have land at their disposal at the time of SPS introduction. Non-farming landowners just need to obtain land back from the tenant. Common practice is that landowners cancel rental contracts, enter in short term contracts, or did not have incentive to renew rental contracts expired just before the SPS introduction. This ensured that non-farming landowners could apply for entitlements themselves at the time of SPS introduction. There is some evidence, especially in Sweden, that landowners entered farming (especially those with low non-farming opportunity costs) just to obtain entitlements. However, this creates uncertainty and hampers farm decision-making on the part of tenant-farmers.

In countries which implement the historical SPS model the numbers of entitlements which farmers received depend on the subsidies and the eligible area in the reference period (2000-2002). For this reason, the only owners of entitlements could be individuals who were farmers in the reference period and received subsidies. This reduces the possibility for non-farming landowners to obtain entitlements.

8.3.1. The effect of SPS on farm credit

An important impact of the SPS is on rural credit markets. In general, credit market imperfections are important in the rural economy (e.g. Blancard et al., 2006; Färe, Grosskopf, and Lee, 1990). The main factors leading to credit constraint are missing markets, asymmetric information and incentive problems. Particularly in agriculture credit problem arises for various reasons: (*i*) there is a significant lag between time of input purchase and time of production sale; (*ii*) farms are generally small; (*iii*) farms face complex management environment (e.g. lengthy biologically based production, complex monitoring; spatial dispersion of production; etc.); (*iv*) the value of farm collateral is generally lower to the lender than to the farmer; (*iv*) costly monitoring of farm activities; etc. (Binswanger and Rosenzweig, 1985; Barry and Robison, 2001).

The SPS may have an important implication on farm access to credit by alleviating the farms' credit constraints. If farms receive the subsidies at the beginning of the season, they can use the SPS directly to pay for inputs. If farms receive SPS payments at the end of the season, the SPS can also improve their access to credit. The subsidies can be used as collateral for bank credit (see also Ciaian and Swinnen, 2007).

The SPS is not expected to lead to a significant change in farm access to credit compared to the previous – coupled – subsidy system. The coupled subsidies introduced by the 1992 CAP reform and Agenda 2000 could also be used as collateral for obtaining bank credit or could be used directly to finance farm inputs depending on the time when the coupled subsidies were received by farmers. The difference could emerge fro two reasons. First, the SPS and the previous subsidy system may pose different risk to lenders if subsidies are used as collateral for bank credit. For example, animal payments were granted per head of animal. From the bank's perspective this creates some uncertainty, as the payments depended on the number of animal stocked and any damage to the stock (e.g. disease) may reduce the total payments. Under the SPS, if farms do not respect cross-compliance criteria, this may lead to lower SPS payments. This creates specific uncertainty for banks and may reduce their willingness to provide farm credit. Second, the hybrid SPS model redistributed subsidies between farms. This also redistributes access to credit. It reduces access to credit or pre-financing ability to those farms who receive fewer subsidies under the SPS than under the previous subsidy system. On the other hand, farms who receive more subsidies under the SPS compared to the pervious subsidy system, gain improved access to credit.

Several country studies confirm that the SPS affects farms' access to credit (e.g. France, Germany, Italy, Spain). First, the SPS increases farm income and hence it directly alleviates farm credit constraints. Second, the SPS increases access to short term credit from banks because farms can use the SPS as collateral for credit. Due to the uncertainty about the future of the SPS, it appears that the SPS does not have an impact on long term credit. Lenders are not willing to provide long run credit by accepting future SPS payments as collateral.

In Germany it is common practice that farms use the direct payments to receive short-term credits. This practice has not changed after the introduction of SPS.[89]

Similarly in Italy, SPS helps farmers to finance farming activities and to access credit, as SPS is used as a guarantee for credit. There is a trend towards the growth of big farms and the abandonment of small ones in Italy. The SPS may have slightly encouraged such trend, though the actual effect is unclear. The increase in liquidity and the easier access to credit by farmers owning large amounts of entitlements may have contributed to this trend.

In France, the SPS is paid later in the year as compared to pre-reform direct payments. For this reason farmers may need more short-term loans from banks with SPS as compared with the previous subsidy system. Additionally, SPS does not represent better credit collateral than pre-reform direct payments because of its uncertain future.

In Spain, there is no great difference between the SPS and the previous subsidy system in terms of farm access to credit. The only main difference is the higher risk of farmers because of cross-compliance controls and possible reduction of the payment if cross-compliance requirements are not respected. However, in some regions, e.g., in the Valencian Community, where the SPS is paid at the end of the season, farmers have to rely on credit to finance their costs until they receive the SPS. In this case, farms use the commitment of the Regional Ministry of Agriculture's to pay SPS as the collateral for credit.

8.4. Effects of changes in the SPS models on land values

In this section we analyse the impact of a hypothetical policy change. We assume that the current SPS model implemented in the EUSC would be replaced by a regional model. Particularly, we focus on how the level of payments, the share of naked land, and the link between payments and land affect the capitalisation of the SPS into land values. The analysis in this section is based on the analysis and findings from the previous sections.

None of the countries investigated in this study implements a pure regional model. Most of the countries implement the historical model. Northern Ireland and Sweden implemented the static hybrid model. Finland, Germany and England implemented the dynamic hybrid model, which is gradually replaced by the regional model. The complete switch to the regional model will occur in 2016 in Finland, in 2013 in Germany and in 2012 in England (Table 10).

The key characteristic of the regional model is that it equalises the value of all entitlements. In a given region, all farms receive entitlements with the same value. The effect of the shift to the regional model will be determined by three key features: (i)

[89] One interviewed expert in Saxony even responded that the SPS might have negative effects on creditworthiness, since due to cross compliance controls SPS payments are more risky.

whether new entitlements will be allocated; (ii) the redistribution of subsidies between regions; and (iii) how landowners are treated with respect to access to the entitlements.

The insights from the previous sections suggest that a switch to the regional model may affect land markets. The most important of these potential effects can be summarised as follows:

- The evidence found in this study suggests that the SPS leads to at least some land capitalisation with both the hybrid and historical models. As a result, a shift to the regional model may lead to changes in the relative land prices between regions. This is due to the fact that the regional model redistributes subsidies between regions, which lead to higher prices in less productive regions and lower prices in more productive regions.

- The effect is expected to be stronger in those regions, which currently implement the historical model. This is because the effects have already materialised to a certain extent in countries, which implemented the hybrid model. Note that under the hybrid model a share of payments were already redistributed. In these countries the policy shift to the regional model will reinforce this redistribution even further.

- Whether the shift to a regional model will lead to a stronger land capitalisation of the SPS compared to the current SPS models, will depend on the implementation details of the regional model. For example, whether the number of entitlements will increase or will stay at the current level, and to what extent non-farming landowners' access to entitlements will be regulated and enforced. The evidence found in the previous sections suggests that landowners tend to benefit more with hybrid model than with the historical model. Two factors explain these differences: (i) because more entitlements were allocated under the hybrid model than under the historical model; and (ii) because the implementation specifics of the hybrid model allowed landowners to obtain entitlements and/or to 'enforce' farm to return entitlements to them.

- However, if the size of the total allocated entitlements will not by affected by the policy changes (only the entitlement value is equalised), the pressure on higher land prices will continue to be stronger in those countries, which currently implement the hybrid model. This is because in these countries there is less "naked" land than in countries which now implement the historical model.

- Frictions between farmers and landowners are expected to increase with the shift to the regional model. Again, this will depend on the implementation details of the regional model. If additional entitlements will be allocated along with the policy shift, non-farming landowners will be able to keep the entitlements, as it was observed in the EUSC, which implement the hybrid model. This is mainly due to the fact that under the hybrid (or regional) model the number of entitlements, which each farm received, depended on the amount of eligible area at the time of the SPS introduction. In contrast, under the historical model it depended on the size of land that generated support in the reference period. Hence, the key factors which will determine whether the frictions between farmers and landowners will increase with the policy shift are to what extent the access to entitlements of non-farming landowners is regulated and enforced, and to what extent the number of newly allocated entitlements (if any) depends on the current or past land use.

- The impact of policy shift on land markets, particularly on the capitalisation into land values, depends on the clarity and transparency of the implementation process. If the shift creates uncertainty among farmers, this will affect land markets. More precisely, it will constrain entitlement markets which, in combination with structural changes taking place in the agricultural sector, may induce stronger land capitalisation.

- In summary, uncertainty and the implementation specifics of the policy change will affect entitlement market which in turn will determine the capitalisation of the SPS into land values. Especially the uncertainty introduced by the policy change may affect the entitlement market. The entitlement market may also be affected by the way the policy shift is implemented. For example, there is evidence from the Netherlands that the possible future expected shift to the regional model affects the trade in high value entitlements. This expectation reduces the market price of high value entitlements as market participants expect that the future shift to regional model will likely cut the value of high value entitlements. On the other hand, there is evidence that in Belgium the trade in low value entitlements was stimulated by the regulation which allows young farmers to replace low value entitlements with higher value entitlements equal to the average regional value.

- On the other hand, the shift to the regional model will increase transparency in the entitlement market, as all entitlements will have same value. Particularly, it will stimulate transactions on the entitlement market and hence lead to lower capitalisation of the SPS.

9. GENERAL CONCLUSIONS

The conclusions are organised in three themes: Land markets in the EUSC, CAP reform and land markets and limitations. In the section on land markets in the EUSC we summarise the key findings about the nature of the land market and its development and the key drivers of land values. In the section on CAP reform and land markets, we summarise the key findings about the implementation of the SPS, the activation, trade and valuation of entitlements, the effects of the SPS implementation, the distribution of the SPS benefits and the main effects on structural change. Finally, we outline the main limitations of the present study.

9.1. Land markets in the EUSC

9.1.1. Nature and developments

The size of rental market transactions differs greatly among the EUSC. The farms in Belgium, France, Northern Ireland, and Germany are the top renters (more than 65% of used land). In Sweden farms rent approximately 50% of the used agricultural land. In contrast, in Ireland land renting is the lowest (17%). In the rest of the countries covered by this study, farms rent between 34% and 43% of used land. The share of rented farmland in total UAA is increasing in most of the EUSC.

Agricultural land prices differ strongly across the EUSC. In the peak years the land price difference between the most expensive country and the least expensive country exceeds 2,000%, ranging from around 2,000 EUR/ha in parts of Sweden to over 40,000 EUR/ha in parts of the Netherlands. These figures imply that awarding the same amount of subsidy per hectare of agricultural land would have quite different impacts on land prices.

The variation in rental prices is somewhat lower than in purchase prices but there are also large differences in rental prices. The difference in rental prices between the lowest and highest country in 1992 was around 600% and over 700% in 2006.

Changes in agricultural land prices over the past decade also differ strongly across the EUSC. Over the period 1992 to now, real farmland sales prices declined by around 25% in Greece, while they increased by around 250% in Ireland. Developments in rental prices were also very heterogeneous: since 1992 real rental prices declined by around 25% in Finland and increased by around 55% in Spain.

This cross-country heterogeneity in agricultural land markets suggests that farmers and landowners in these different land markets may be differently affected by (changes in) the Common Agricultural Policy.

9.1.2. Drivers of land values

Agricultural commodity prices and agricultural productivity, infrastructural expansion, and urban pressures have important influences on land markets, but their relative importance differs between rental and sales markets. First, agricultural commodity prices and productivity are significant drivers of agricultural land prices, but their effects seem to be stronger on rental markets than on sales markets. Second, urban pressures, such as growing housing demand, are an important driver for agricultural land prices particularly in densely population EUSC (e.g. Belgium and the Netherlands) and the faster-growing economies (e.g. Ireland and Spain). The same applies to the role of infrastructural expansion in driving up land prices. The latter factors in particular affect purchase prices.

Land market regulations affect land prices and exchange; this is particularly the case for rental exchanges. Rental prices for agricultural land tend to be more regulated by the government than purchase prices. In one third of the EUSC, the maximum rental prices are set by the government.

The duration of rental contracts is regulated in some EUSC and influences the rental market's responsiveness to agricultural policy changes. The length of rental contracts is regulated by the government in Belgium and France (minimum 9 years), the Netherlands (minimum 6) and Spain (minimum 5). In several EUSC (e.g. France) also the renewal/inheritance of rental contracts is regulated. In these countries the formal rental markets are stickier and the time lag is longer in adjusting to policy changes. The importance of land renting is typically higher in countries with strong rental market regulations, such as Belgium and France. Belgium and France have the highest minimum lengths of rental contracts (9 years) and have the highest share of rented area (77% and 75% in 2006, respectively) among all the EUSC.

Land taxes differ substantially across the EUSC. Three types of tax regulations affect market participants' decisions to sell, buy and own agricultural land have been studied: sales tax, purchase tax and ownership tax. The land transaction tax rates are rather heterogeneous across the EUSC, ranging from 1% for low value land in the United Kingdom to 18% for high value farmland in Italy. Similarly, the ownership taxes for agricultural land are highly heterogeneous across countries ranging from 0% tax rate on farmland in Finland to over 15% in the Southern EU countries.

Low taxes for ownership and transactions with farmlands and entitlements do not constrain structural change, but expose farmlands to non-agricultural investors. Low taxes for transactions with farmlands and the SPS entitlements facilitate structural change via the reallocation of agricultural land and entitlements from less productive to more productive farms (e.g. Germany). On the other hand, agricultural land markets in low transaction tax countries are more exposed to speculative farmland purchases (and sales) from non-agricultural investors (e.g. Finland). Differentiated farmland ownership taxes for farmers and non-farmers reduce the incentives for long-run speculative farmland purchases (and sales) from non-agricultural investors, but hinder structural change (e.g. Greece).

CAP subsidies have an impact on land values, but the impact varies importantly across countries and appears relatively modest compared to other factors, in particular where land prices are high. CAP subsidies appear to affect land purchase s prices in the EUSC. However, their relative importance appears limited compared to other drivers.

Generally, the lower the land price, the higher the impact of CAP policies on land prices (e.g. Nordic regions in Finland and Sweden). In countries such as the Netherlands and Ireland, which have very high or rapidly increasing land prices, factors other than CAP policies appear to be much more important.

9.2. CAP reform and land markets

9.2.1. Implementation of the SPS

The EU member states can choose between three SPS implementation models: the *historical model*, the *regional model*, and the *hybrid model*. Under the historical model, the SPS payment is farm-specific and equals the support the farm received in the "reference" period. This is the most commonly implemented SPS model in the EUSC. Under the regional model an equal per hectare payment is granted to all farms in the region.

Concerns over the redistribution of subsidies were by far the most important factor for the EUSC in choosing the historical SPS implementation model instead of the regional model. An important motivation for England, Finland and Germany to choose the dynamic hybrid model instead of directly going for the regional model was to smooth the adjustment of the farming sector over some period.

Receipt of the full SPS support is conditioned on the fulfilment of cross-compliance requirements. More precisely, a farmer receiving SPS support must respect Statutory Management Requirements (SMR) and maintain land in Good Agricultural and Environmental Condition (GAEC).

None of the EUSC implemented the pure regional SPS model (see also the last section). The comparative insights are therefore based on contrasting the implications of the historical model with the hybrid model.

9.2.2. Entitlements: activation, trade and valuation

The share of non-activated entitlements in the total distributed entitlements is low. For most EUSC it is less than 3%. The value of non-activated entitlements tends to be lower than the value of activated entitlements. The main reasons for non-activating entitlements are non-availability of eligible area and administrative burdens.

The share of the activated entitlements tends to be somewhat larger in countries which implement the hybrid SPS model than in countries with the historical SPS model. We find that this might be due to specific criteria relating to the implementation of the hybrid model.

There is a significant variation in the face value of entitlements among and within the EUSC. This variation appears to be determined by the commodity structure, support in the reference period, the implementation SPS model and implementation details.

There is a significant variation among the EUSC in the entitlement trade restrictions. The EU regulations allow entitlements to be tradable but certain constraints are imposed by the EU. Member states have certain flexibility in introducing additional country specific restrictions on entitlement tradability. Spain, Italy, and France have the greatest restrictions in entitlement trade.

Trade with entitlements is most often conducted directly between farmers. Market agents or farm organisations also play a role sometimes. Spain appears to have the most developed entitlement trading system, similar to an auction.

There is no informal trading in entitlements, except among family members. An informal entitlement market was not found in any of the EUSC, because in order to receive payments, entitlement holders need to be identifiable. However, unofficial "trade" may occur among members of the same family.

The entitlement market tends to be smaller in regions under the hybrid model compared to the historical model. Under the historical SPS model trade is likely to be driven by structural change. This is because entitlements were distributed based on the land use in 2000-2002 while the SPS was implemented in 2005-2007. With the hybrid SPS model entitlement trade is driven by a combination of decoupling and the fact that relatively more entitlements were allocated than with historical model. Structural change is less important in the hybrid model as entitlements were distributed based on area used in the first year of the SPS application. Differences in the implementation details between the two SPS models may explain higher trade with the historical model than with the hybrid model. This is particularly evident in the short-run, which is investigated in this study.

Preliminary evidence suggests that trade in entitlements is also affected by the functioning of land markets, restrictions on the tradability of entitlements, the availability of an opportunity to consolidate entitlements, and the level of "naked" land.

Entitlements are most often traded with land. The evidence from EUSC shows that with few exceptions entitlements are traded with land.

The market value of entitlements is between 1 and 3 times the face value of the entitlements. Our data show that the market price for entitlement in most EUSC is between 1 and 3 times the annual face value of the entitlement. A simple calculation would indicate that with perfect markets and without uncertainty the entitlement price would be in the range of 4-5 times the face value if the SPS runs until 2013, or in the range of 10-20 if the SPS runs indefinitely.

Several factors may explain the observed gap in the entitlement price between theoretical expectations and empirical evidence: (i) uncertainty about the SPS future (e.g. modulation, health check, etc.); (ii) additional costs of SPS (e.g. administrative costs); (iii) taxes and fees imposed on transactions; and (iv) credit market imperfections. However, the low market price of the entitlements may also reflect the capitalisation of the SPS in farmland values.

9.2.3. Effects of the SPS implementation

Our theoretical framework and the empirical evidence in the literature suggest that the impact of the SPS on land markets depends on several factors, including the SPS implementation model and implementation details, market imperfections, transaction costs, market structure, other implemented policies, etc.

On average, the impact on land markets of the change to the SPS appears to be weak and did not lead to lower capitalisation than under coupled policies, *though there is variation among the EUSC and regions.* Preliminary evidence presented in this report indicates that the average impact is limited. On average, we do not observe major declines in land prices with the shift to decoupled policies, which suggests that there are no major reductions in capitalisation of support.

The SPS introduction appears to have a stronger impact on land rents than on farmland purchase prices. The net impact of the SPS introduction on land values also depends on the capitalisation of the SPS rate and on the relative importance of SPS compared to other drivers of land values. The empirical evidence from this study suggest that the relative importance of SPS in determining farmland prices compared to other drivers of land values is higher for rents than for purchase prices.

Preliminary evidence suggests that the historical SPS implementation model leads to lower capitalisation of the SPS into land values than the regional and hybrid models. In countries with the hybrid SPS model, capitalisation appears to be driven by the low amount of “naked” land. In countries with the historical model the impact of SPS appears to be significantly weaker. Where SPS land capitalisation occurs the strongest driver tends to be structural changes combined with constrained entitlement trade (the strongest in Belgium). In countries such as Greece there is little activity on the land market and hence there is limited capitalisation of SPS. In Ireland the possibility to consolidate entitlements reduces the pressure of SPS on land markets and the SPS land capitalisation appears minimal.

We also find that instead of reducing capitalisation, the SPS introduction appears to increase capitalisation in the least productive countries. The SPS appears to put a floor on land values in less productive regions (e.g. in Sweden and parts of the UK). The clearest evidence of the SPS impact on land values appears in higher land values for less fertile lands (e.g. grassland). However, this could also be due to the redistribution that came with the hybrid model.

In countries with regulated rental prices the SPS implementation seems to mostly affect unofficial markets. In these MS there is little effect on official prices (since these are regulated) but where regulations lead to the existence of unofficial markets for agricultural land, the SPS tends to increase the unofficial market rental price (e.g. Belgium) and the size of the unofficial markets for agricultural land (e.g. Belgium, the Netherlands).

9.2.4. Distribution of the SPS benefits

Landowners seem to benefit more from the hybrid SPS model than from the historical SPS implementation model. Landowners benefit more under the hybrid SPS model through two channels. The first channel is the capitalisation of the SPS into land values. This is mostly where low amounts of "naked" land drive land values up. The second channel is the implementation details of the hybrid model. Under the hybrid model the number of entitlements which farmers received is equal to the total eligible area in the first year of the SPS application. This allowed some non-farming landowners to obtain entitlements either by cancelling the existing rental contracts and hence applying themselves for entitlements; or by adjusting rental contracts that ensure that entitlements are returned to landowner after the expiry of the contracts; or by other similar arrangements.

The distribution of SPS rents to landowners appears to differ strongly between EUSC. From our country studies, it appears that landowners tend to benefit most from SPS in Finland and Sweden (60-100% of the value of entitlement) while least in Greece and Ireland (0-10%). In the rest of the countries, the landowner benefits from the SPS are low to medium (10-60%).

The distribution of the SPS also depends on whether landowners are also farmers, which differs among the EUSC. As mentioned above, the importance of land renting varies significantly among the EUSC. The evidence in this report suggests that in EUSC such as Germany, Northern Ireland, and Sweden, an important share of SPS benefits will be channelled to non-farming landowners. This also holds, but to a lesser extent, for England, Finland and Scotland. In the rest of the EUSC, a lower share of the SPS will go to non-farming landowners, either because land renting is less important and/or because the capitalisation of the SPS into land values is small. In these countries farmers appear to gain the largest share of the SPS.

9.2.5. Effects on structural change

It is too early to observe significant impacts of the SPS on structural change in agriculture. Structural change is a long-term process, and it is therefore too early to assess the developments observed in 1-2 years since implementation of the SPS. Furthermore, substantial other structural changes which were unrelated to SPS occurred in agriculture in the last few years. Still, the decoupling of subsidies with the introduction of the SPS was identified by most country studies as an important factor affecting structural changes in agriculture.

The SPS seems to constrain farm exit and increase part-time farming. Evidence from several countries, e.g. Belgium, Finland, Sweden and the UK, suggests that the SPS constrains farm exit. The SPS also appears to increase part-time farming. This effect appears to be stronger in marginal areas. Part-time farming allows farmers to reduce non-profitable farm activities, while benefiting from the SPS. No significant difference can be identified between the hybrid and historical SPS models.

The impact of the SPS on hired labour appears small. There is insufficient evidence to identify SPS effects on other agricultural labour developments.

The hybrid SPS model has stimulated (formal) farm entry, unlike the historical model. The hybrid SPS model has stimulated (formal) farm entry and creates uncertainty on the rental markets. This is because under the hybrid model, the allocation of entitlements is based on land use at the time of introduction of the SPS and not on land use in the reference period. We find some evidence that landowners have started farming in order to get access to the entitlements. The long-term net impact of these rent-seeking activities on farm structures is unclear. However it has affected the distribution of SPS rents and the market in entitlements in different ways than with the historical model where such activities did not occur.

The introduction of SPS reduced farm credit constraints, in particular for short-term credit. An interesting, and potentially important, side-effect of the SPS is on rural credit markets. Several country studies (e.g. France, Germany, Italy and Spain) confirm that the SPS affects farms' access to the credits. If farms receive the subsidies at the beginning of the season, they can use the SPS directly to pay for inputs. If farms receive SPS payments at the end of the season, the SPS subsidies can be used as collateral for bank credits. Due to uncertainty about the future of the SPS, it appears that the SPS has no impact on long term credit. Lenders are not willing to provide longer term loans by accepting future SPS payments as collateral.

9.2.6. Effects of changes in the SPS model on land values

None of the EUSC has implemented a purely regional model. Most of the EUSC have implemented the historical model and some have implemented the dynamic hybrid model which will gradually be replaced by the regional model.

The key characteristic of the regional model is that it equalises the face value of all entitlements. The effect of the shift to the regional model will be determined by three key features: (i) whether new entitlements will be allocated; (ii) the redistribution of subsidies between regions; and (iii) how landowners are treated with respect to access to the entitlements.

The regional model may lead to changes in the relative land prices between regions. The regional model redistributes subsidies between regions, which is expected to lead to higher prices in less productive regions and lower prices in more productive regions. The effect is expected to be stronger in those regions, which currently implement the historical model. Under the hybrid model a share of the payments were already redistributed.

Implementation details of the regional model will largely determine whether the shift to the regional model will increase the capitalisation of the SPS compared to the current SPS models. Among other things, this will depend on whether the number of entitlements will increase or will stay at the current level, and to what extent non-farming landowners' access to entitlements will be regulated and enforced.

However, if the size of the total allocated entitlements will not be affected by the policy changes, the upward pressure on land prices will continue to be stronger in those countries which currently implement the hybrid model.

Frictions between farmers and landowners are expected to increase with the shift to the regional model. The key factors which will determine the frictions are to what extent the access to entitlements of non-farming landowners is regulated and enforced, and to what extent the number of newly allocated entitlements (if any) depend on the current or past land use.

The change in models may have an impact on uncertainty and transparency of the entitlement market. If the shift to the regional model creates uncertainty among farmers it will constrain entitlement markets and may induce stronger land capitalisation. On the other hand, the shift to the regional model may increase the transparency on the entitlement market, as all entitlements will have the same face value.

9.3. Limitations

The results reported in the present study are subject to certain limitations. First of all, as in any empirical analysis, one should keep in mind data limitations when interpreting the presented results presented. In particular, data on land transactions are scarce for the period when the SPS was implemented. The rather short time span since the implementation of the SPS combined with varying quality of the available data do not allow us to perform a consistent econometric analysis. In addition, farmland markets are only marginally covered in nation statistical data. For example, in several countries uniform land market databases have still to be established (e.g. land cadastre in Greece).

Second, the global food markets have simultaneously undergone other major changes, such as the increase in world prices for agricultural commodities. Additionally, rising energy prices increase the competition for farmland from the bio-energy sector. These factors reduce the possibility to precisely identify the SPS impact on agricultural land markets.

Third, the qualitative analysis performed in the present study does not allow us to assess the confidence interval nor does it allow us to perform sensitivity analysis and statistical robustness checks of the presented results. Although we have attempted to systematically verify all the input data and prove our findings using several alternative sources of information, this cannot replace statistical robustness checks. This is a promising avenue for future work, when more and better quality data become available.

Fourth, the results for farmland purchase prices are not directly comparable to the results for farmland rental prices. On the one hand, it is rather difficult to identify the impact of the SPS on land purchase prices, because they are more heavily driven by non-agricultural factors, and market expectations are more important. For land rents this problem is less acute. On the other hand, rental markets for agricultural land are more regulated than sales markets and tend to have longer duration. Rental contract regulations may delay or mitigate the capitalisation of the SPS into higher land rents than observed in rental market data.

Moreover, if previous area payments introduced under the 1992 CAP reform and under Agenda 2000 were capitalised into land values, then the capitalisation of the SPS may be difficult to observe. The empirical literature estimating the impact of previous subsidies on land values is very limited, with only three studies covering EU countries. Trail (1980) and Goodwin and Ortalo-Magné (1992) estimate the effect of pre-1992 CAP polices. Duvivier, Gaspart and de Frahan (2005) estimate the impact of the 1992 and subsequent CAP reforms on arable farmland price in Belgium. Depending on the year and region considered, the elasticity for arable farmland price to compensatory payments ranges from 0.12 to 0.47.

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11. FIGURES AND TABLES

Table 3. Sales market regulations in EUSC

	Min/Max sales price	Registration tax real estate tax*	Land use and other regulations & norms
		% of land value	
Belgium	No	10-12.5% KI	Farmland reducing zoning regulations
Finland	No	4%* 0% on farmland	
France	No	5.09% KI	Some transactions subject to State approval (via SAFER). Farmland reducing zoning regulations
Germany	Max sales price for long-term tenants in East Germany	3.5% 2.6-6%	Subject to state agency approval
Greece	Min price	7-9%* 0% on farmland	No
Ireland	No	9% 0%	No
Italy	No	11-18%** 0.4%-0.7%	
Netherlands	No	0% on farmland 0% on farmland 6% sales tax*	
Spain	No	6-7% 6-15%	
Sweden	No	30% on 2/3 of sales value 0%	Purchase permits in sparsely populated areas & legal buyers
United Kingdom	No	0-4% 0%	Tenant and community right to buy in Scotland. Strict development control in UK

Source: Own calculations based on LM Project country studies. Notes: KI – Differentiated Cadastral Income. *exemptions for farmers; ** usually calculated on standard values rather than on the price of the transaction.

Table 4. Rental market regulations in EUSC

	Min/Max rental price	Min/Max, average tenancy duration	Other rental market regulations & norms
		Years	
Belgium	Max rent	Min 9/Max 27(99) Usually 9	
Finland	No	Max 10 Average 5-6	
France	Min & Max rent	Min 1/Max 25 Usually 9 or 18	Inheritable rental contracts, automatically renewed
Germany	No	No Average 6-11.5	Subject to state approval
Greece	Min rent	No <4 years	
Ireland	No	No Average 11 months	Conacre rental agreements
Italy	No	No Average arable crops 2-5, fruit crops 5-10	Possibility of contracting with the assistance of farmer associations
Netherlands	Max rent	Min 6 (until 2007) 24 in the past; <10 now	
Spain	No	Min 5	
Sweden	No	No Average: declining towards 1	
United Kingdom	No	In Scotland for new 2003 Act tenancies max 5, min 15	Northern Ireland - conacre rental agreements; Scotland - Traditional short duration tenancies; England - traditional tenancies & farm business tenancies

Source: Own calculations based on LM Project country studies.

Table 5. Sales market of agricultural land in EUSC

	Land price development	**Number/share of sales transactions**	**Average size of transacted plots**
	EUR/Ha	No, %	Ha
Belgium	Increasing since 1996 – 2-3% p.a. Big regional differences after 2005	Steadily decreasing since 1980's	Total decreasing; average stable (0.9-1.0 ha)
Finland	Big price fluctuations between years (±300%). Real land price 1998≈2007	Yearly average 5,800, fluctuations ±10%. Since 2005 decreasing	Until 1993 decreasing, since 1993 fluctuating at 4.6-6.3 ha
France	Continuous increase from 1995. In 2004 the average price 9,341	Stagnating 1994-2004. In 2004 0.93% of the total UAA sold	Fluctuations ±12%. Average plot size transacted 3.3 ha
Germany	Constant Germany average, ↑ East, ↓ West.	Decreasing, in 2006 38,400. In 2005 only 0.6 % of UAA sold Average plot size transacted 2.5 ha	Stable over the last 5 years at 2.2-2.8 ha (4.5-6 ha in East and 1.5 ha in West)
Greece	Stable for irrigated, decreasing (-16%) 1991-2206 for non-irrigated land	Small	Small
Ireland	Increasing, very strongly since 1990. In 2005 214 % higher than in 1990	Decreasing, from 31,210 ha in 1991 to 6115 ha in 2004	Fluctuating, 11 ha in 1991, 9 ha in 2004 (+50% in '93, '94 and '98)
Italy	Increasing in current values, stable in real values. In 2006 15,900 (regional variation 5,600-37,200)	Yearly 1-2% of total UAA	
Netherlands	During the 1990s, increase from 17,000 in 1993 to 36,500 in 2001 (+10% pa). 2001 to 2005 decrease of 17%. Since 2006 increasing	Sizable fluctuations, which depend on land price. In 2000 5%, in 2003 2.5%.	Average size 4.0-4.5 ha, 50% of all sales <2.7 ha
Spain	Increasing nominal prices (14,340 in 1990, 28,000 in 2006). Irrigated land 4x more expensive than non-irrigated	Small	
Sweden	Increasing, real prices doubled from 1,874 in 1990 to 3,706 in 2006	Decreasing, from 27,106 in 1990 to 19,439 in 2006	Decreasing, from 13.7 in 1990 to 7.5 in 2006.
United Kingdom	Increasing, with a decrease in 2002-2003	Decreasing, from 4.3% in 1997 to 1.6% in 2004	

Source: Own calculations based on LM Project country studies.

Table 6. Rental market of agricultural land in EUSC

	Land rent development	Number/share of rental transactions	Country-specific characteristics
	EUR/Ha	No, %	
Belgium	Increasing, +16.8%, 1992-2006	Stable -1.7% 1992-2006 62-73% in UAA Landowner eligibility to SPS reduces land supply	Significant fragmentation - farmers are both renting the land out and renting from others landowners.
Finland	Stable	Increasing, +42% 1990-2007 (from 13% to 33%).	No rental price statistics; rental prices estimated from national accounts
France	Stable, 1% yearly decrease since 2000	Increasing 59.9% in 1990 75.8% in 2006	
Germany	Decreasing, -37.4%, 1992-2006 West > East	In 2007 61.7 % decreasing in East>80%, increasing in West	
Greece	Decreasing, -13.6%, 1992-2006	Increasing, +49.2%, 1992-2006	High fragmentation
Ireland	Stable	Increasing, +34.1%, 1992-2006	
Italy	Increasing, +24.4%, 1992-2006 400 – 900 in 2006	Increasing from 17,9% in 1990 to 25% in 2005 Regional differences from 15-45%	
Netherlands	Low till 1994 (regulated), since 1995 increasing, +17.8%, 1992-2006	Fluctuating-decreasing since 1990 at 2-10,000. In 2002 10%	Until 1994 rental prices regulated, therefore low
Spain	Increasing, +54.1%, 1992-2006	Increasing, +36.0%, 1992-2006 70% in UAA	
Sweden	Increasing, +30.1%, 1995-2006	Increasing till 2002, declining since 2003 40-45% in UAA	
United Kingdom	Decreasing, -13.7%, 1992-2006	Increasing till 1997-1999; stable since 2000	

Source: Own calculations based on LM Project country studies.

Table 7. Drivers of agricultural land prices in EUSC

Drivers	BE	FI	FR	GE	GR	IR	IT	NL	SP	SE	UK
Agricultural commodity prices	+++	+	++	+	+	--	++	+++	+	++	++
Infrastructural expansion	++	0	+++	+	+	+++	++	++	+++	na	0
Urban pressures	+++	0	+++	0	-	+++	+	+++	+++	+	+
SPS	+	++	+	0	++	+	+	0	+	+	0
Farm size	++	+	+	+/0	0	+	+	+++	--	++	+/0
Coupled subsidies	++	-	+	0	+	+	0	0	++	na	0
Informal institutions	0	++	0	0	0	++	0	0	0	+	+
Interest rate	+	0	+	0	+	0	+	na	--	+	0
Agricultural productivity	0	+	+	+	0	+	0	+	++	+	0
Bio-energy	0	0	++	+/0	0	0	0	+++	+	+	0
Other subsidies	0	++	0	na	0	+	0	0	+	na	0
Rural development polices	0	++	0	0	0	+	0	0	0	0	0
Taxes	+	0	0	+	0	+	0	0	0	0	+/++
Inflation	0	+	0	0	0	0	+		++	na	0
Land sale regulations	0	0	-	0	0	0	0	0	0	na	0
Other factors	+++	+++	++				0			+	++/+

Source: Own calculations based on LM Project country studies. Notes: +++ strong increase, ++ medium increase, + weak increase, 0 no changes, --- strong decrease, -- medium decrease or - weak decrease.

Table 8. Drivers of agricultural land rents in EUSC

Drivers	BE	FIN	FR	GE	GR	IR	IT	NL	SP	SE	UK
Agricultural commodity prices	++	++	0	++	0	-	++	+++	0	++	++
Infrastructural expansion	+	+	0	++	0	++	0	++	++	0	+
Urban pressures	+	++	0	+	0	0	++	+++	++	0	0
SPS	+	+	0	+	++	++	+	0	+	++	+
Farm size	+	+	0	0	0	0	0	+++	--	+++	0
Coupled subsidies	+	0	0	+	0	+	0	+++	0	na	0
Informal institutions	0	+++	0	0	0	+++	0	0	0	+	0
Interest rate	0	++	0	0	0	+++	0	0	0	+	0
Agricultural productivity	++	0	0	+++/+	0	0	0	+++	++	++	0
Bio-energy	0	0	0	0	0	0	0	+++	0	+	0
Other subsidies	0	0	0	+/0	0	0	0	0	0	+	0
Rural development polices	0	0	0	0	0	0	0	++	0	+	+
Taxes	0	0	0	0	+	0	0		0	0	0
Inflation	0	+	0	+	+	0	0	0	0	na	0
Land rental regulations	++	0	-	0	0	0	0		0	na	0
Other factors		+++							0	+	0

Source: Own calculations based on LM Project country studies. Notes: +++ strong increase, ++ medium increase, + weak increase, 0 no changes, --- strong decrease, -- medium decrease or - weak decrease.

Table 9. Output and input price changes in the key EU markets

		Change of real prices in 2007 relative to 2004 (%)
Crop prices	Barley (Germany)	63
	Sunflower (Spain)	61
	Wheat (Germany)	53
	Maise (Germany)	51
	Rape (Germany)	17
Animal prices	Raw cows' milk (Germany)	12
	Pigs (Netherlands)	-6
	Young cattle (Ireland)	-13
Input prices	Diesel oil (UK)	40
	Sulphate of potash (France)	10
	Sulphate of ammonia (France)	7

Source: Calculated from Eurostat data.

Table 10. SPS model by member state

		Start of SPS	SPS model	Comments
Belgium	**Flanders**	2005	Historical	
	Wallonia	2005	Historical	
Finland		2006	Dynamic hybrid moving to flat rate	In 2011-2013 and 2014-2015 the historical farm-specific component will reduce to 70% and 30%, respectively, of the original value; from 2016 on it will reduce to 0.
France		2006	Historical	
Germany		2005	Dynamic hybrid moving to flat rate	Starting in 2010, the hybrid scheme will be gradually transformed into a pure regional model until 2013 (see Box 4 for more details).
Greece		2006	Historical	
Ireland		2005	Historical	Farmers can consolidate entitlements (see Box 9)
Italy		2005	Historical	
Netherlands		2006	Historical	
Spain		2006	Historical	
Sweden		2005	Static hybrid (divided into five regions)	
United Kingdom	**England**	2005	Dynamic hybrid moving to flat rate	Gradually transformed into a pure regional model until 2012. In 2005 10% is regional component and 90% is historic component. The SPS is implemented within three defined regions: (1) moorland within the Severely Disadvantaged Areas (SDA), (2) non-moorland within SDA, and (3) non SDA.
	Scotland	2005	Historical	To activate entitlement it was necessary firstly to enable them, and secondly to claim them. All the allocated entitlements had to be enabled in 2005 and thereafter claimed within three years. Unclaimed or un-enabled entitlements were reverted to the National Reserve.
	Wales	2005	Historical	
	Northern Ireland	2005	Static hybrid	20% is regional component (78 EUR/entitlement) and 80% is historic component. Farmers were permitted to consolidate their historic component of the entitlement value onto a lesser area to increase the unit value of their entitlements.

Source: European Commission (2007a); Country studies.

Table 11. Budgetary ceilings for single payment schemes in member states, 2006

	SPS ceiling	Percentage SPS of total	SPS per UAA
	1000 EUR	**%**	**EUR**
Austria	540 441	2	167
Belgium	475 642	2	344
Denmark	981 540	3	362
Finland	519 629	2	226
France	6 060 556	20	187
Germany	5 644 899	19	333
Greece	2 041 888	7	513
Ireland	1 335 312	4	313
Italy	3 593 133	12	244
Luxemburg	36 603	0.1	284
Netherlands	325 104	1	171
Portugal	365 646	1	97
Spain	3 529 454	12	139
Sweden	630 452	2	200
United Kingdom	3 914 946	13	234
EU-15	29 995 245	100	226

Source: Own calculation using European Commission (2007a) and Eurostat data

Table 12. Share of decoupled direct payments on total direct payments in EUSC, 2006

	Share of decoupled direct payments on total direct payments (%)
Belgium	62
Finland	-
France	-
Germany	97
Greece	-
Ireland	98
Italy	56
Netherlands	-
Spain	-
Sweden	86
United Kingdom	98

Source: Own calculations using data from European Commission (2007b).

Table 13. Activated and un-activated entitlements and average value of entitlements

		Year	Activated entitlements		SPS eligible area	Number of distributed entitlements/Total eligible area	Un-activated entitlements	Average value of entitlements
			Number in 1000	% of UAA	% of UAA	Total eligible area = 100	% of distributed entitlements	Euro/entitlement
Belgium	Flanders	2006	456	73	85	92	6.8	485
	Wallonia	2006	649	86	95	97	6.8	345
Finland		2007	2327	101	101	102	0.9	209
France		2007	24202	88	95	95	2.2	246
Germany		2007	16749	99	110	90	1.1	332
Greece		2006	n.a.	n.a.	54	60	n.a.	n.a.
Ireland		2007	4219	99	108	95	3.6	309
Italy		2006	n.a.	n.a.	n.a.	n.a.	n.a.	58-445
Netherlands		2007	1569	83	105	80	1.5	500
Spain		2007	15624	62	80.2	78	1.2	223
Sweden		2007	3109	98	n.a.	n.a.	2.7	211
UK	England	2006-2007	8126	87	91	n.a.	n.a.	268
	Scotland	2007	4270	70	72	100	2.4	131
	Northern Ireland	2007	992	98	100	100	2.5	360

Source: Own calculation based Country reports and Eurostat data
Notes: * estimate

Table 14. Share of un-activated entitlements in Germany in 2005

Region	Share of un-activated entitlements in 2005	Average value of distributed entitlements	Average value of un-activated entitlements
	% of distributed entitlements	EUR/ entitlement	EUR/ entitlement
SH & HH	1.2	356	189
NS & HB	0.6	347	325
NRW	0.5	352	184
HE	3.4	295	269
RLP	1.7	289	255
BW	1.2	307	234
BY	0.2	351	198
SL	1.2	259	180
BE & BB	0.3	299	145
MVP	2.3	327	264
SN	0.7	356	362
SA	1.0	348	253
TH	0.3	344	216
TOTAL	0.9%	335	253

Source: German Country report.

Table 15. Tradability of entitlements: Country specific restrictions

	Tradability of entitlements
Belgium	Entitlements became tradable from 2006. Entitlements can be transferred temporally[90] or permanently. Entitlements can be transferred between Flanders and Wallonia however entitlement can only be activated on a plot in the same region where it was activated the first time.
France	No restrictions on trade, but entitlements can only be activated within the "département" (NUTS3) where they were first created. There are various specific restrictions (see Table 16). Renting of entitlements with land is not subject to restrictions (but the rental length of the entitlement should equal the rental length of the attached land).
Finland	No specific restrictions
Germany	Entitlements are tradable within regions
Greece	Only farmers with agriculture as secondary activity are subject to restrictions on entitlement transfers. They need to revert to the National Reserve: 5% of transferred entitlements if transferred with entire holding; 10% if transferred with land or if transferred entitlements are s.t. special conditions; and 30% if transferred without land.
Ireland	No specific restrictions
Italy	- Sale of entitlements with land: 10% must be reverted to the national reserve; this is reduced to 5% if the whole farm is sold or reduced to 0% if the sale is concerning "set-aside entitlements" or new farmers. - Sale of entitlements without land: 50% in 2005-2007 and 30% in 2008 must be reverted to the national reserve. If the sale concerns new farmer than the rate is zero. From 2008, new regulations has removed the restrictions in both cases of sale of entitlements with or without land
Netherlands	No specific restrictions
Spain	Percentage of transferred entitlements needed to be reverted to the National Reserve: - Professional farmers without land: 15% (2006-2007) and 10% (2008 on). New farmers: 0%. - Non-professional farmers without land: 50% (2006-2007) and 30% (2008 and following years). - With land: 5% (2006-2007) and 3% (2008 on). New farmers: 0%. - With entire farm: 3% (2008 on). - Sale of all special entitlements: 5% (2006-2007) and 3% (2008 on). - Sale of entitlements when the land is returned to the owner: 5% (2006-2007) and 3% (2008 on).
Sweden	Entitlements are tradable within regions
UK	Trade not allowed between countries (and regions within England such as between moorland and other regions).

Source: Country reports

[90] *Temporally transfer of entitlements in Belgium:* Only landowners can make a temporally transfer of land in case of a simultaneous rental of the equivalent number of hectares. The transfer of entitlements is only limited to the duration of the tenancy. When the rental agreement ends the entitlements go back to the owner of the entitlements, the landowner. If the tenant doesn't activate the entitlement in a period of three successive years the entitlement goes to the national reserve and is lost for both tenant and owner. This link with the tenancy legislation limits the popularity of the temporally transfers and therefore farmers sometimes make a definitive transfer to the tenant and then afterwards the entitlement is transferred back to the original owner. In 2006 and 2007 there were no temporally transfers of entitlements in Wallonia; in 2006 there were 155 transfers in Flanders.

Table 16. Retention on entitlement transfers through purchase in France

	Transfer with land				Transfer without land	
	Farm UAA < Specific threshold defined at NUTS3 level		Farm UAA > Specific threshold defined at NUTS3 level		Transfer of the whole farm	Other cases
	Transfer of part of the farm	Transfer of the whole farm	Transfer of part of the farm	Transfer of the whole farm		
Transfer of entitlements to a new farmer: young farmer	0%	0%	0%	0%	0%	0%
Transfer of entitlements to a new farmer: other farmer	0%	0%	10%	0%	0%	50%
Transfer of entitlements to a relative	0%	0%	10%	0%	0%	50%
Transfer of entitlements to any other type of farmer	3%	3%	10%	3%	3%	50%
Change of farm legal status		0%		0%	0%	

Source: French country report

Table 17. Yearly entitlement market transactions

		Type of transaction	Percentage traded entitlements on total activated entitlements (%)	
			2006	2007
Belgium[91]	Flanders	All types	7*	
	Wallonia	All types	6*	6.6
Finland		Market		5.1
France		All types		5.4
Germany		Market	1.9	1.3
Greece		Market	Trade is thin	
Ireland			n.a.	n.a.
Italy			n.a.	n.a.
Netherlands		Market	3.1	8.1
Spain		Market	3.39	
Sweden		All types	6.2	11.7
United Kingdom	England	Market	Small	
	Scotland		n.a.	n.a.
	Northern Ireland	All types	Small	

Source: Country reports Notes: * estimate

[91] As from 2008 young farmers in Wallonia can obtain a higher value entitlement from the national reserve if their own entitlement has a value lower than the average in the region. This may to certain extent increase the trade of entitlements with low value as one may expect that rational young farmers may have incentive to purchases entitlements with a low value and exchange them with a higher value entitlements from the national reserve. In Flanders agricultural consultancy organisations already spotted such an increase in the purchases of low value entitlements by young farmers, as they can already replace it with a higher value entitlements from 2007.

Table 18. Market sale price of entitlements and organisation SPS entitlement market

		Year	Market price of entitlements / Average value of entitlement Average value of entitlement = 1	Organisation of SPS entitlement market
Belgium		2006-2008	2-3*	Trade done directly between farmers. In many cases the agricultural consultancy organisations assist farmers.
Finland			n.a.	Trade done directly between farmers. Agents or trades do not play any role.
France		2006-2007	1-6**	There is no official institution for trading entitlements. But the Ministry of Agriculture must be notified of change of owner.
Germany		2007	1.3	SPS are traded face to face.
Greece			n.a	Trade is thin. Most trade takes place among family members.
Ireland		2007	2.5**	Entitlements are traded independently or through agents who usually charge a fee between 3% to 5% of the value of the entitlement. DAFF must be informed when entitlements are traded rented or gifted (e.g. through inheritance).
Italy		2007-2008	1-3**	No special organisation of the market. Often farmers' professional organisations or farm advisors support matching between entitlement sellers and buyers. Some support is also given by CAA (Centre of Agricultural Assistance).
Netherlands		2007-2008	2.5	Entitlements are mostly traded through agents. No official institution offers an institutionalized market for entitlements. Private marketplaces play a negligible role.
Spain		2006	n.a.	Trade done directly between farmers. There is no official institution for trading entitlements. The farmers inform to the FEGA for the record of the entitlements. Some private societies have been constituted but with small activity (see Box 6 for more details).
Sweden		2006-2007	0.8-2.5**	Entitlements are traded through internet at agricultural societies, private real estate agents, and/or through advertisements in professional farmers' newspapers. There is no official SPS entitlement market organisation
UK	England	2005-2007	0.8-1.5	In England and Scotland entitlements are traded on the open market, often conducted by auction markets or agents on behalf of their clients.
	Scotland	2006 2007 2008	2.4 3 2.5	
	Northern Ireland		n.a.	No official institution is involved in the trading of entitlement. Market is very small. Majority transfers are not on the open market but tend to be transfers within a business (father to son etc).

Source: Country reports.

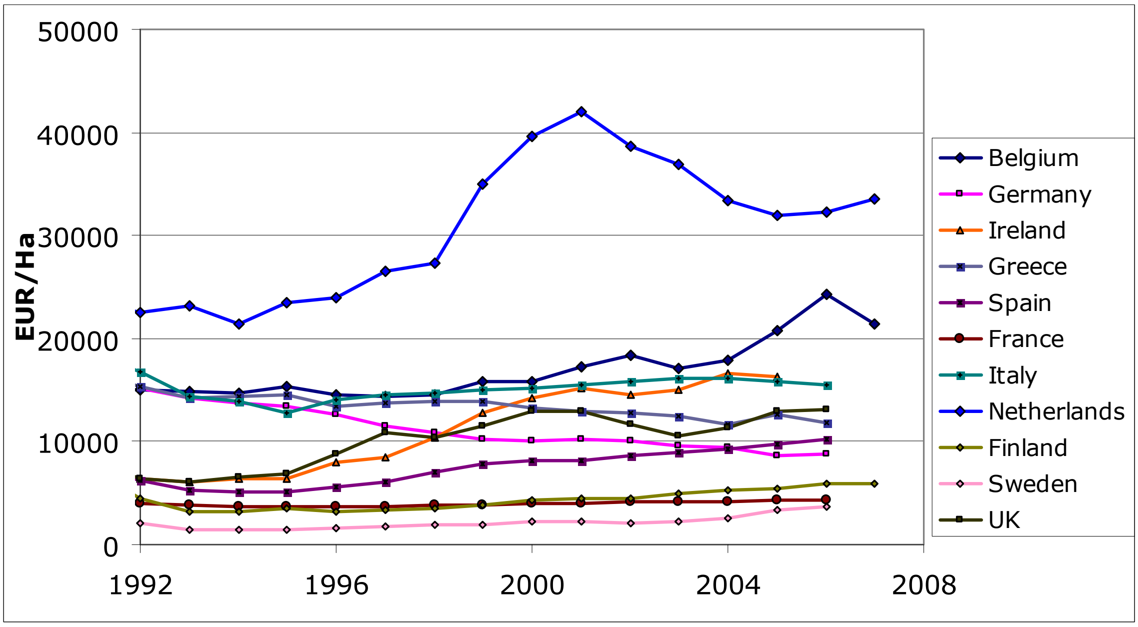
Notes: *Belgium: Agricultural consultancy organisations advice a price of 2-3 times the value of the entitlement and this advice is followed by most of the farmers; **estimate.

Table 19. Level of Landowners benefits from SPS

Landowners benefits from SPS*	Historical SPS model	Hybrid SPS model
Zero or weak	Greece, Ireland, Scotland (UK)	
Low	Belgium, Italy, France, the Netherlands, Spain	Northern Ireland (UK)
Medium		England (UK)**, Germany
Significant		Finland, Sweden

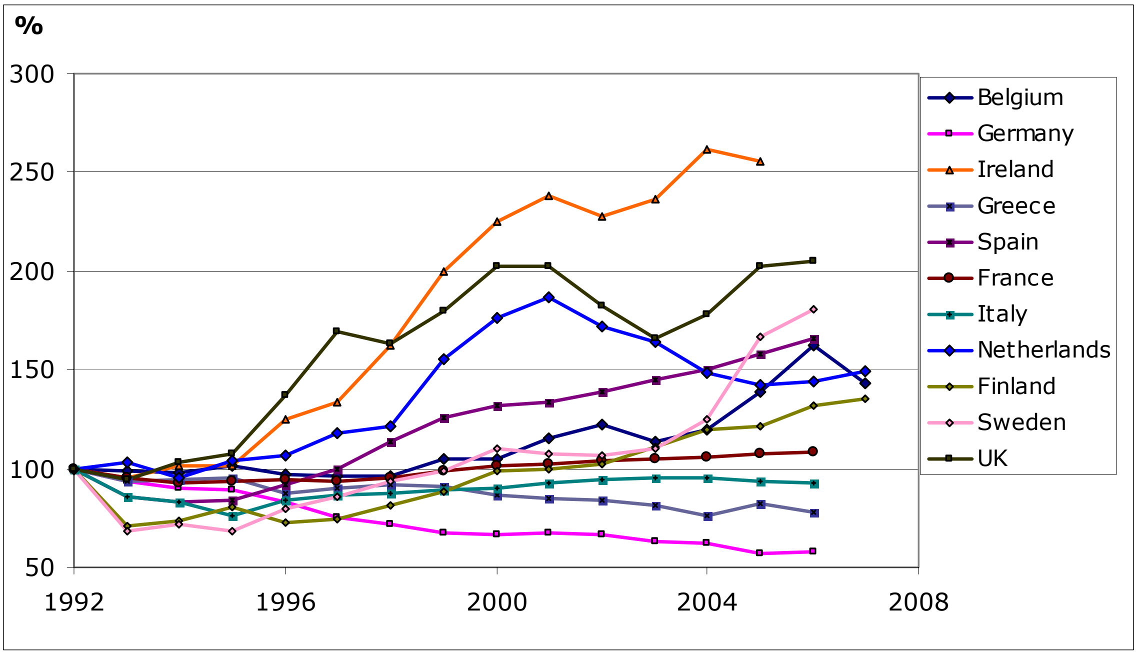
Source: Based on country studies
Notes:
*Zero or weak: 0-10% of the value of entitlement; Low: 10-30%; Medium: 30-60%; Significant: 60-100%
** Whilst medium just now this will move to full in 2012 - as all SPS will be area based and tied to land - meaning landowners accrue the benefit through the payment or rent of SPS.

Figure 2. The evolution of real sales prices for agricultural land in EUSC 1992-2007 in EUR/Ha



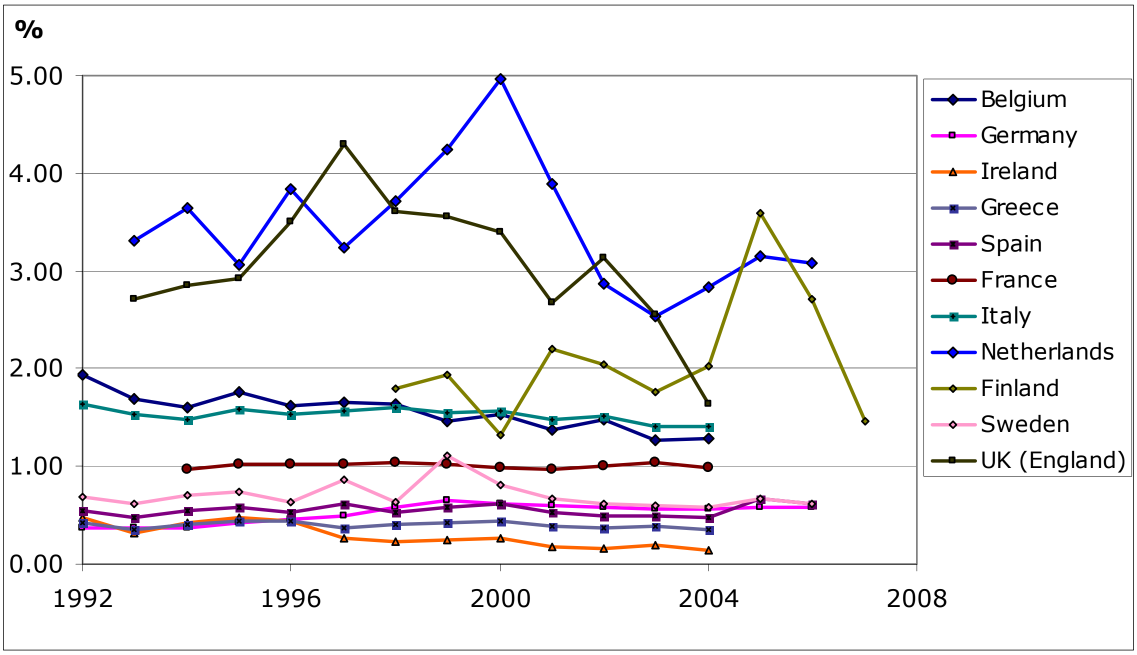
Source: Own calculations based on Eurostat (2008). Notes: 1971-1996: GDP deflator for Germany, OECD; 1997-2007: Harmonised indices of consumer prices, Euro area, Eurostat.

Figure 3. The evolution of sales price indices for agricultural land in EUSC 1992-2007 in percent (1992=100)



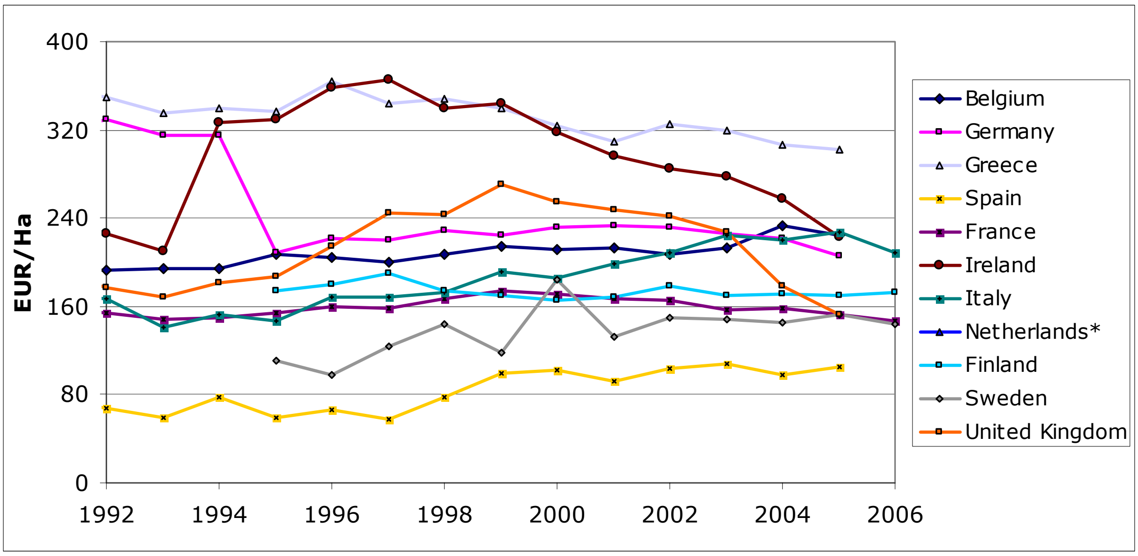
Source: Own calculations based on Eurostat (2008). Notes: 1971-1996: GDP deflator for Germany, OECD; 1997-2007: Harmonised indices of consumer prices, Euro area, Eurostat.

Figure 4. The evolution of agricultural land sales as percentage of total UAA in EUSC 1992-2007



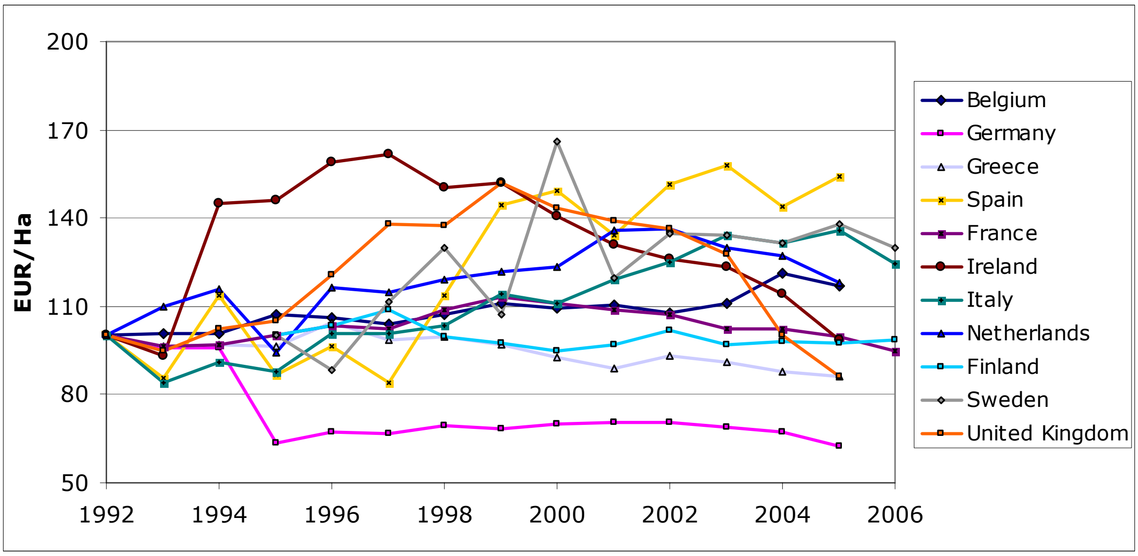
Source: Own calculations based on LM Project country reports.

Figure 5. The evolution of real rental prices for agricultural land in EUSC, 1992-2006 in EUR/Ha



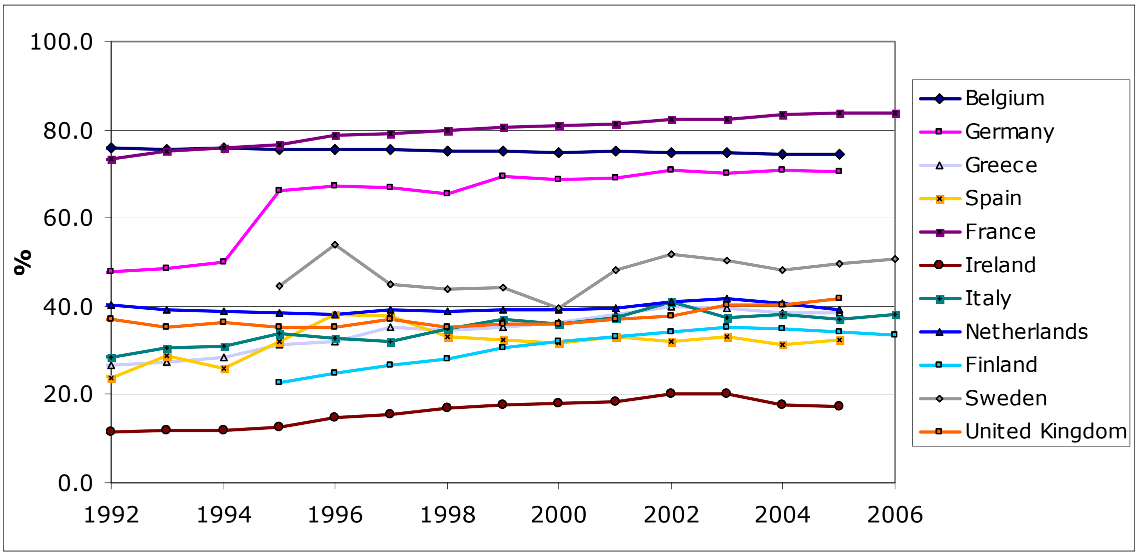
Source: Own calculations based on FADN (2008). Notes: *Not on Figure. 1971-1996: GDP deflator for Germany, OECD; 1997-2007: Harmonised indices of consumer prices, Euro area, Eurostat.

Figure 6. The evolution of rental price indices for agricultural land in EUSC, 1992-2007 in percent (1992=100)



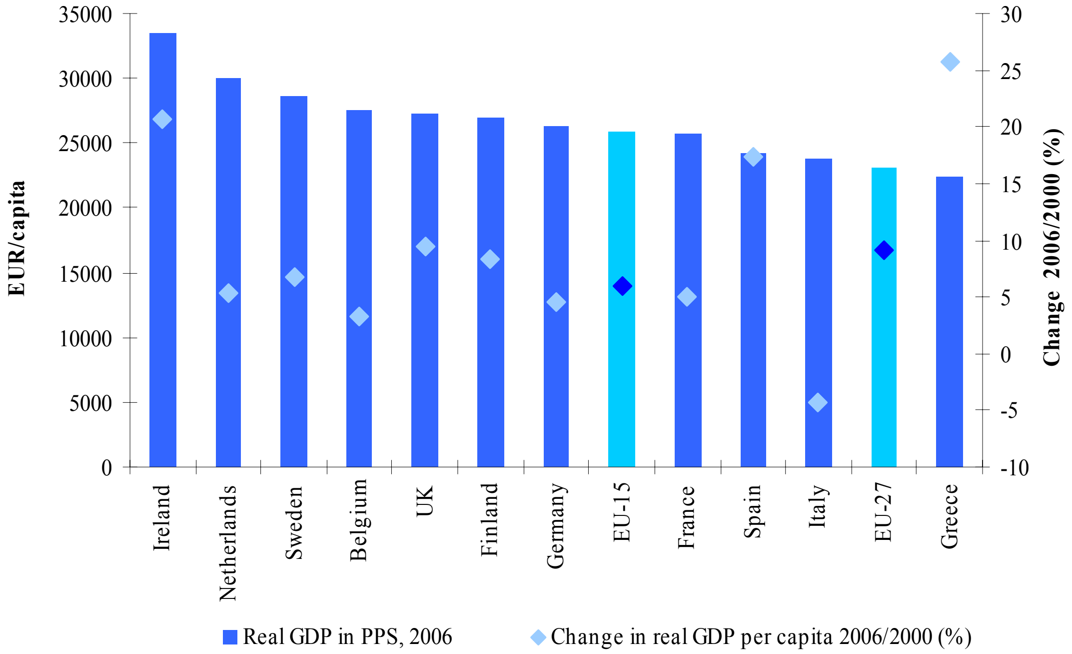
Source: Own calculations based on FADN (2008). 1971-1996: GDP deflator for Germany, OECD; 1997-2007: Harmonised indices of consumer prices, Euro area, Eurostat.

Figure 7. The evolution of the rented share in total area agricultural area in EUSC, 1992-2006 in percent



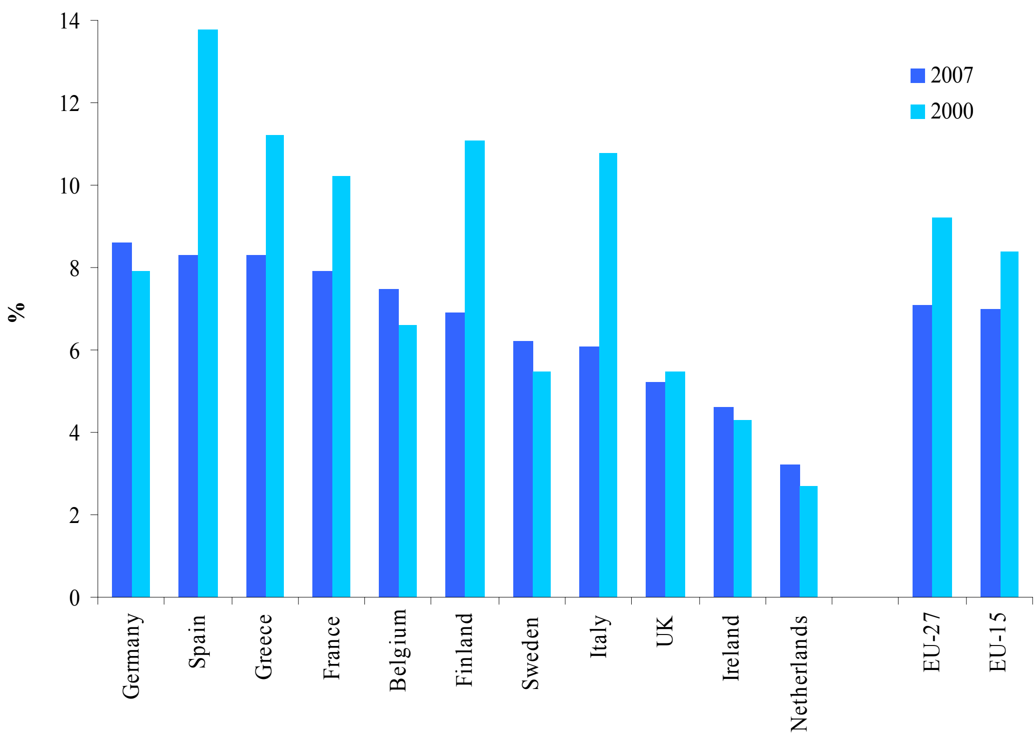
Source: Own calculations based on FADN (2008).

Figure 8. Real GDP per capita expressed in PPS



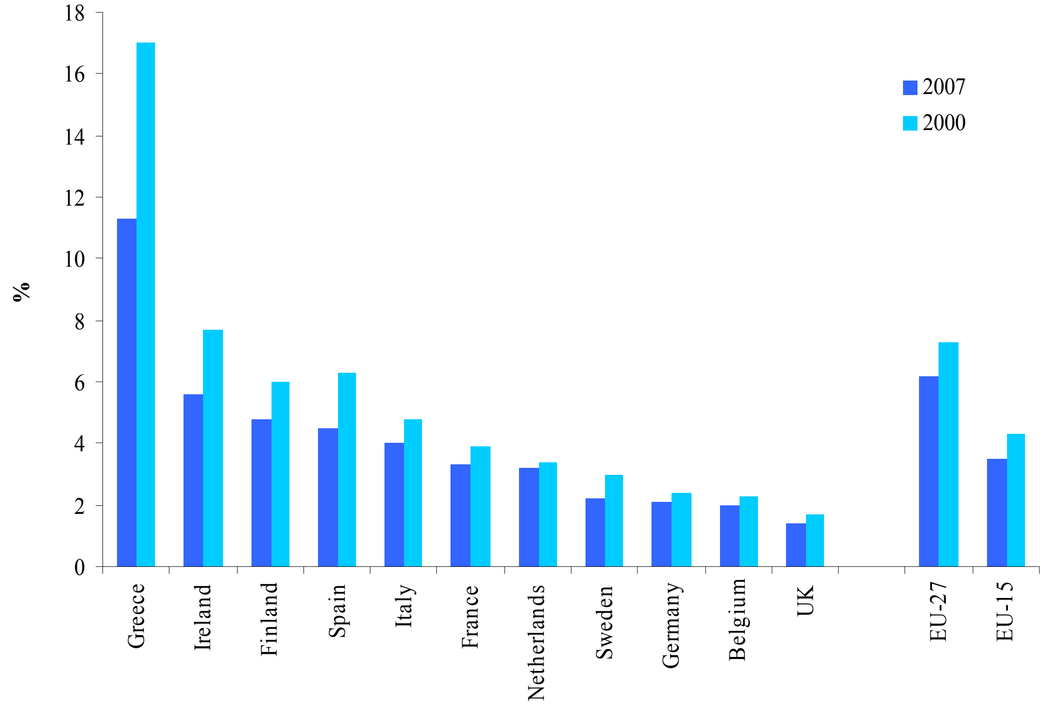
Source: Calculated from Eurostat data

Figure 9. Development of unemployment rates



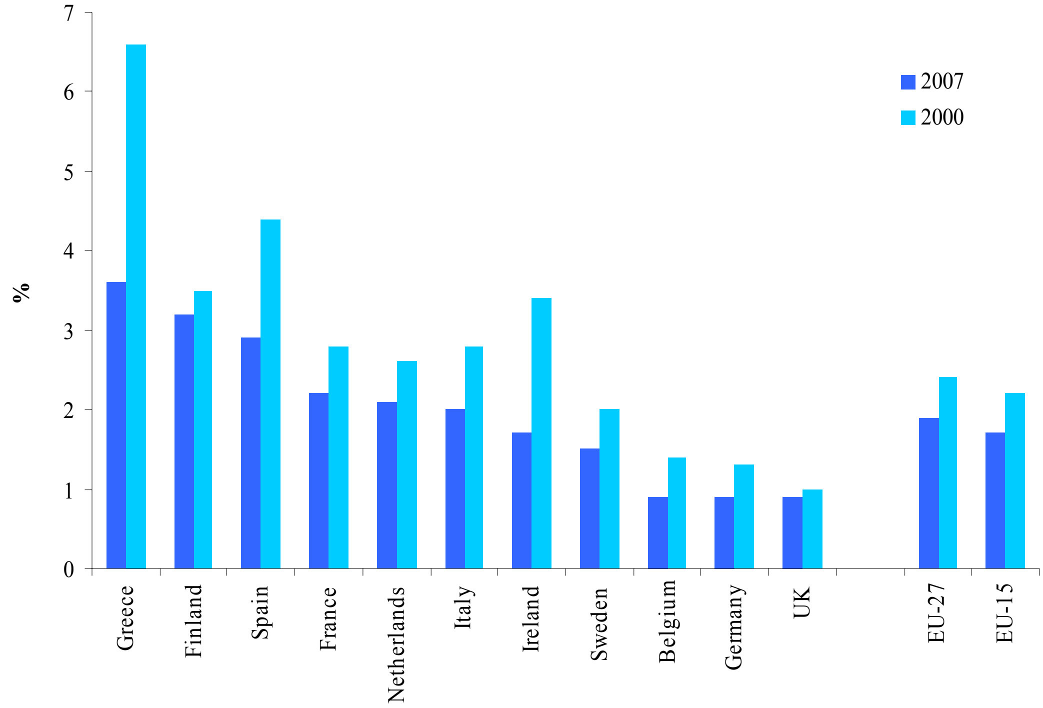
Source: Eurostat

Figure 10. Share of agriculture in total employment



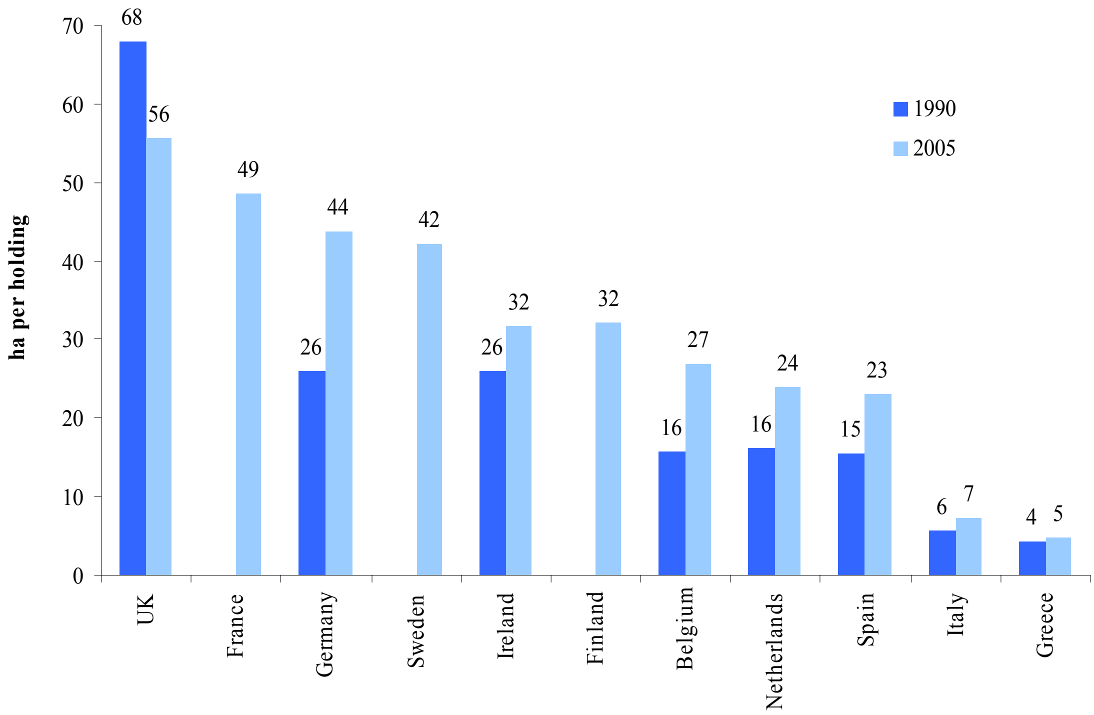
Source: Eurostat
Note: For Belgium and the Netherlands the values are for 2006 and 2000, respectively.

Figure 11. Share of gross value added of agriculture, fishing and hunting in total gross value added (%)



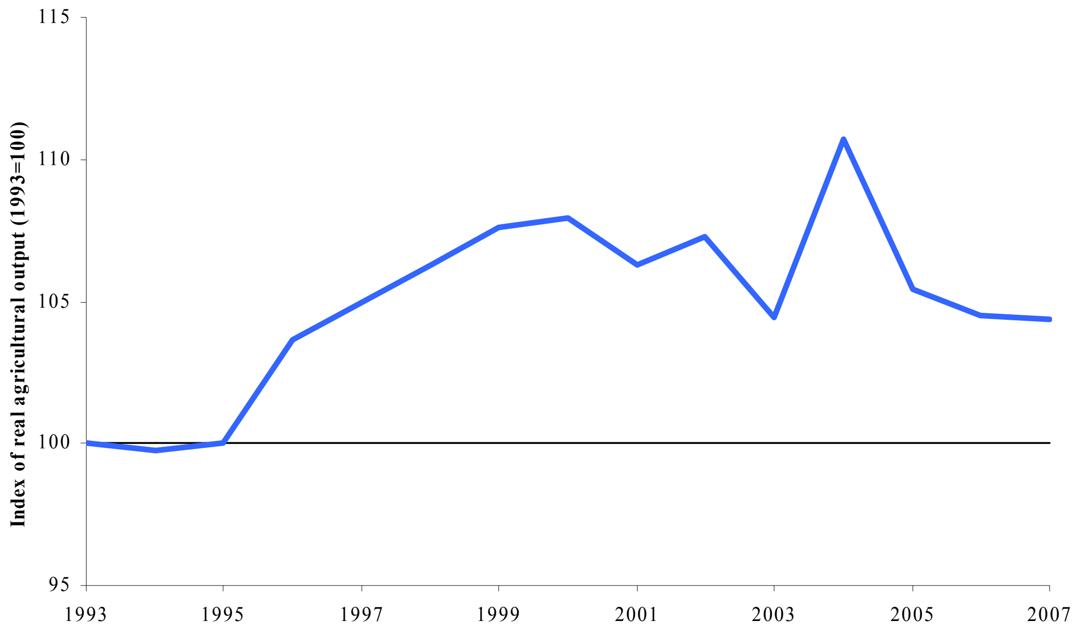
Source: Eurostat
Note: For Ireland the values are for 2006 and 2000, respectively.

Figure 12. Development of farm size



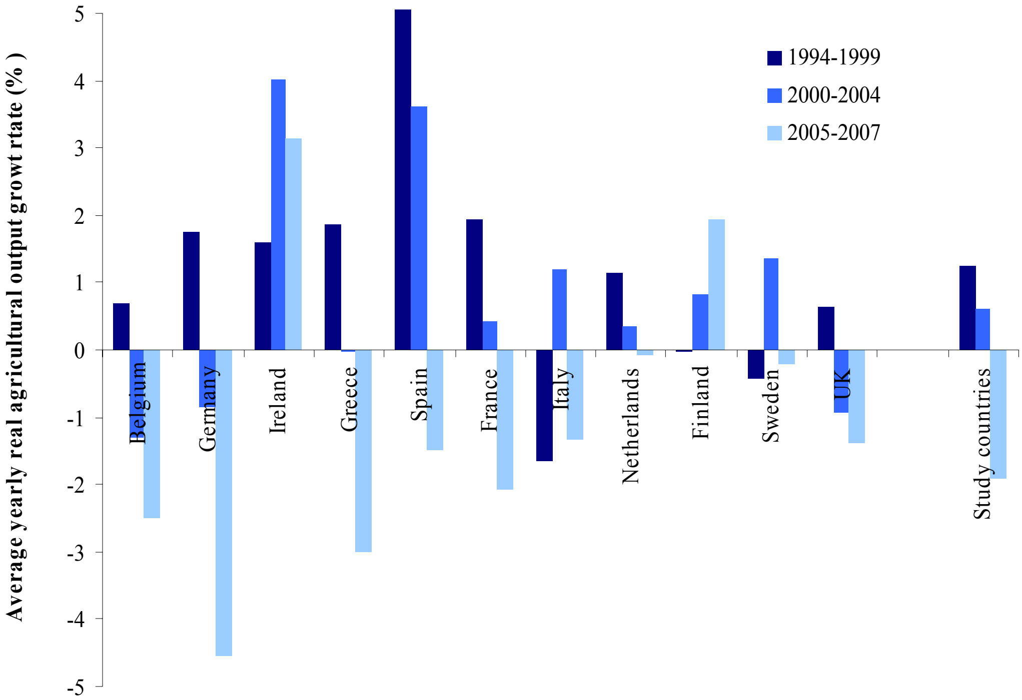
Source: Calculated from Eurostat data

Figure 13. Development of real agricultural output in the EUSC



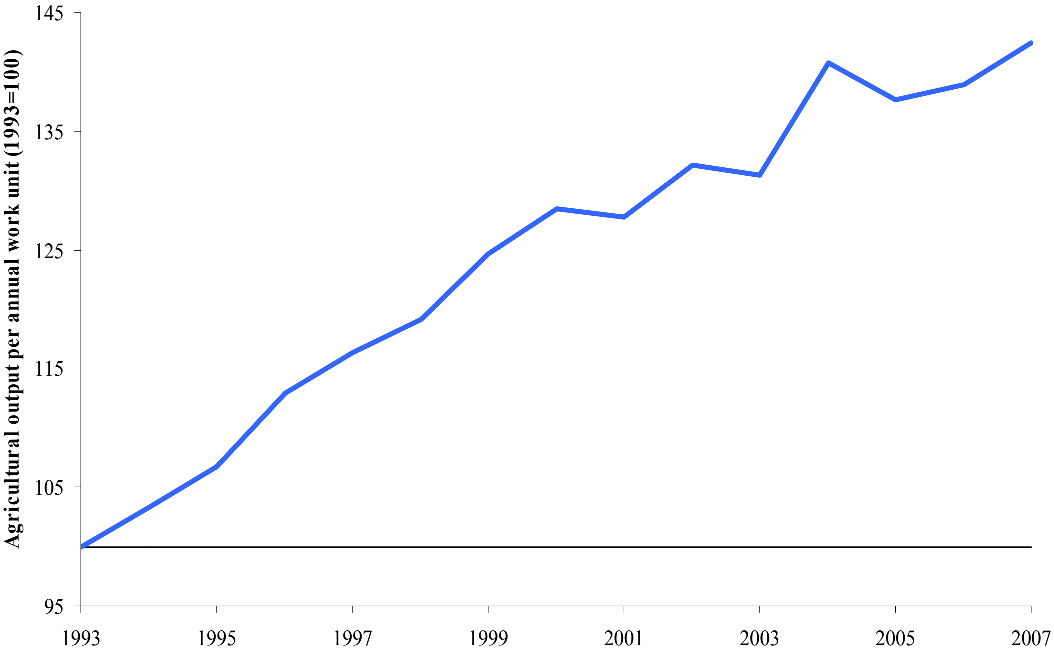
Source: Calculated from Eurostat data

Figure 14. Development of real agricultural output in the EUSC (in basic prices)



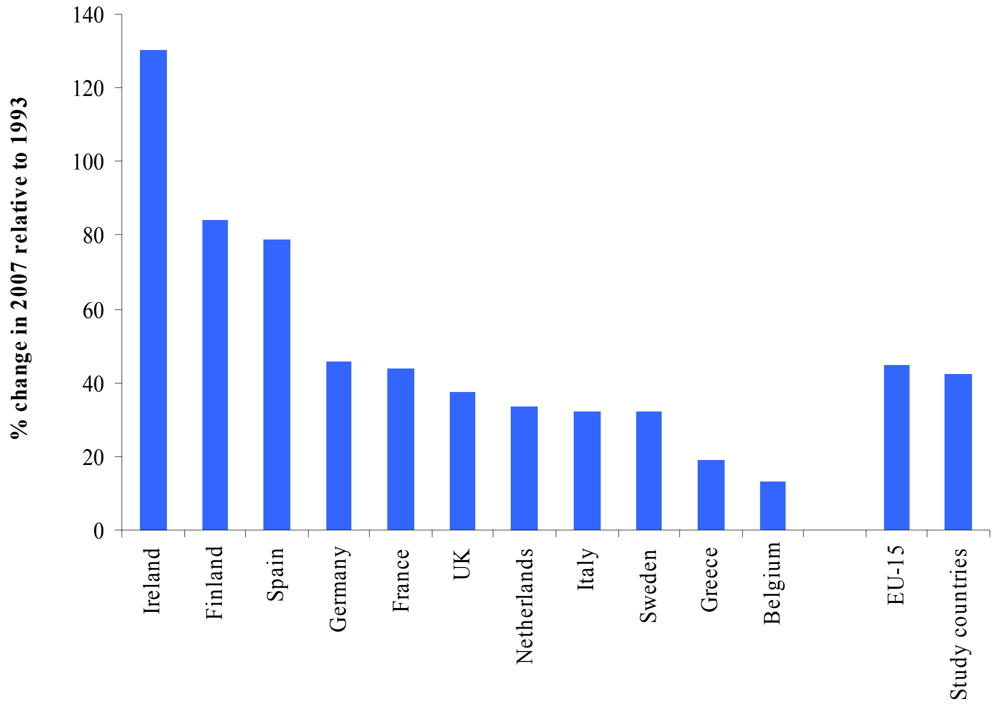
Source: Calculated from Eurostat data

Figure 15. Changes in agricultural labour productivity (output per annual work unit) in the EUSC



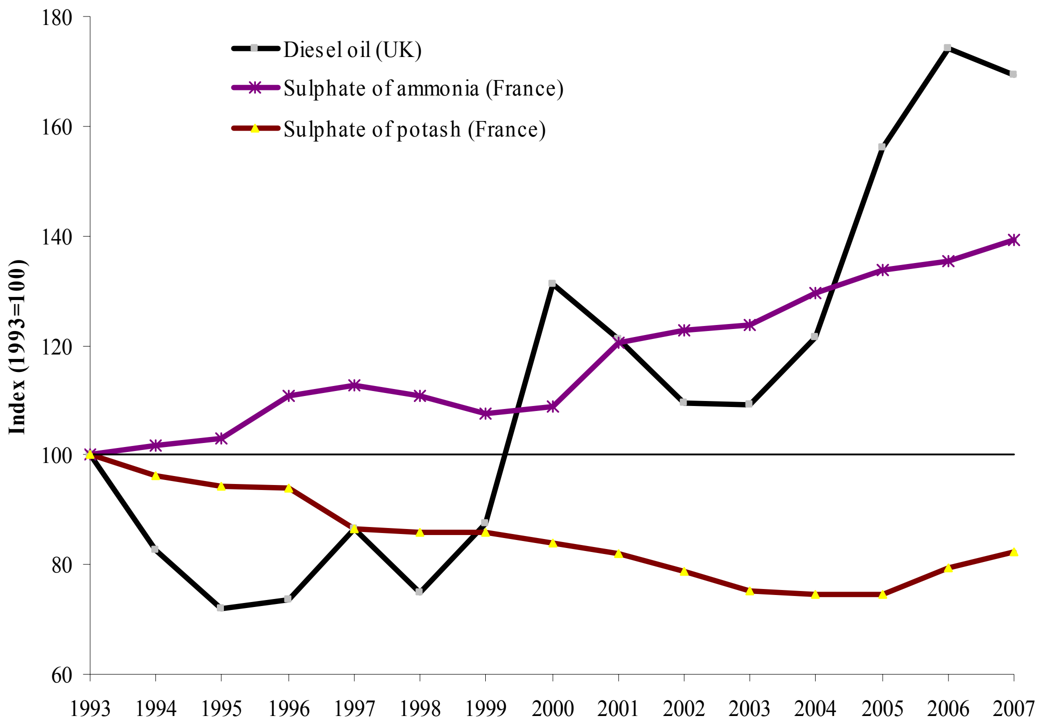
Source: Calculated from Eurostat data

Figure 16. Changes in agricultural output per annual work unit (% change in 2007 relative to 1993)



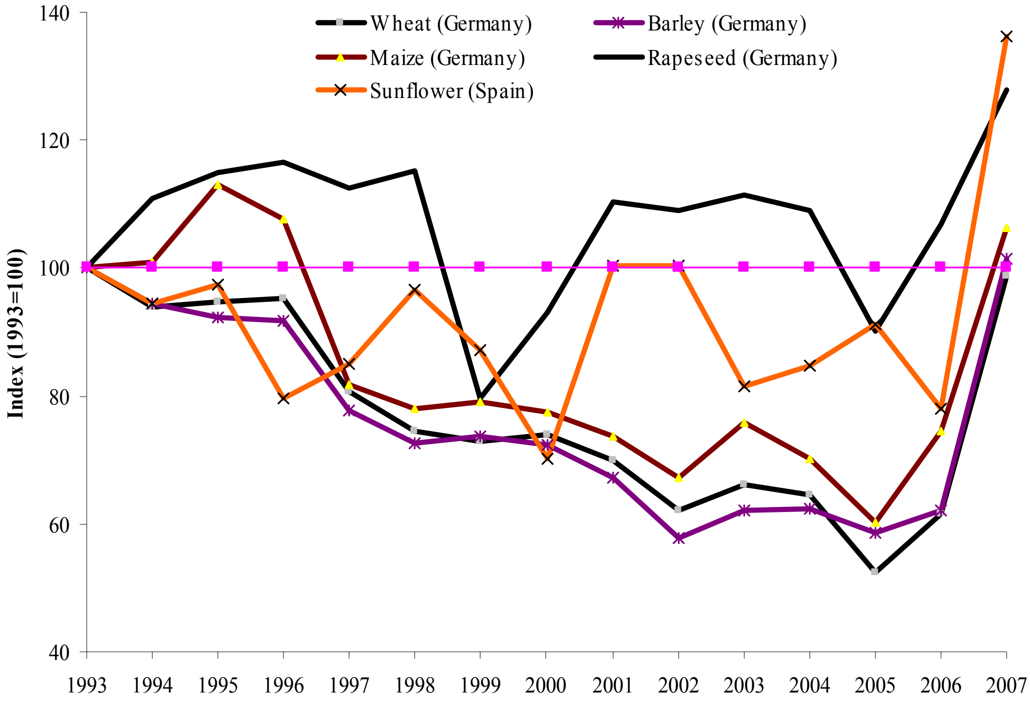
Source: Calculated from Eurostat data

Figure 17. Development of real input prices in the key EU markets (index, 2000=100)



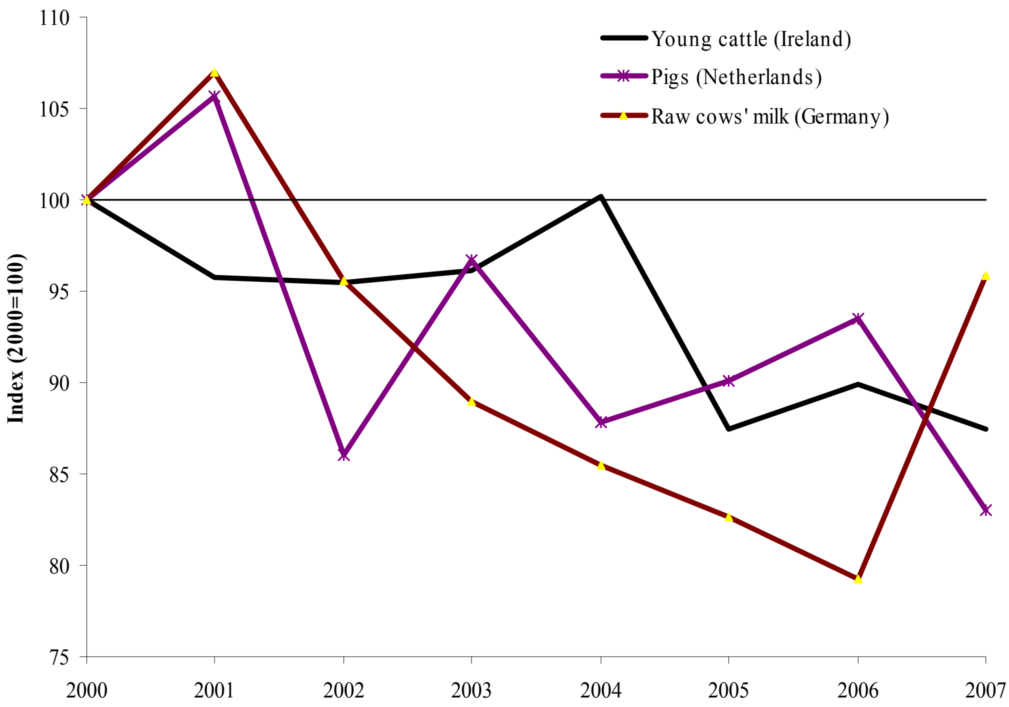
Source: Calculated from Eurostat data

Figure 18. Development of real crop prices in the key EU markets (index, 1993=100)



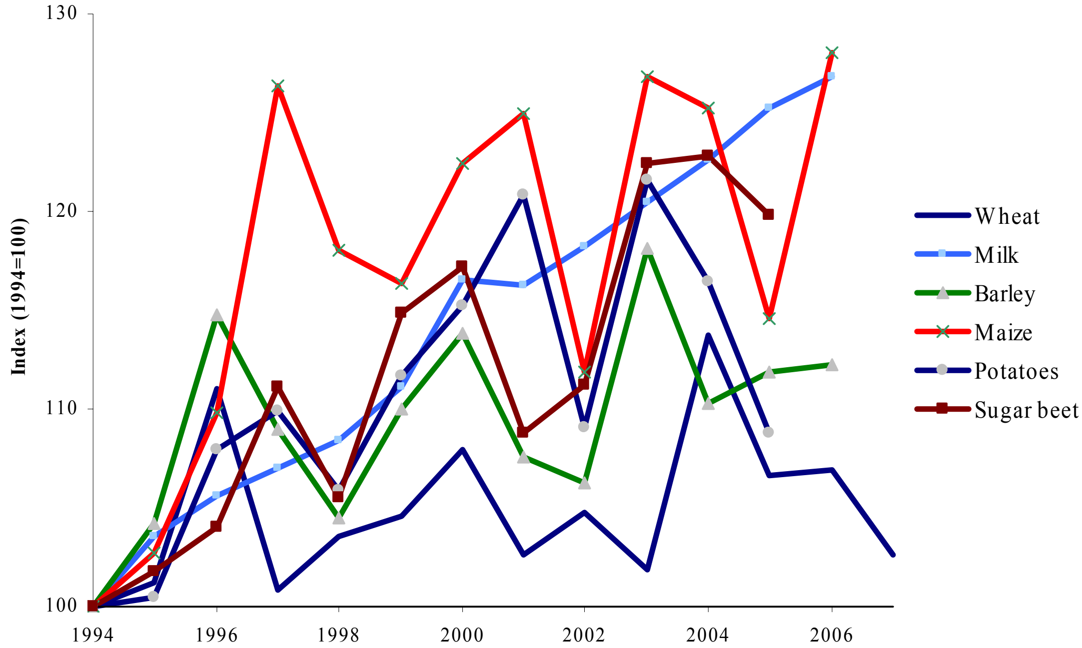
Source: Calculated from Eurostat data

Figure 19. Development of real animal prices in the key EU markets (index, 2000=100)



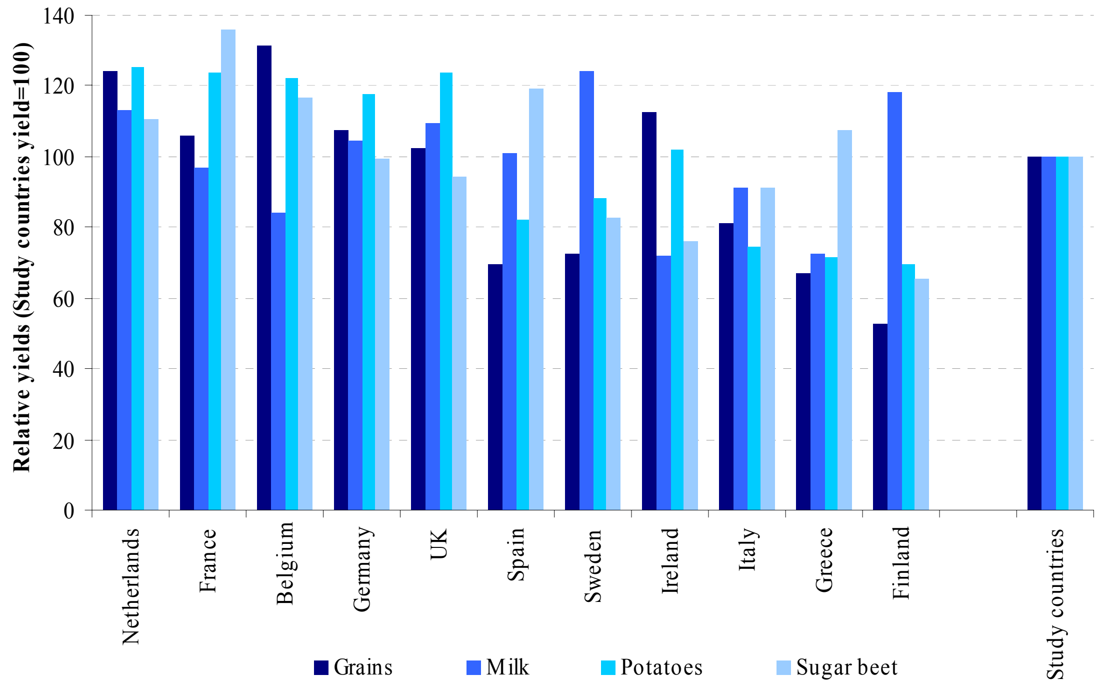
Source: Calculated from Eurostat data

Figure 20. Development of yields in the EUSC



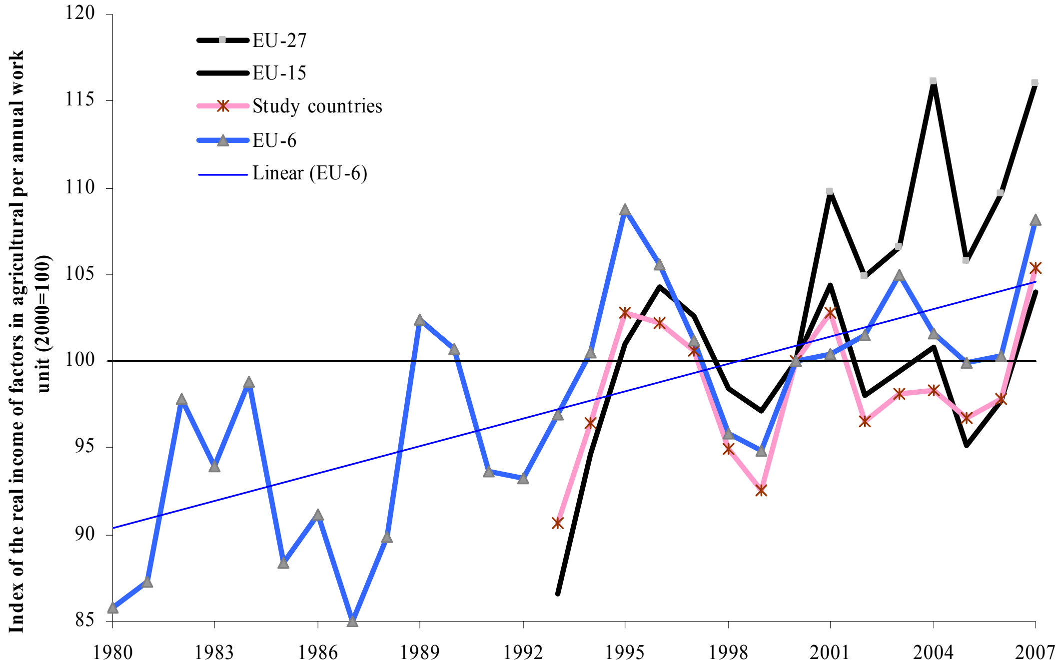
Source: Calculated from Eurostat data

Figure 21. Relative yields by country (average 2005-2006)



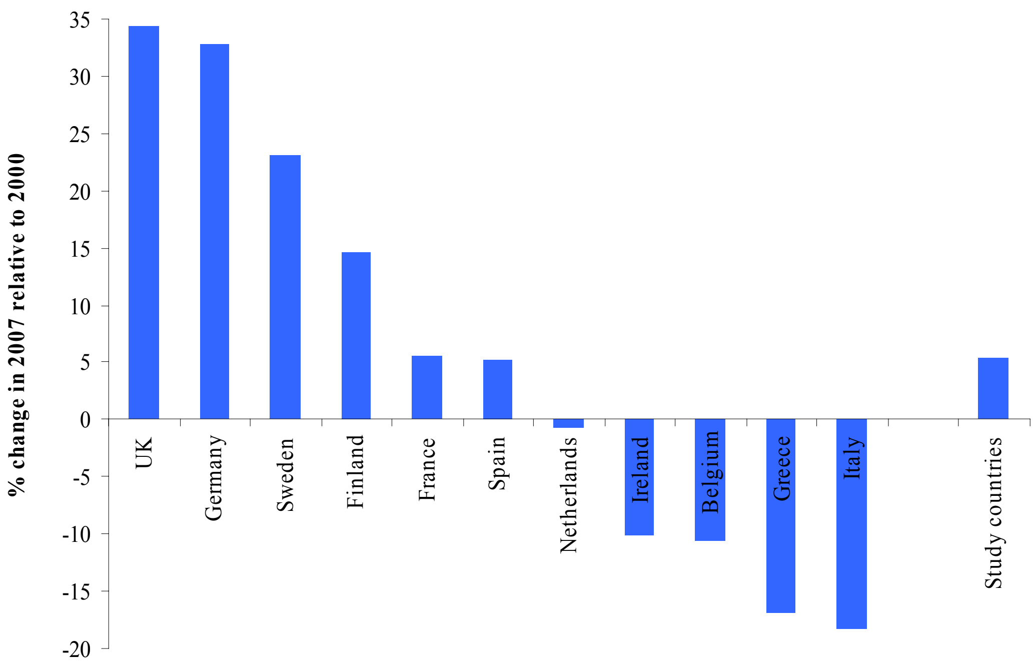
Source: Calculated from Eurostat data

Figure 22. Index of the real income of agricultural factors per annual work unit



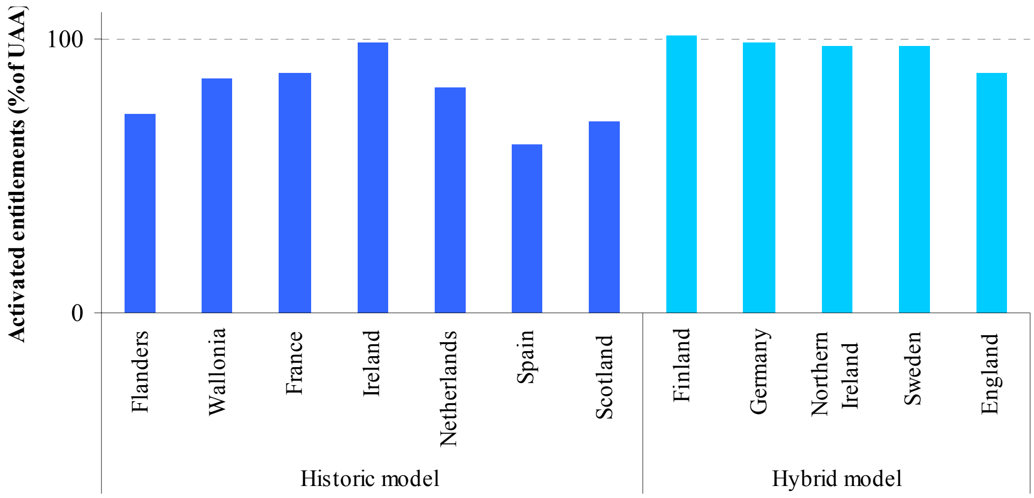
Source: Calculated from Eurostat data
Note: EU-6 includes Belgium, Finland, France, Italy, Sweden, UK

Figure 23. Change of the real income of agricultural factors per annual work unit by country



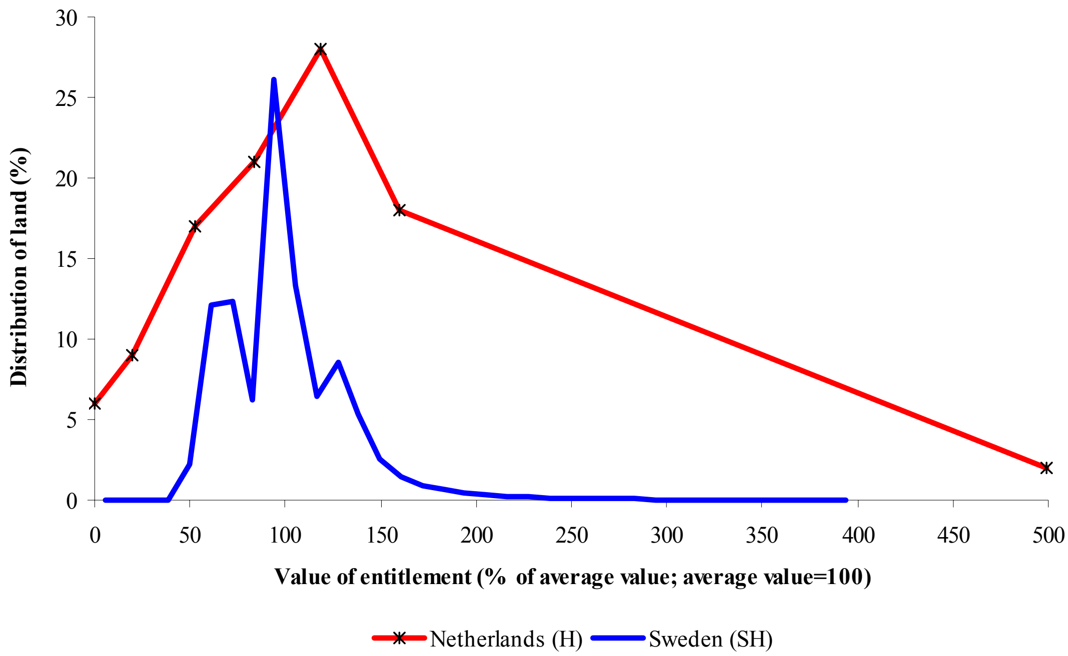
Source: Calculated from Eurostat data
Note: EU-6 includes Belgium, Finland, France, Italy, Sweden, UK

Figure 24. The share of activated entitlements on UAA (%)



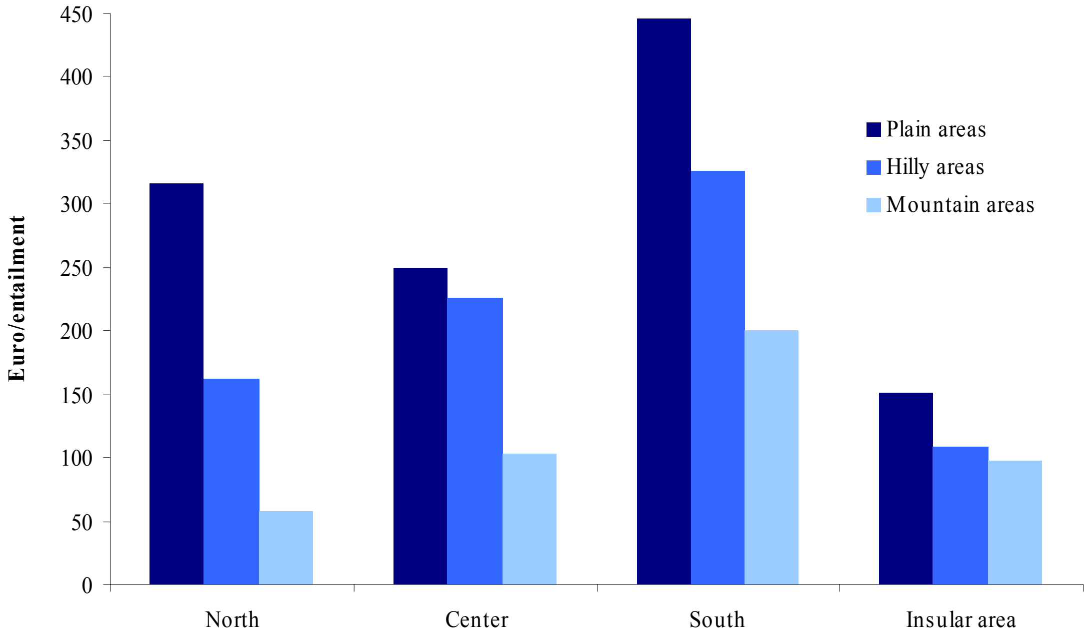
Source: Country reports. Notes: the data are for 2006 or 2007 depending on the country; see Table 13.

Figure 25. Distribution of SPS entitlements



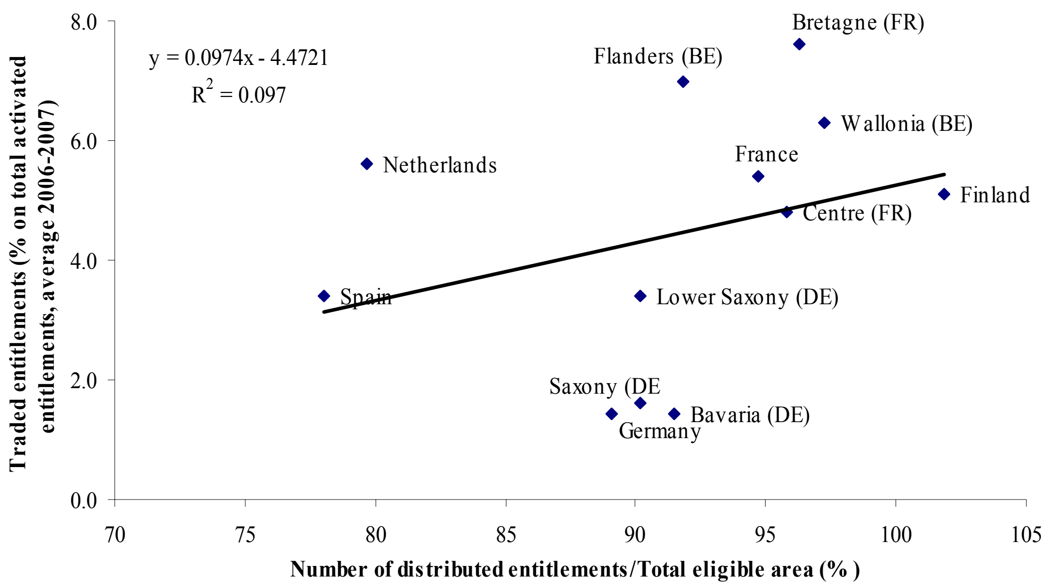
Source: Country reports.
Notes: H: Historical model; SH: Static hybrid; DH: Dynamic hybrid

Figure 26. Value of SPS entitlements by region type in Italy, 2007



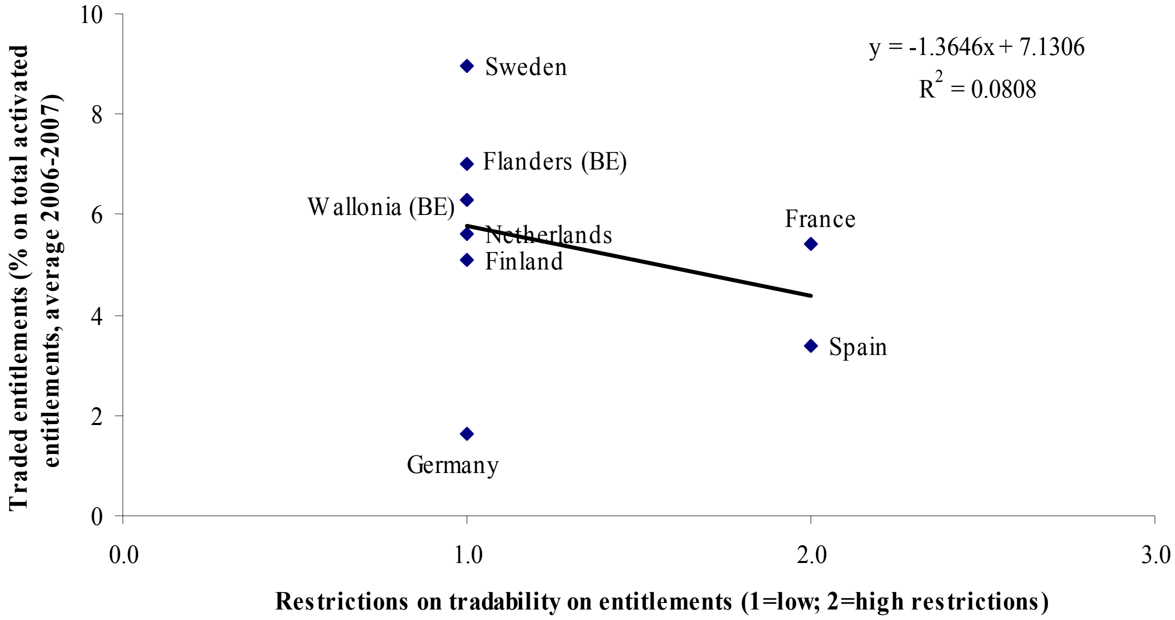
Source: Country reports.

Figure 27. Impact of "naked" land on entitlement trade in EUSC



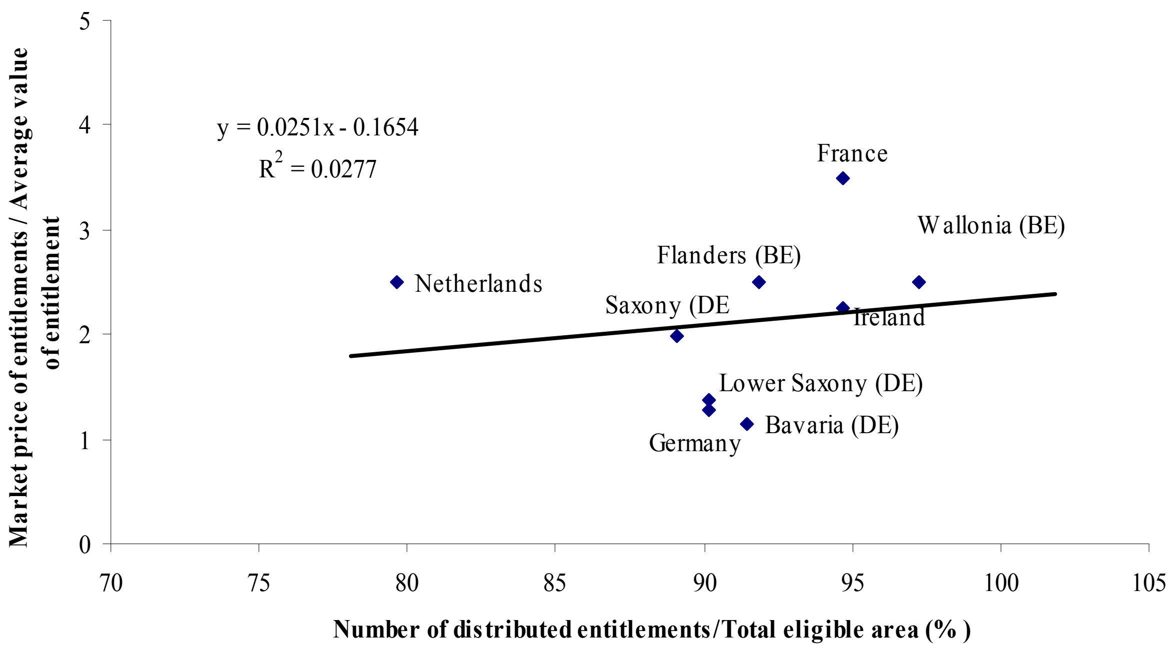
Source: Country reports.

Figure 28. Impact of entitlements' tradability restrictions on entitlement trade in EUSC



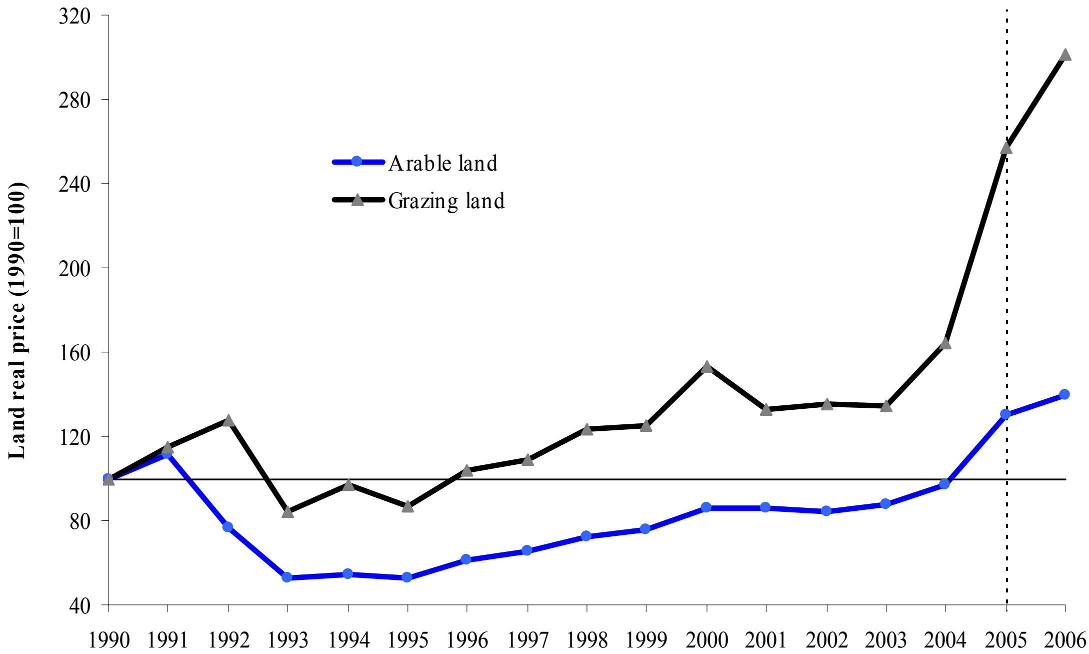
Source: Country reports.

Figure 29. Impact of "naked" land on entitlement market price in EUSC



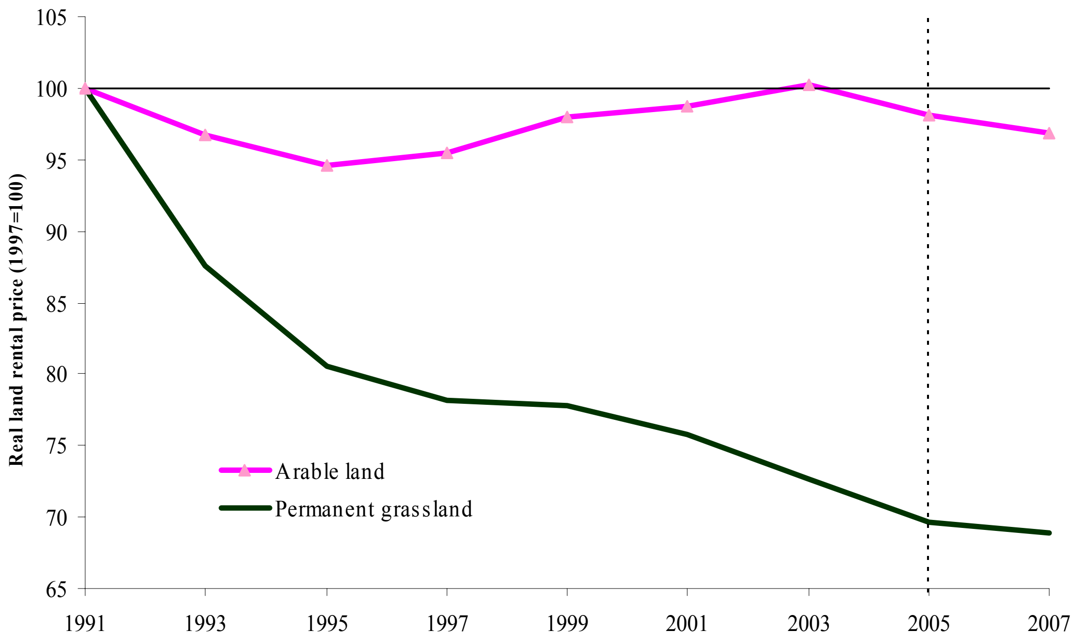
Source: Country reports.

Figure 30. Development of real land sale prices in Sweden, 1990=100



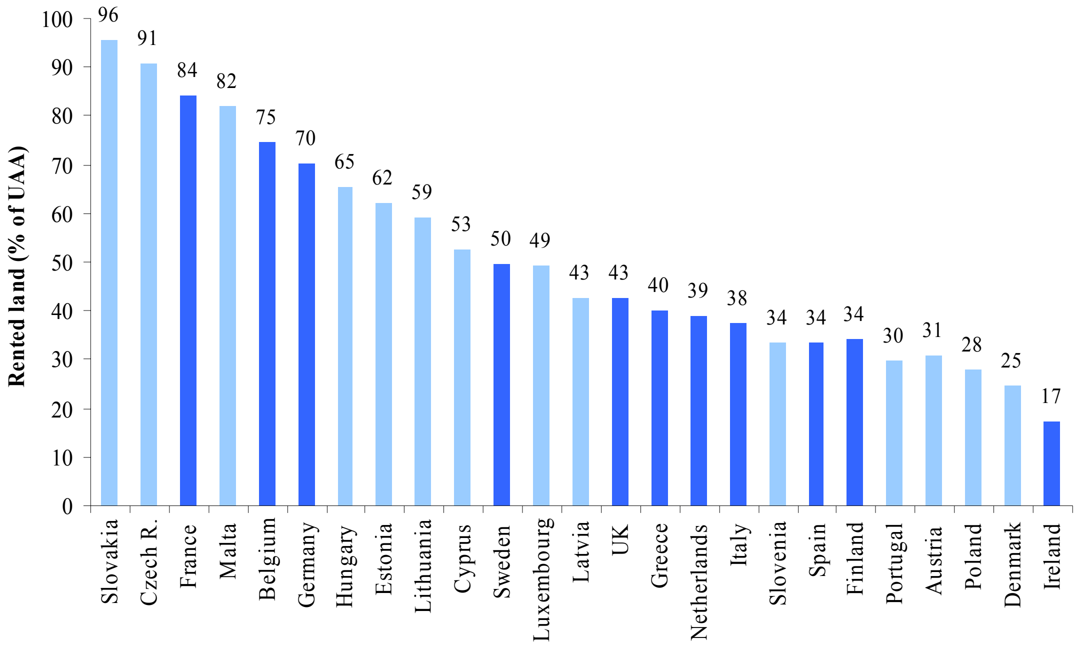
Source: Swedish country report.

Figure 31. Development of real land rental prices in Germany, 1997=100



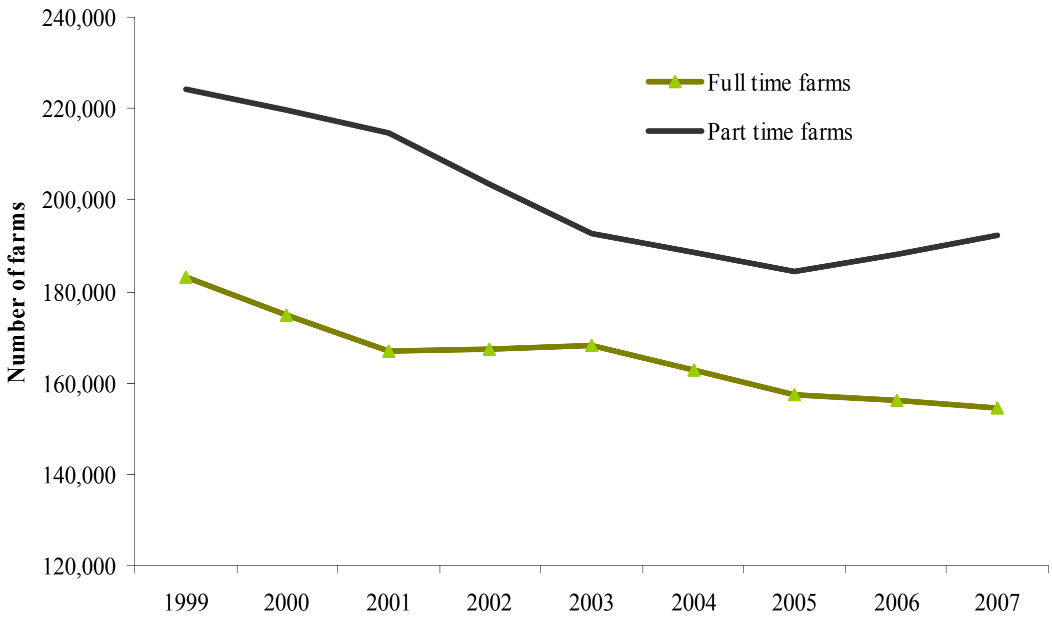
Source: German country study

Figure 32. Land renting in EU (2005).



Source: Calculated from FADN data

Figure 33. Full time and part time farmers in Germany.



Source: German Country report

12. APPENDIX 1. ADDITIONAL FIGURES AND TABLES

Table 20. Some facts about the SPS

	Historical model	Regional model	Hybrid model
Reference period	2000-2002	First year of SPS application	Mix of historical and regional model
Farm reference amounts (total SPS payments established at farm level)	Farm direct payments in the reference period	Regional amount calculated in the first year of SPS application	Mix of historical and regional model
Eligible area	Eligible area includes arable land and permanent pasture except areas under permanent crops, forests or area used for non agricultural activities.		
Activation of entitlements	SPS entitlements are activated if accompanied by and equal number of eligible hectares.		
Beneficiaries of SPS	Active farmers with historical reference (or with inherited entitlements; or entitlements from national reserve) when SPS applied by MS.	All active farmers using land in region in first year of SPS application	All active farmers using land in region in first year of SPS application
Number of entitlements	The number of hectares that generated support in the reference period.	Total eligible area in the first year of SPS application	Total eligible area in the first year of SPS application
Unit value of entitlements	Individual reference amount divided by average number of hectares in reference period (by number of entitlements)	Regional amounts divided among eligible hectares declared in region in the first year of SPS	Mix of historical and regional model
Use of eligible area	The eligible area can be used for any agricultural activity except for permanent crops, fruit and vegetables, non-starch potatoes. The 2007 reform included fruit and vegetables in the SPS from 2008; and land covered by fruit and vegetables become eligible for payment entitlements.		
Unused entitlements	Unused entitlements for a period of 3 years are reverted to the national reserve.		
Tradability of entitlements	In general entitlements are tradable but certain constraints are imposed generally in the EU as well as each MS has some flexibility to introduce additional country specific restrictions. Renting of entitlements without land is not possible.		
Set-aside entitlements	Set-aside entitlements are based on the reference period. Set-aside entitlements can be activated by putting eligible hectare into set-aside. Set-aside land may be subject to rotation and may be used for non-food production. In 2008 set-aside rate was set to 0%, i.e. any eligible area can activate the entitlement.	Set-aside obligations are spread across all arable land. The total set-aside area per region remains the same but set-aside area may differ between individual farmers.	
Special entitlements	If farmers did not have land in the reference period but received livestock direct payments they are eligible for special entitlements. The entitlements can be activated with or without equivalent number eligible hectares. Activation without land requires farmer to maintain at least 50% of the agricultural activity exercised in the reference period expressed in livestock units (LU)	-	
Dairy payments	Dairy payments can be included in the SPS from the beginning of SPS implementation but no later than 2007.		

Source: European Commission

Table 21. Reason for selecting particular SPS model

	Reason for selecting particular SPS model	Expected changes in SPS model
Belgium	To avoid redistribution of subsidies. This was mainly pressured from the farm organisations, also motivated by the fact that France and the Netherlands implement the historical model. With a flat rate most of the farmers would gain, however the ones who would loose, would loose relatively more per farm basis.	There is incentive from both farm unions and government to keep the current system as long as possible. No strong incentive to decouple remaining coupled payments due to the possible reallocation and concentration of animal production
Finland	A pure historical model was not selected in order not to constrain structural changes. On the other hand, regional model was not an optimal choice because it would lead to redistribution of subsidies, especially in the livestock sector.	Hybrid model is moving to flat rate. Some incentives to maintain coupled support especially in less productive areas in the Eastern and Northern parts of Finland.
France	To minimise the adjustment costs of farming sector and to avoid redistribution of subsidies.	There is no pressure to shift to a regional model, but rather on adjusting the current historical model. There is split between farm unions on the SPS model (Box 4).
Germany	Compromise of three factors: implementation transaction costs, adjustment costs and potential redistribution effects of subsidies	Government prefers regional model because it is simpler, easier to justify and fosters regions with a high share of permanent pasture and extensive land management. The biggest farmers union (Deutscher Bauernverband) prefers to maintain the hybrid model, because the redistribution of payments would come very much at the expense of animal producing farms. The government gives mainly signals that the payments will be moderately reduced in the medium run and phased out or drastically reduced in the long-run.
Greece	To avoid redistribution of subsidies. Greece was not prepared administratively to use a regional model.	At present, neither Greek farmers nor government are willing to change the current system. However, main farm union prefers historical model. Farmers in less productive regions prefer regional model. Government tends to favour regional model.
Ireland	To avoid redistribution of subsidies. Full decoupling was chosen to ensure a full use of support payments.	There is almost no political support for a shift to a flat rate model in Ireland. Government prefers to maintain the current payments.
Italy	To avoid redistribution of subsidies. More difficult to reform are sensitive sectors such as livestock, fruits and vegetables, grapes and olives than arable sector.	There is incentive from farms not to decouple further. In regions with more heterogeneous value of entitlements concerns exist about redistributional effects of a shift to the regional model.
Netherlands	To avoid sectoral and territorial redistribution of subsidies.	Government signals that the current historical system will evolve to a flat(ter) system in the next years.
Spain	To avoid redistribution of subsidies between farms, regions, and sectors. Regional SPS model would lead to important redistribution between regions: e.g. from irrigated lands to dry lands, from dry lands to fruit and vegetable production and hence between Andalusia to the East coast.	In general, there is no interest from both farmers and government to switch to flat rate. There is an important opposition form farmers against further reforms and against decoupling. Need to balance coupling/decoupling of subsidies and variety of crops. However, there is split among farmer unions: COAG (Spanish Coordinator of Farming Organisations) defends coupling and modulation, while other associations, such as the Young Farmers Association (ASAJA), defend a complete decoupling all sectors.
Sweden	Compromise of three factors: the preservation of grazing lands, the competitiveness of Swedish agriculture, and potential redistribution effects of subsidies.	Liberalisation and reduction.

United Kingdom	England: the National Farmers Union argued for a historical based system, whilst the Country Landowners Association wanted a hybrid model. DEFRA saw the distribution of SPS more of an economical issue and aimed for a regional SPS model. Dynamic model was chosen to smooth adjustment of farms. Scotland: There was considerable industry pressure on the government to introduce historical based system in an attempt to “minimise losers and maximise the winners”. Northern Ireland: to avoid redistribution of subsidies.	UK: There does appear to be a trend to try and further re-couple CAP support for environmental reasons. Moreover there is growing calls to re-couple support from livestock producers and farming pressure groups in some regions with declining livestock number.

Source: Country reports

Table 22. Coupled direct payments by member state

		Sectors remained coupled
Belgium	Flanders	- suckler cow premium 100 % - slaughter premium calves 100% - seeds (some species) 100%
	Wallonia	- suckler cow premium 100 % - seeds (some species) 100%
Finland		-sheep and goats payments 50% - special male bovine premium 75% - Article 69 application: (2.1% of the ceiling for arable crops, 10% of the ceiling for the bovine sector, seed (timothy seed))
France		- arable crops 25% - sheep and goat premium 50% - suckler cow premium 100% - slaughter premium calves 100% - slaughter premium bovine adults 40% - seeds (some species) - outermost regions 100% - 10 % deduction in the olive sector for the funding of working programmes established by producer organisations - hops payments 25% - olive oil coefficient for decoupling: 1 - tobacco coefficient for decoupling: 0.4
Germany		- hops payments 25 % coupled - tobacco coefficient for decoupling: 0.4
Greece		- seeds article 69 application: (10% of the ceiling for arable crops; 10% of the ceiling for the beef sector; 5% of the ceiling for the sheep and goat sector; 2% of the ceiling for tobacco; 4% of the ceiling for olive oil; 10% of the ceiling for sugar; 2% deduction in the olive oil sector for the funding of working programmes established by producer organisations (Art 110 (i) of 1782/2003 and Art. 8 of Reg. 865/2003); - tobacco and olive oil coefficient for decoupling: 1
Ireland		None
Italy		- seeds 100% article 69 for quality production: (= 8% of the ceiling for the arable sector; 7% of the ceiling for the bovine sector; 5% of the ceiling for the sheep and goat sector; 8% of the ceiling for sugar) - 5% deduction in the olive oil sector for the funding of working programmes established by producer organisations (Art 110 (i) of 1782/2003 and Art. 8 of Reg. 865/2003) - olive oil coefficient for decoupling is increased to: 1 - tobacco coefficient for decoupling: 0.4 - for the region Puglia the decoupling coefficient for tobacco is 100%
Netherlands		- slaughter premium calves 100% - slaughter premium bovine adults 100% - seeds for fibre flax 100%
Spain		- seeds 100% - arable crops 25% - sheep and goat premiums 50% - suckler cow premium 100% - slaughter premium calves 100% - slaughter premium bovine adults 40% - Article 69 application: (7% of the ceiling for the bovine sector; 10% of the ceiling for dairy payments; 5% of the ceiling for the tobacco sector; 10% of the ceiling for the cotton sector; 10% of the ceiling for sugar) - outermost regions 100% - tobacco coefficient for decoupling: 0.4 - olive oil coefficient for decoupling: 0.936
Sweden		- Special male bovine premium 74.55% - Article 69 application (0.45% of total ceiling)
United Kingdom	England	None
	Scotland	Article 69 application (10% of the ceiling for the bovine sector)
	Wales	None
	Northern Ireland	None

Source: European Commission (2007a).

Table 23. Activated and un-activated entitlements and average value of entitlements in study regions

	Type of transaction	Percentage transferred entitlements on total activated entitlements		Average market price of entitlements	Market price of entitlements / Average value of entitlement
		2006	2007	Euro/entitlement	Average value of entitlement=1
France					
Centre		na	4.8	na	na
Bretagne	All		7.6		
Germany					
Saxonian Loess Area (Saxony)	Market		1.4	700	2.0
Weser Ems (Lower Saxony)	Market		3.4	475	1.4
South East Upper Bavaria (Bavaria)	Market		1.4	400	1.1
Italy					
Emilia Romagna					1.5-2
Puglia					1-2.5
Spain					
Andalucía					
Aragon					
United Kingdom					
England	Market		Small		0.8-1.5
Scotland	Market				2.4
Northern Ireland	All		0.1		

Source: Country reports

Notes: * UAA is for latest available year; France: set-aside entitlements were excluded when calculating the average value of entitlements

Table 24. Land sales market in Germany in 2006

	Germany	West Germany	East Germany
Average price for UAA (EUR/ha)	8.909	15.941	4.040
Total transacted area (1000 ha)	98.63	39.79	57.48
Total number of land sale transactions (1000)	38.4	26.37	12.01
Average plot size transacted (ha)	2.53	1.51	4.79

Source: STATISTISCHES BUNDESAMT (2008).

Table 25. Land price (LP) EUR /ha, land rent (LR) EUR /ha and discount rate δ in Finland 1990 to 2007

	LP	LR	δ
1990	6,357	105	0.017
1991	5,327	94	0.018
1992	3,300	95	0.029
1993	2,499	107	0.043
1994	2,739	125	0.046
1995	3,011	132	0.044
1996	2,709	125	0.046
1997	2,820	132	0.047
1998	3,122	132	0.042
1999	3,426	140	0.041
2000	3,933	137	0.035
2001	4,039	139	0.034
2002	4,246	141	0.033
2003	4,700	150	0.032
2004	5,197	151	0.029
2005	5,377	152	0.028
2006	5,979	156	0.026
2007	6,250	160	0.026

Country report Finland (2008).

Table 26. Index of agricultural rents in Greece

	1996	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Rents	87.2	91.0	92.5	93.3	100	103.2	108.3	113.8	117.2	116.8	113.9	115.3

Source: NSSG

Table 27. Market value and rents of agricultural land in Greece (EUR /Ha)

	Market value of agricultural land (parcels)										
	1996	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Irrigated land	11 339	11 852	12 147	12 163	11 870	11 930	12 050	11 950	11 420	12 600	12 100
Non-irrigated land	4 505	4 660	4 777	4 896	5 010	5 040	5 080	5 000	4 800	4 930	4 950
	Rents for agricultural land										
Arable land	389	407	413	417	441	455	477	502	517	515	502

Source: Eurostat

Table 28. Prices of agricultural land by location in Italy (000 EUR, year 2006)

	Altimetric area					Total
	Mountain Interior	Mountain Litoral	Hill Interior	Hill Litoral	Plain	
North-west	5,6	14,4	18,4	37,2	32,7	22,1
North-east	18,5	-	27,1	25,1	35,7	29,7
Center	7,1	11,6	10,8	16,4	20,0	11,8
South	6,5	10,5	10,3	15,5	14,3	11,1
Isles	5,8	9,4	7,3	9,3	12,5	8,4
Totale	**8,8**	**10,2**	**11,9**	**13,8**	**26,8**	**15,9**

Country report Italy (2008)

Table 29. Main drivers of sales markets in Italy reported by INEA (2006)*

DRIVERS	VALLE D'AOSTA	PIEMONTE	LOMBARDIA	LIGURIA	VENETO	FRIULI VENEZIA GIULIA	TRENTINO ALTO ADIGE	EMILIA ROMAGNA	TOSCANA	UMBRIA	MARCHE	LAZIO	ABRUZZO	MOLISE	CAMPANIA	PUGLIA	BASILICATA	CALABRIA	SARDEGNA	SICILIA
Agricultural commodity prices	=	=			-		+	+	+		+					+	-			-
Agricultural productivity	=	-		=			+	=		-/+	=					-	-			=
SPS		-	=	=	=	-	=	+/=	-		-	-	-	+	-		-	-	-	-
Coupled subsidies								=								+				
Rural development polices	+			+		+	+	=	+		+		+	+	+/-		+	=	=	+
Other subsidies		+				-		=							+					+
Taxes								=								-				
Land sale regulations								=												
Informal institutions								=												
Farm size		+						+						+		+				
Bio-energy								=												
Urban pressures								+				+		+	+					
Infrastructural expansion		+			+		+	+						+			+		+	
Interest rate								=												
Inflation					+			=												
Other factors	+	+			+	+			+	+	+							+	+	

* += increases land price; - = decreases land price; = does not change land price

Table 30. Main drivers of land rental markets in Italy reported by INEA (2006)

DRIVERS	VALLE D'AOSTA	PIEMONTE	LOMBARDIA	LIGURIA	VENETO	FRIULI VENEZIA GIULIA	TRENTINO ALTO ADIGE	EMILIA ROMAGNA	TOSCANA	UMBRIA	MARCHE	LAZIO	ABRUZZO	MOLISE	CAMPANIA	PUGLIA	BASILICATA	CALABRIA	SARDEGNA	SICILIA
Agricultural commodity prices	=	+	+	+	+	+	+	+	+	+	+	+	+	+	+					+
Agricultural productivity							+												+	
SPS		+	+	+	+	+	-	+	+		+	+		+	+	+	+	+	+	
Coupled subsidies		+				+	+	+			+							+		
Rural development polices		+		+		+						+	+		+	+	+	+		
Other subsidies	+					+	=		=		+									
Taxes																				
Rent Land regulations																				
Informal institutions																				
Farm size			+			+	+	+		+	+					+			+	
Bio-energy												+								
Urban pressures		+										+			+					
Infrastructural expansion														+			+			
Interest rate																				
Inflation																				
Other factors																				

* += increases rental price; - = decreases rental price; = does not change rental price

Table 31. Effects of SPS on sales markets in Italy according to INEA regional reports (2006)*

EFFECTS	VALLE D'AOSTA	PIEMONTE	LOMBARDIA	LIGURIA	VENETO	FRIULI VENEZIA GIULIA	TRENTINO ALTO ADIGE	EMILIA ROMAGNA	TOSCANA	UMBRIA	MARCHE	LAZIO	ABRUZZO	MOLISE	CAMPANIA	PUGLIA	BASILICATA	CALABRIA	SARDEGNA	SICILIA
Land price	=	=	+/-	+/-	=		+	+/-	+	-/+		+/=		+			+	+		=
Number of transactions	+	+		=	-		+	=		+	=	+	=/+	+	=/-	=	=/-	=	=	-
Supplier	+	+					+		+	+	+	+	+	+		+	+			+
Land supplied		+					=		+		+	+	+	+		+	+			+
Buyers		+	=				+							+						-
Land sought		=	=				+	+						+						-
Link land/entitlements		+	=		=		-							+	=/+			+		+
Formalisation																				
Conflicts																				
Crop productions		-					=		=											-
Land use		=					=	=												+

* += increases land price; - = decreases land price; = does not change land price

Table 32. Effects of SPS on land rental markets in Italy according to INEA regional reports (2006)

EFFECTS	VALLE D'AOSTA	PIEMONTE	LOMBARDIA	LIGURIA	VENETO	FRIULI VENEZIA GIULIA	TRENTINO ALTO ADIGE	EMILIA ROMAGNA	TOSCANA	UMBRIA	MARCHE	LAZIO	ABRUZZO	MOLISE	CAMPANIA	PUGLIA	BASILICATA	CALABRIA	SARDEGNA	SICILIA
Rental price	+	+	+	+	+	+	+	=	+	=	-	+	-	+	+	=	+	+	+	-
Number of transactions	=	+	+	=	+	+	=		+	=		+	-	=	=	=	=	+	+	-
Supplier (for rental contracts)	=		=		=	+			-	=	+	+	=						=	
Rental land supplied	=	-		+	=	=	=	=	-	=	+					=		+	=	-
Tenant	=	+	+		+		+		+	+		+	-						+	-
Rental land sought	=	+		+	+	+	+	=	+	+	+	+			+	+		+		-
Link land/entitlements																				
Formalisation	+	+	+	+	+	+	+	+	+	+	+	+	=	+		+	+	=/+	+	+
Conflicts																				
Crop productions	=	=					+		=					+						=
Land use	=	+			=		=		+											-

* += increases rental price; - = decreases rental price; = does not change rental price

Table 33. Regional distribution of land prices per group of agricultural areas in Netherlands

Region	Median price for agricultural land				
	1993	2000	2003	2007	change 1993-2007
IJsselmeerpolders	1.58	2.48	4.9	4.45	182%
Westelijk Holland	1.94	4.14	5	5.41	179%
Zuidwestelijk Akkerbouwgebied	1.27	3.25	3.17	3.45	172%
Centraal Veehouderijgebied	1.95	3.85	4.07	4.47	129%
Rivierengebied	1.93	4.57	4.44	4.38	127%
Veenkoloniën en Oldambt	1.01	2.54	2.3	2.25	123%
Bouwhoek en Hogeland	1.25	3.37	2.26	2.72	118%
Waterland en Droogmakerijen	1.24	3.05	2.1	2.61	110%
Noordelijk Weidegebied	1.25	2.93	2.33	2.54	103%
Zuidwest-Brabant	2.04	4.49	4	4	96%
Hollands/Utrechts Weidegebied	1.81	3.75	3.36	3.5	93%
Zuidelijk Veehouderijgebied	2.31	4.08	3.86	4.14	79%
Zuid-Limburg	2.07	3.84	3.8	3.61	74%
Oostelijk Veehouderijgebied	2.21	3.74	3.4	3.4	54%

Source: Kadaster

Table 34. Agricultural land sale prices in Sweden 2005 and 2006, EUR/ hectare.

	2005	*2006*
Agricultural land (arable and grazing land)	3350	3706
Arable land	3868	4247
Grazing land	1616	1934

Source: Statistics Sweden (2008) and the Swedish Board of Agriculture (2008)

Table 35. Share of rented land in total utilised agricultural area in Sweden

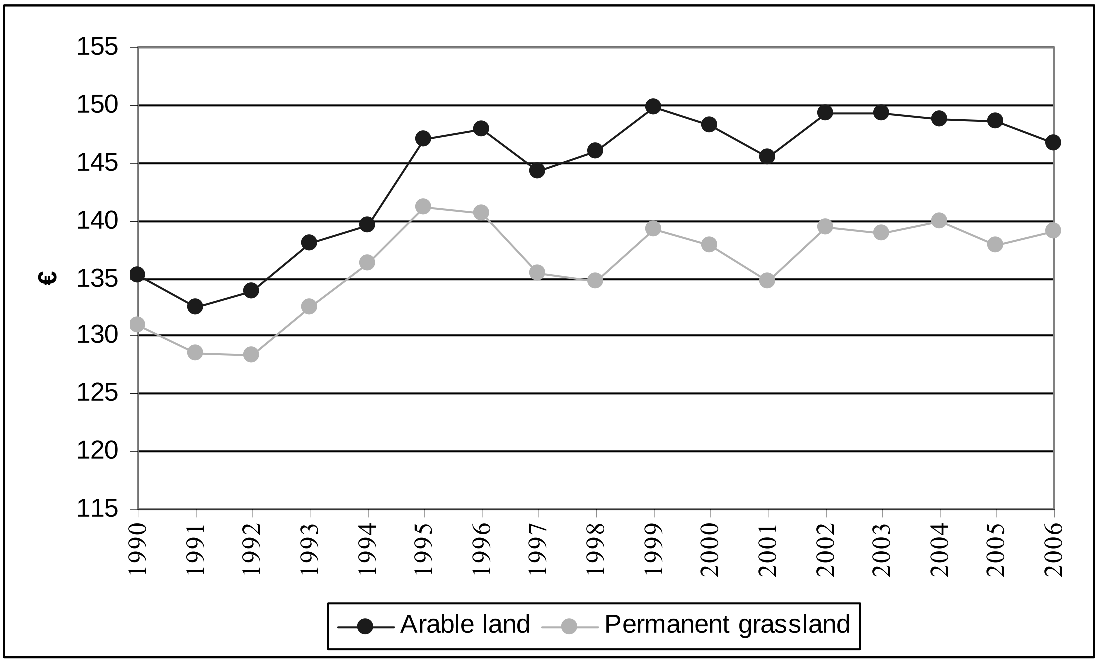
1 990	**1 995**	**1 999**	**2003**	**2005**
43%	45%	46%	45%	40%

Source: Statistics Sweden (2008) and the Swedish Board of Agriculture (2008)

Table 36. Increase in English land values between 2004 and 2007

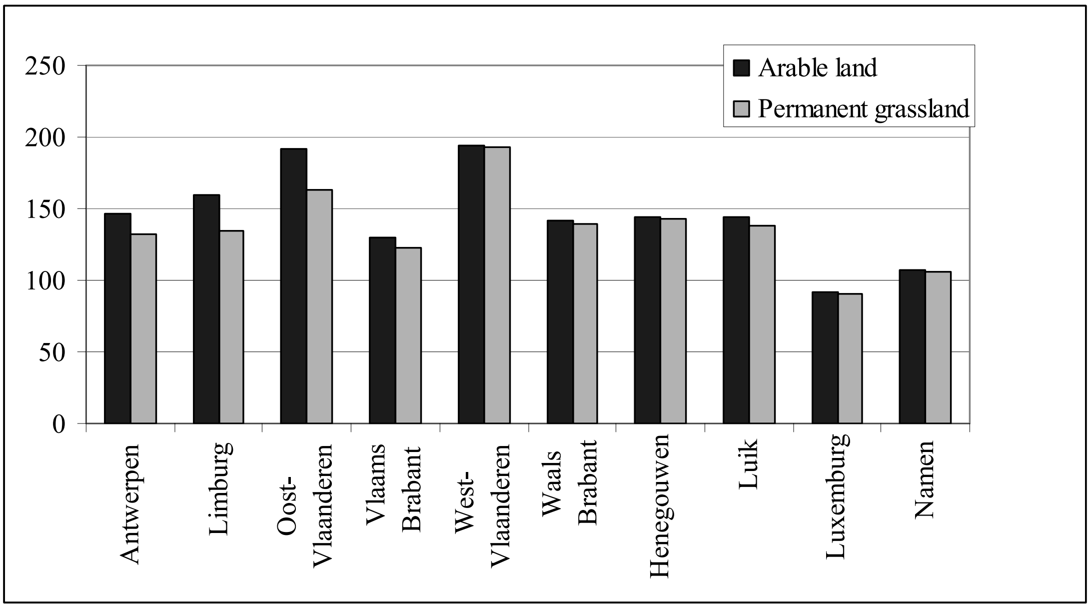
Prime Arable	91%
Average Arable	97%
Average Livestock	104%
Prime Dairy	82%
Poor Arable	117%
Poor Livestock	127%
All Land Types	95%

Figure 34. The reported real rental prices of arable land and permanent grassland in Belgium



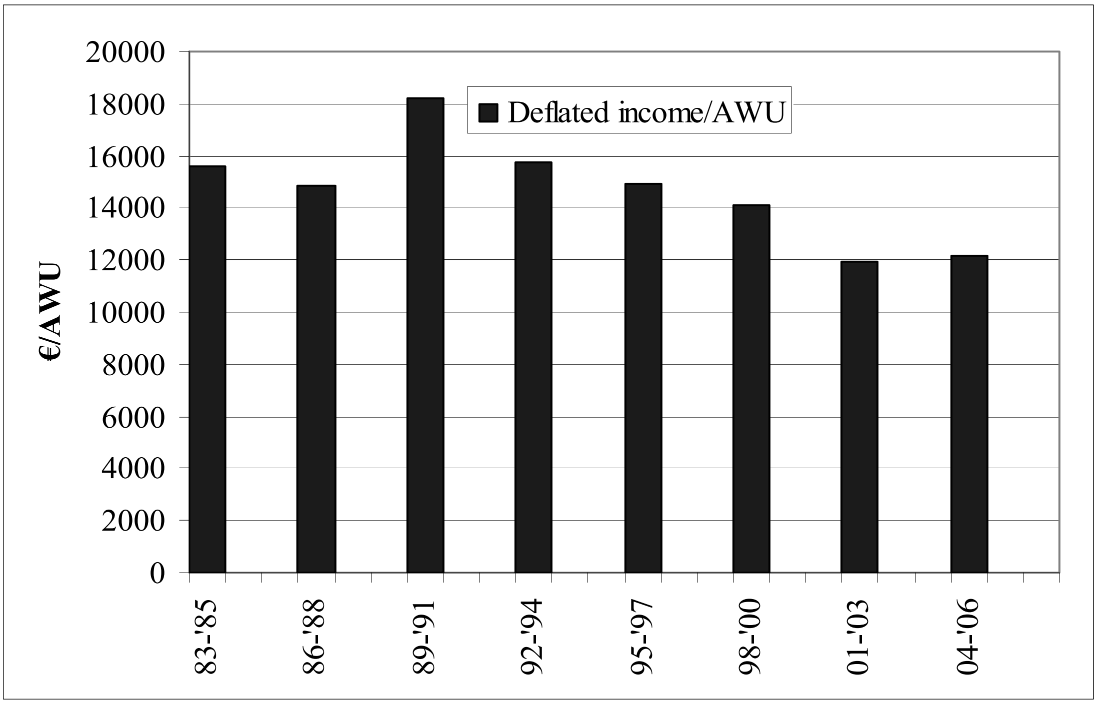
Source: "FOD Economie, KMO, Middenstand en Energie" (2008).

Figure 35. Regional differences in the rental prices in 2006 in Belgium



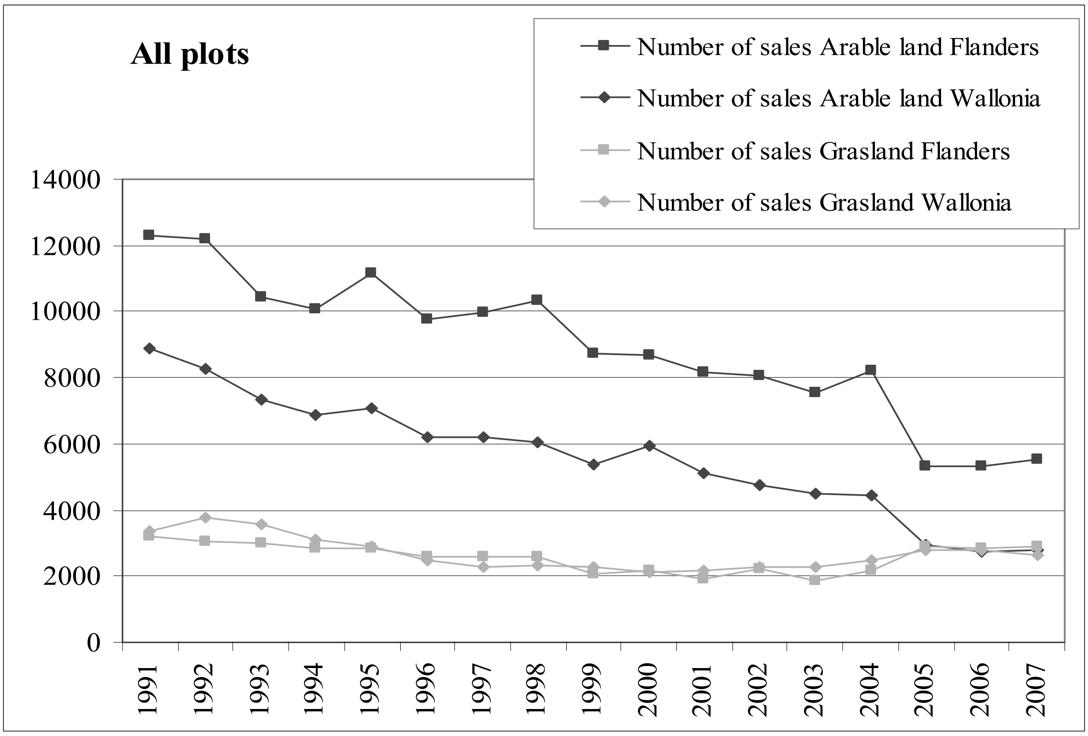
Source: "FOD Economie, KMO, Middenstand en Energie" (2008).

Figure 36. Evolution of the deflated entrepreneurial income/ AWU in Belgium



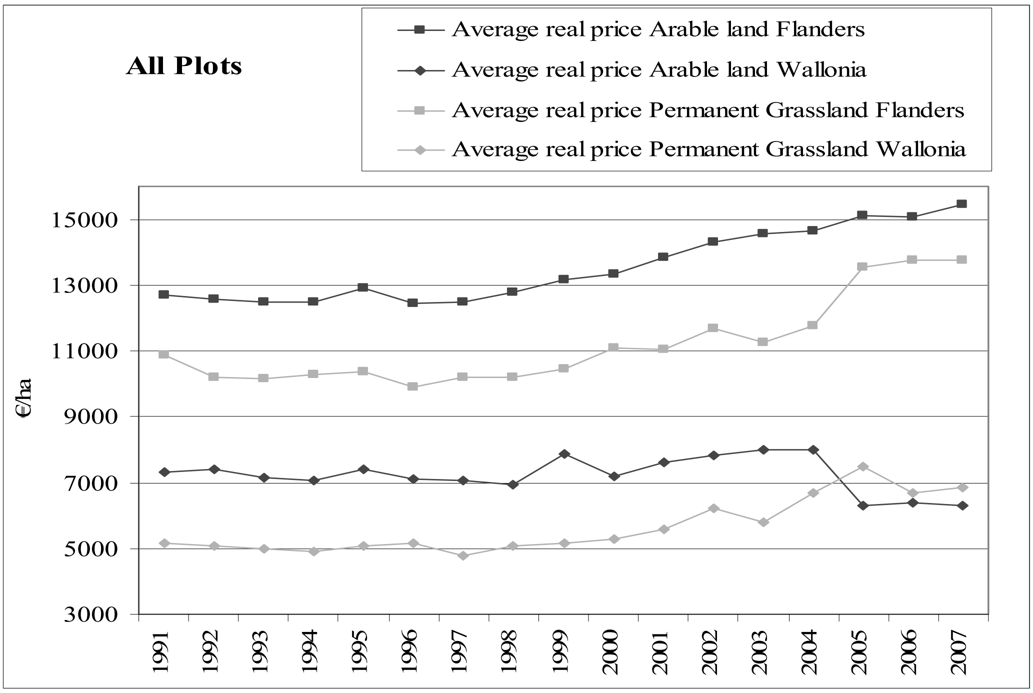
Source: Eorostat (2008)

Figure 37. The evolution of the number of sales in Belgium



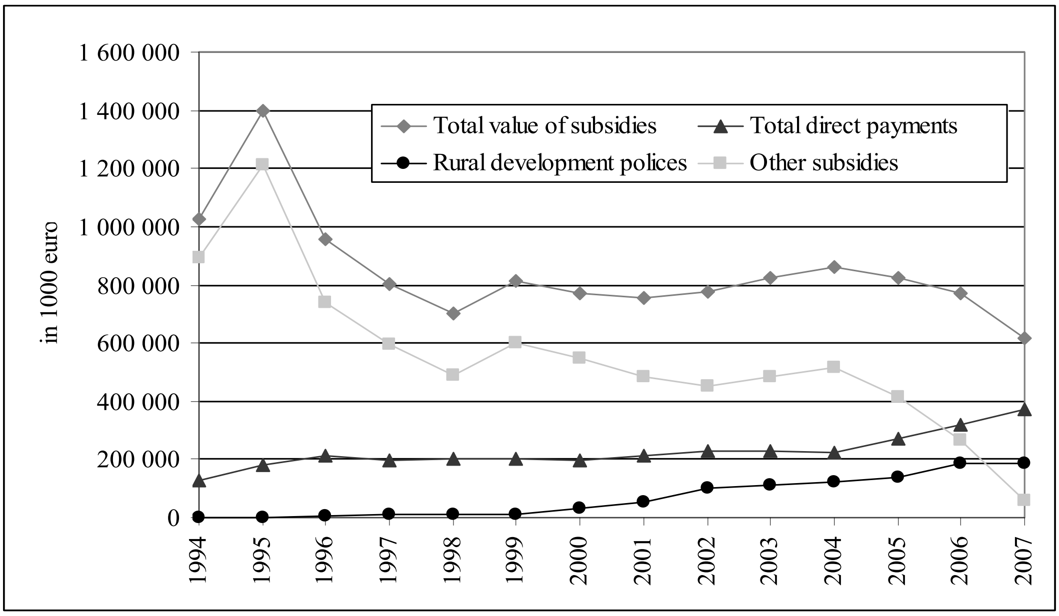
Source: Stadim (2008)

Figure 38. The average real price of arable land and permanent grassland in Flanders and Wallonia: all plots



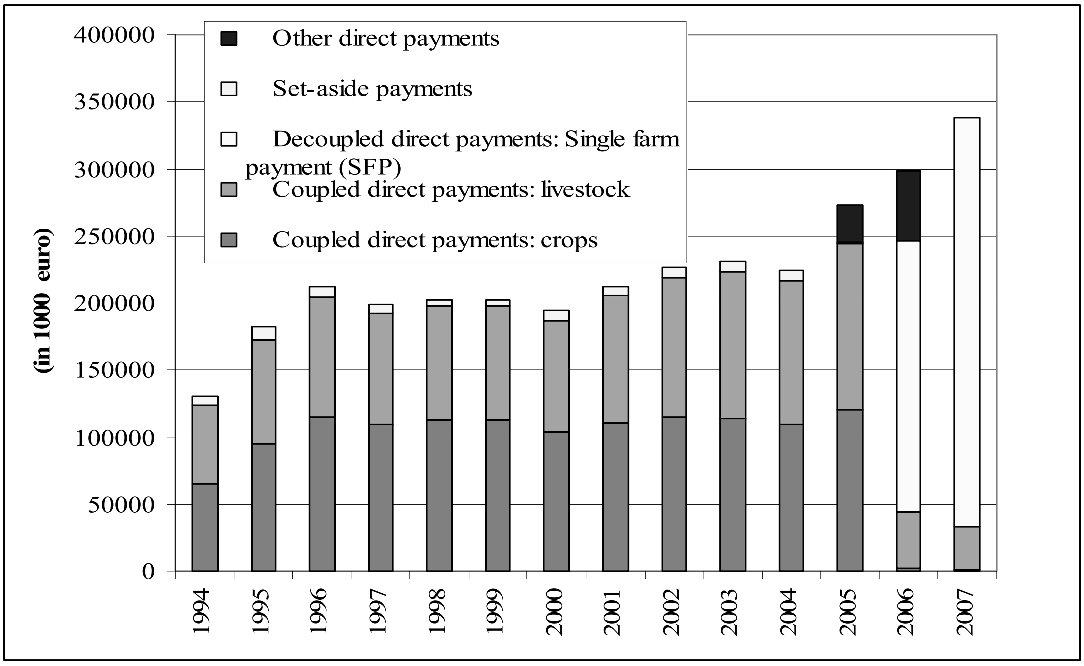
Source: Stadim (2008)

Figure 39. Evolution of the main components of agricultural support in Belgium



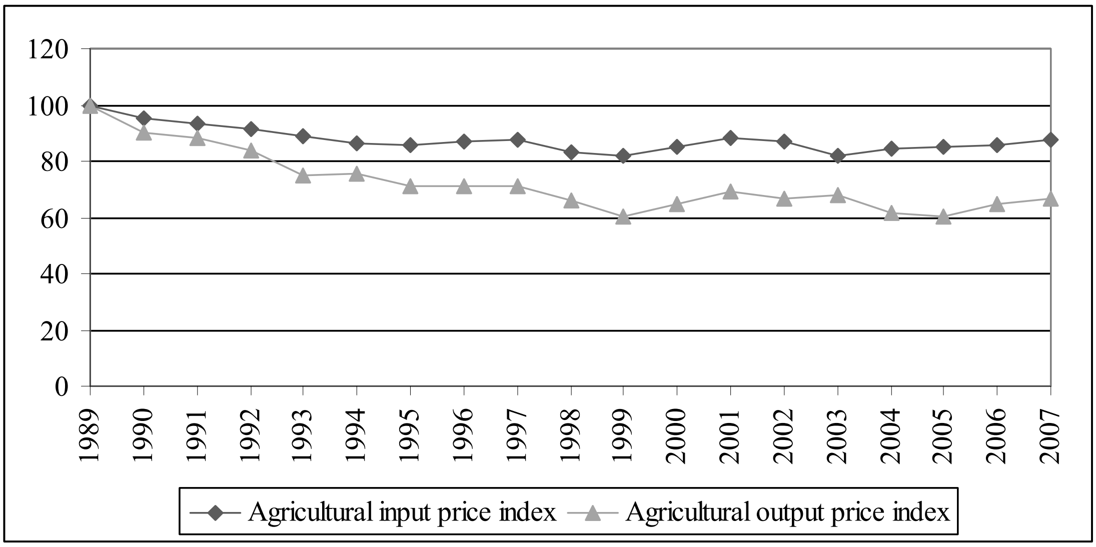
Source: Own calculations based on data from "FOD Economie, KMO, Middenstand en Energie", Flemish Community and Walloon Community (2008).

Figure 40. Evolution of relative subsidy shares in Belgium 1994-2007



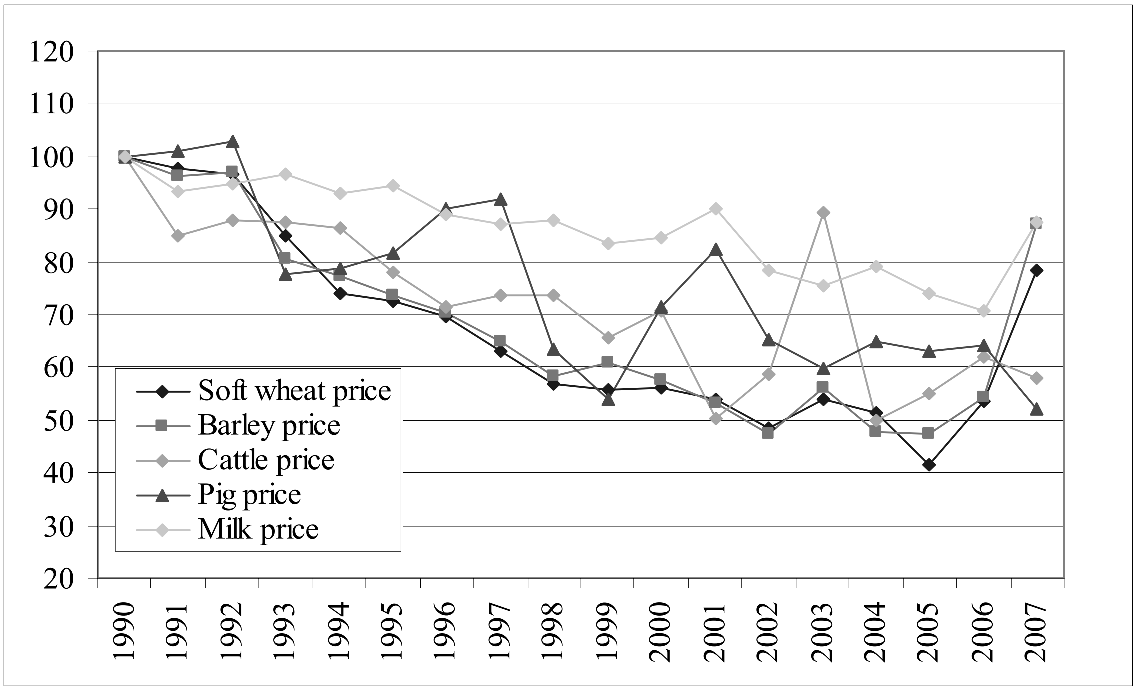
Source: Own calculations based on data from “FOD Economie, KMO, Middenstand en Energie (2008).

Figure 41. The evolution of the real input and output prices in Belgium



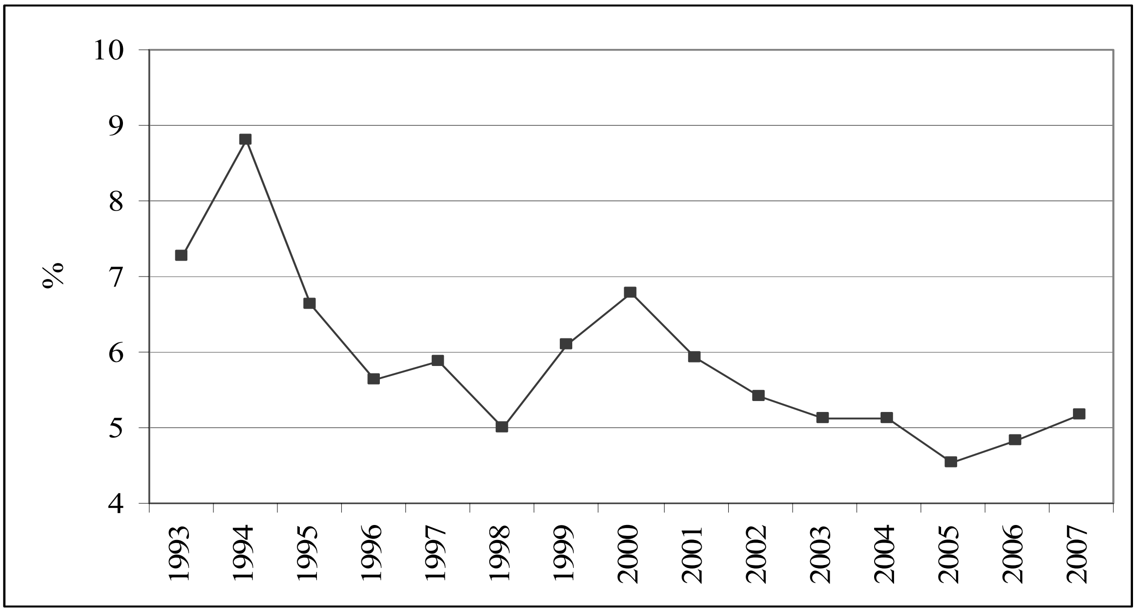
Source: “FOD Economie, KMO, Middenstand en Energie (2008).

Figure 42. The evolution of prices for key agricultural products in Belgium (1990 = 100)



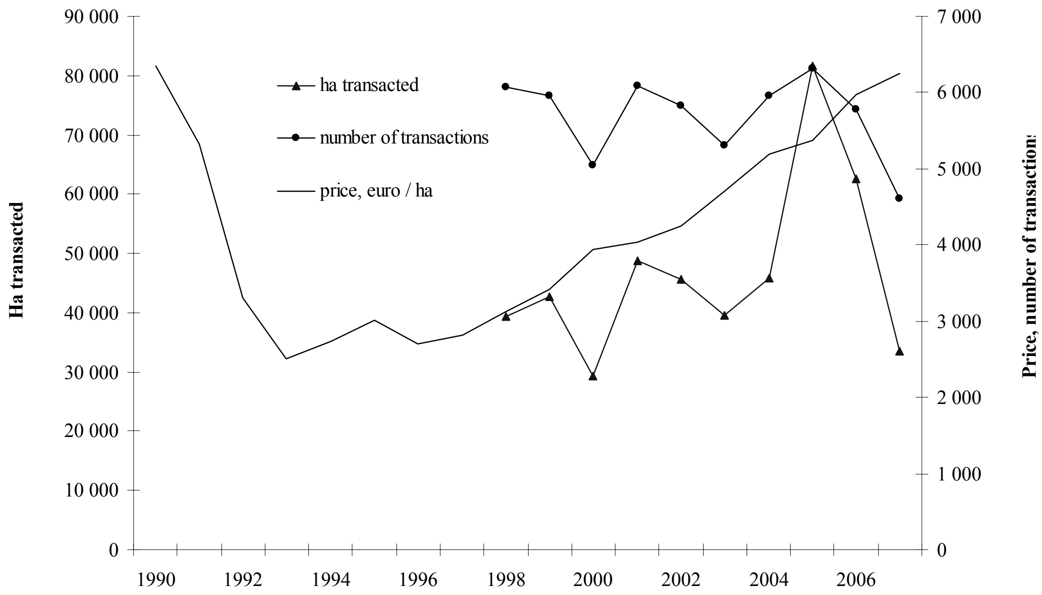
Source: Eurostat (2008).

Figure 43. The evolution of interest rate for land purchases in Belgium



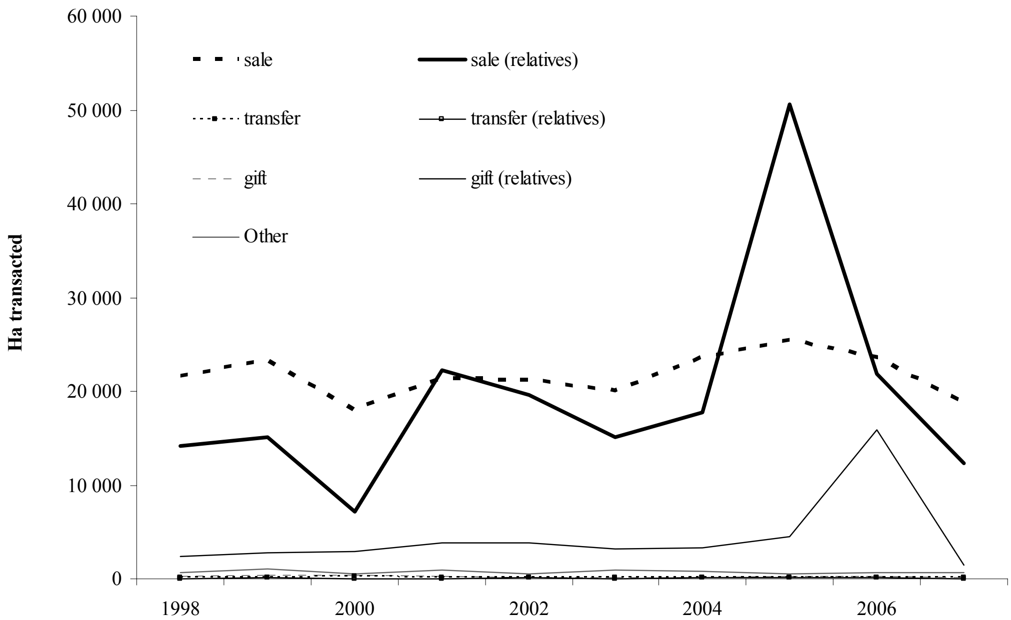
Source: National Bank of Belgium (2008).

Figure 44. Nominal land price, the number of transactions and transacted area in Finland 1990-2007



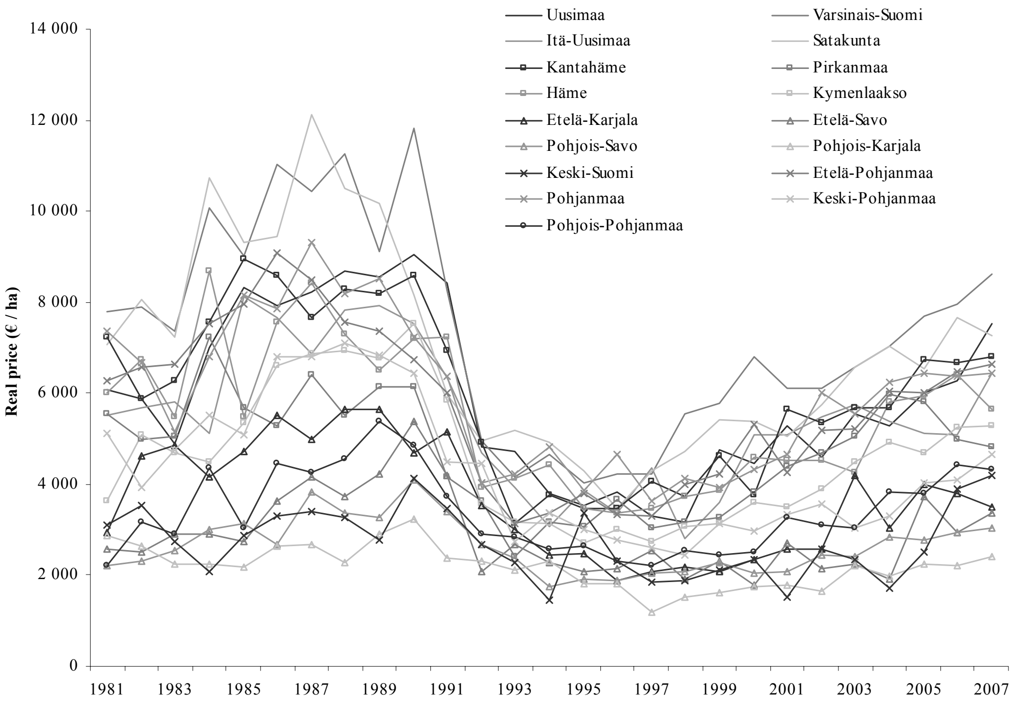
Source: National Land Survey (2008).

Figure 45. Transacted hectares by transfer class (Sale, Transfer and Gift) and relation of the parties (relatives/others) in Finland



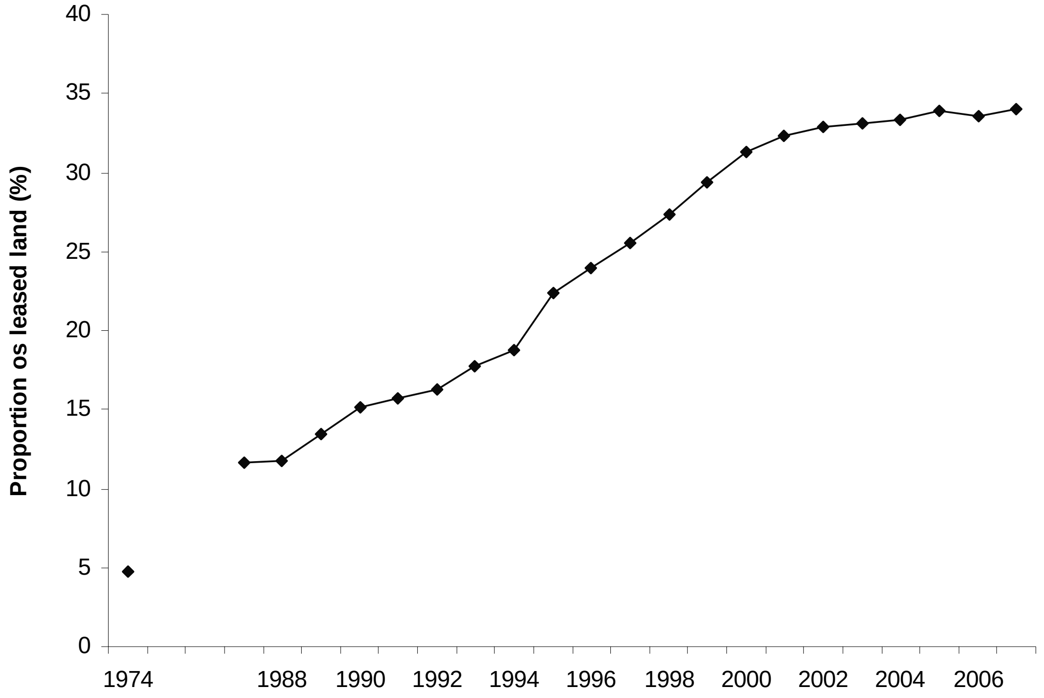
Source: National Land Survey (2008).

Figure 46. The evolution of real agricultural land prices by region in Finland 1981-2007



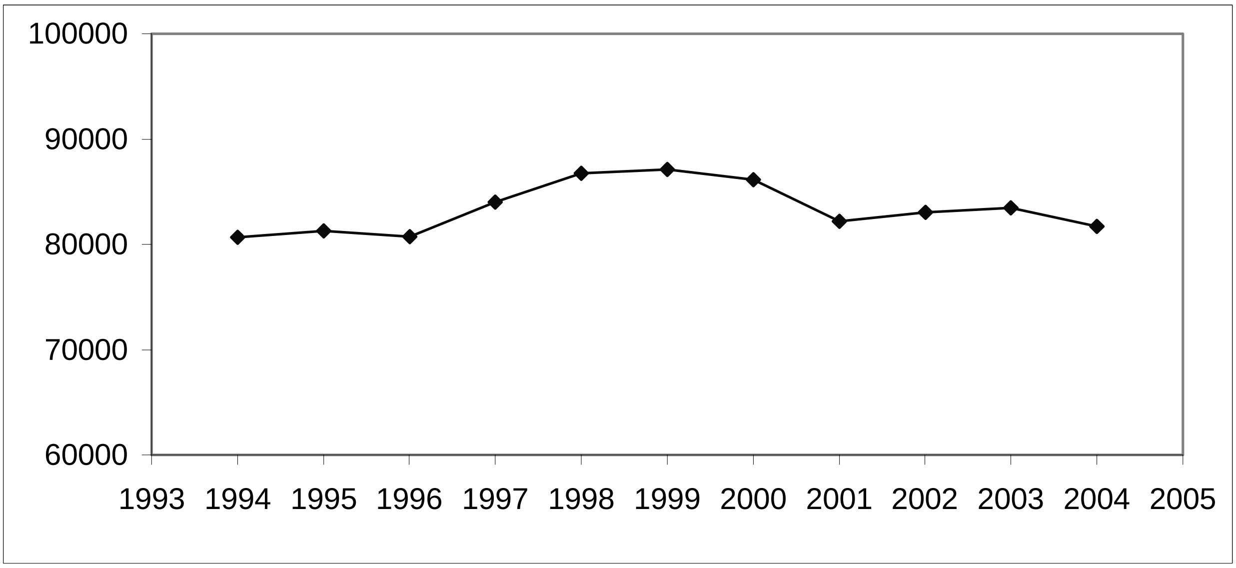
Source: National Land Survey (2008)

Figure 47. Share of rented farmland in total UAA in Finland 1974-2007



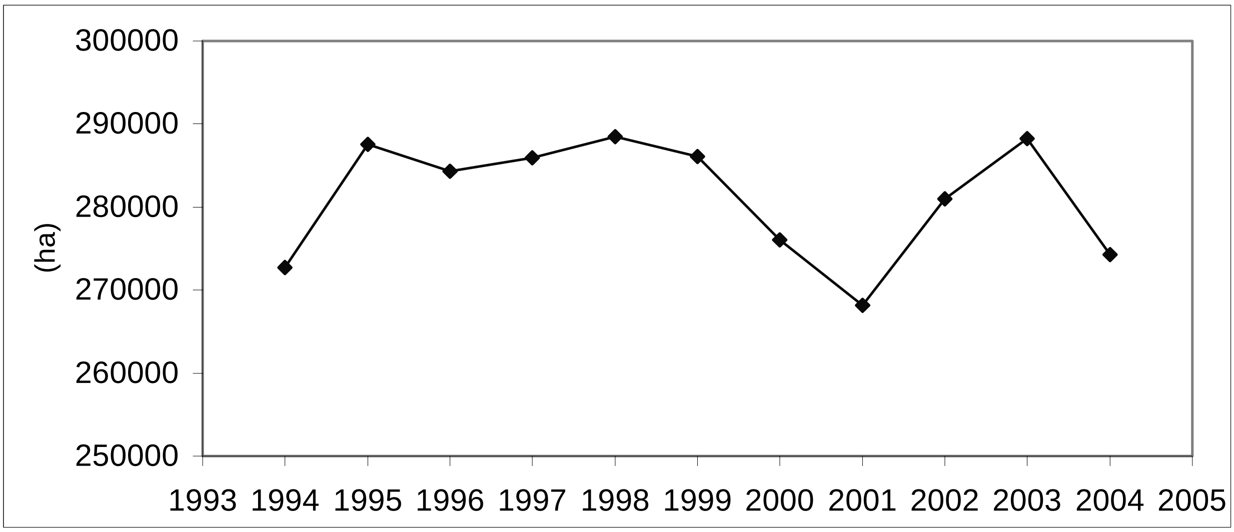
Source: MATILDA

Figure 48. Evolution of the total number of farmland sales transactions in France 1994-2004



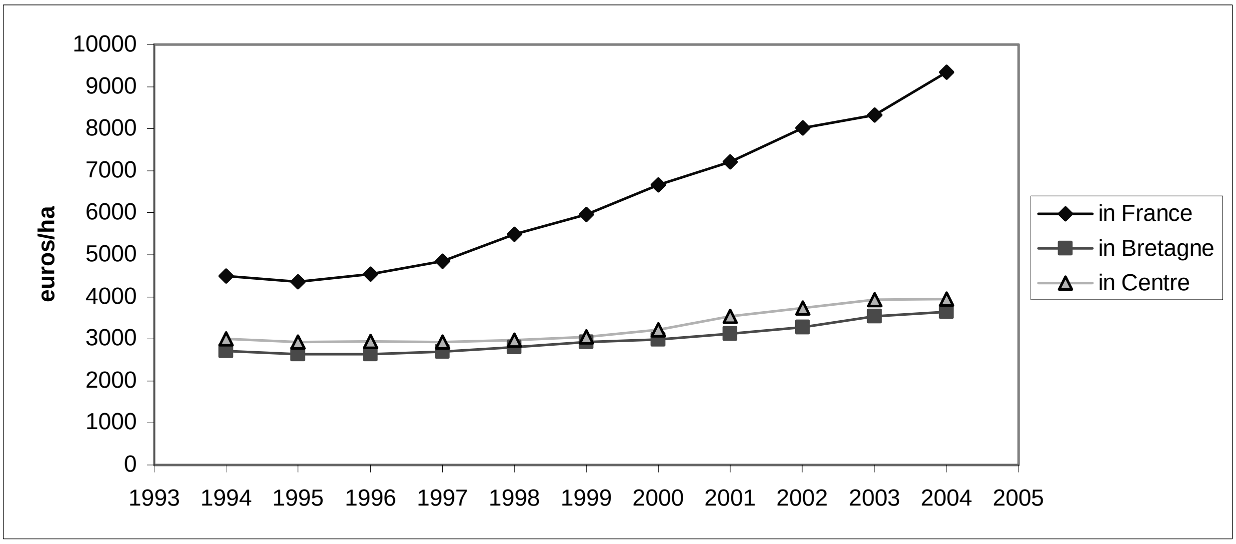
Source: SAFER data from FP6 IDEMA project

Figure 49. Evolution of the farmland sales area transacted in France 1994-2004



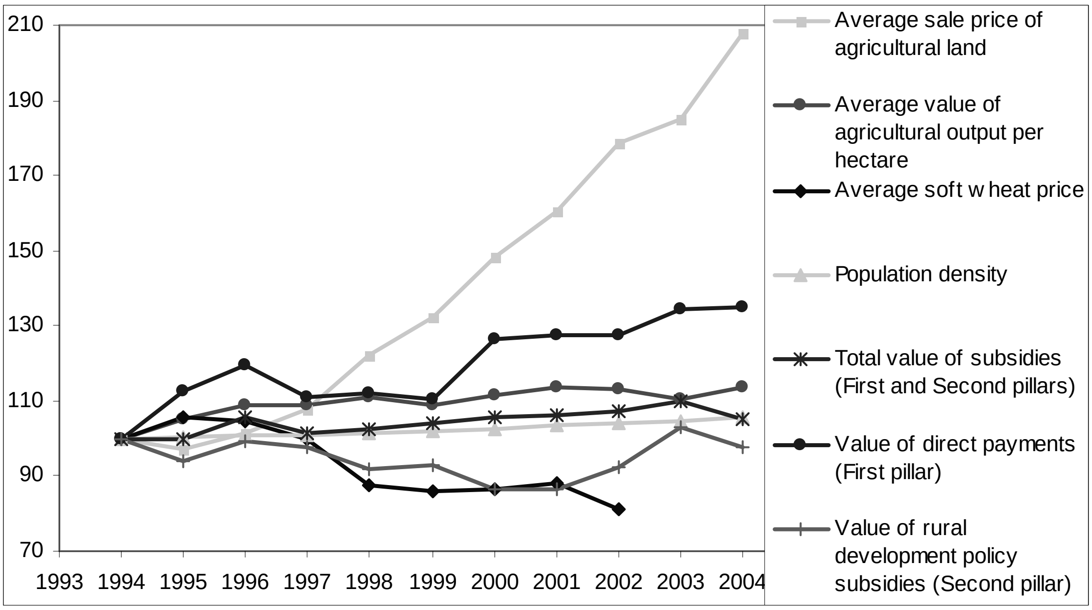
Source: SAFER data from FP6 IDEMA project

Figure 50. Evolution of the average sales price of farmland in France, Bretagne and Centre regions 1994-2004



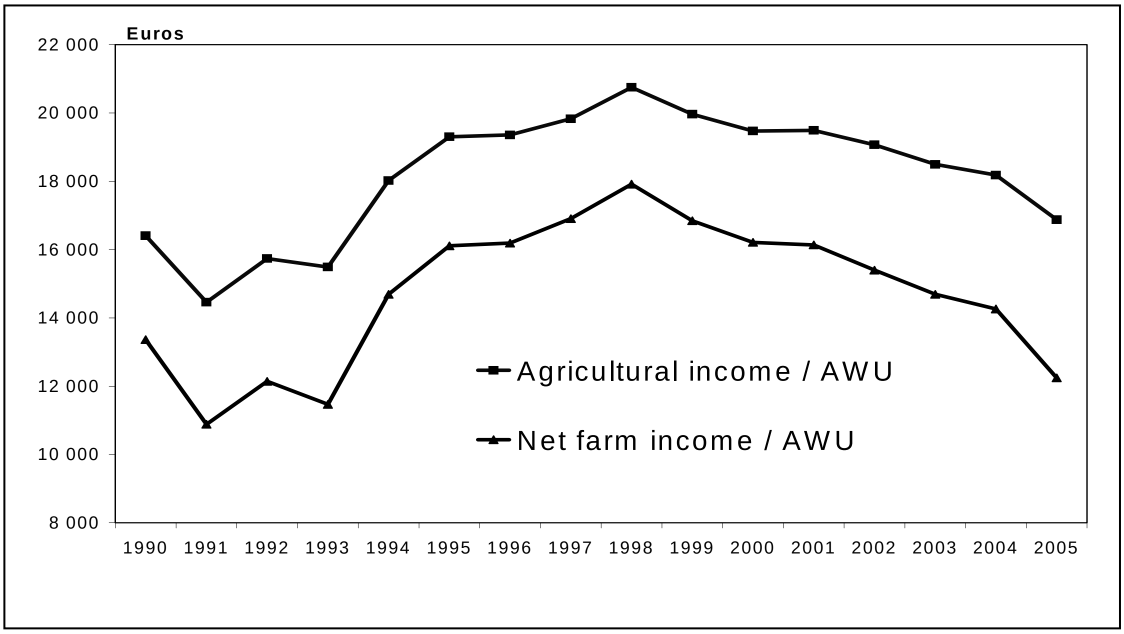
Source: SAFER data from FP6 IDEMA project

Figure 51. Evolution of several indicators in France (indices with base 100 in 1994)



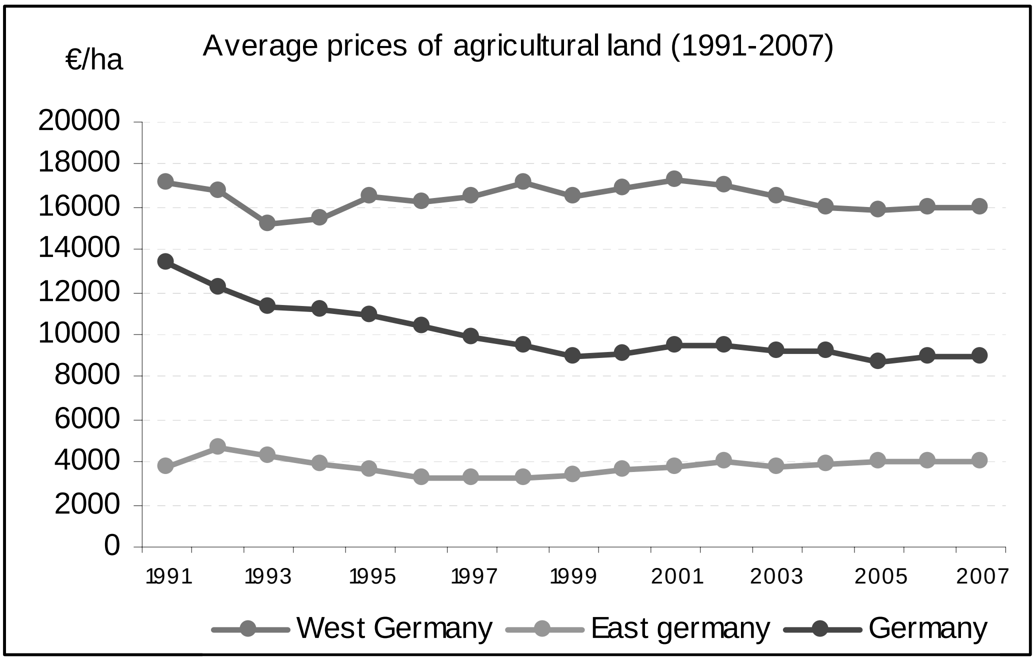
Source: based on SAFER data from FP6 IDEMA project for sale price, and on other data from Eurostat and Agreste (Ministry of Agriculture)

Figure 52. Evolution of real farm income per worker (AWU) in France 1990-2005



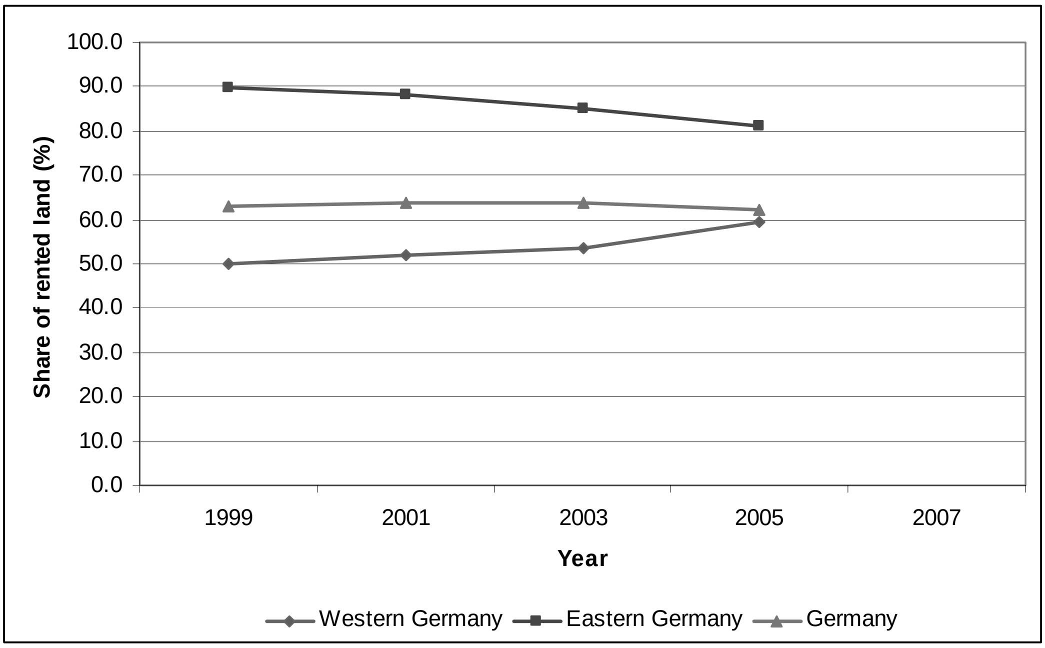
Source: Chatellier et al. (2007).

Figure 53. Average prices of agricultural land in Germany



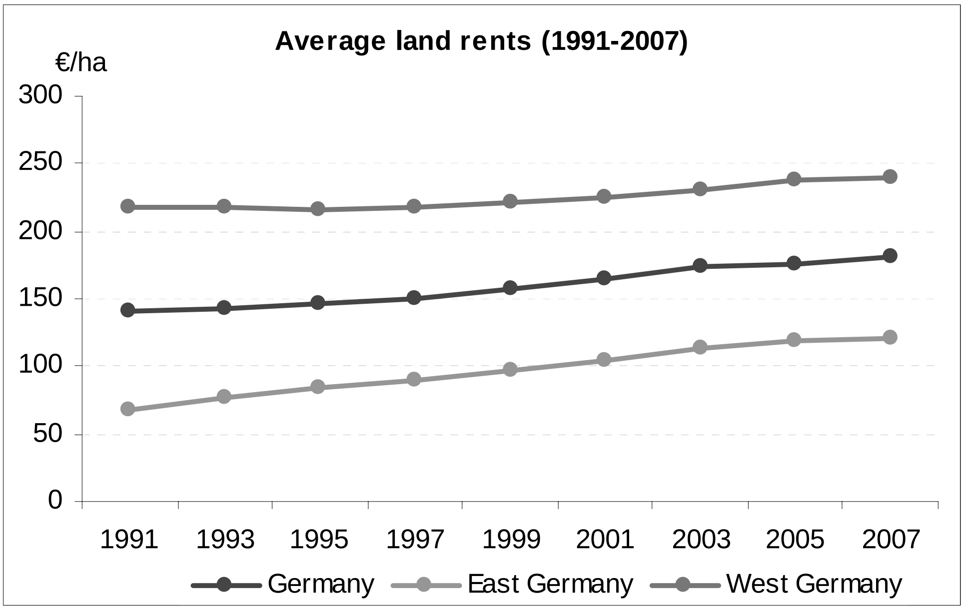
Source: STATISTISCHES BUNDESAMT (2007) and estimated values.

Figure 54. Share of rented land in Germany



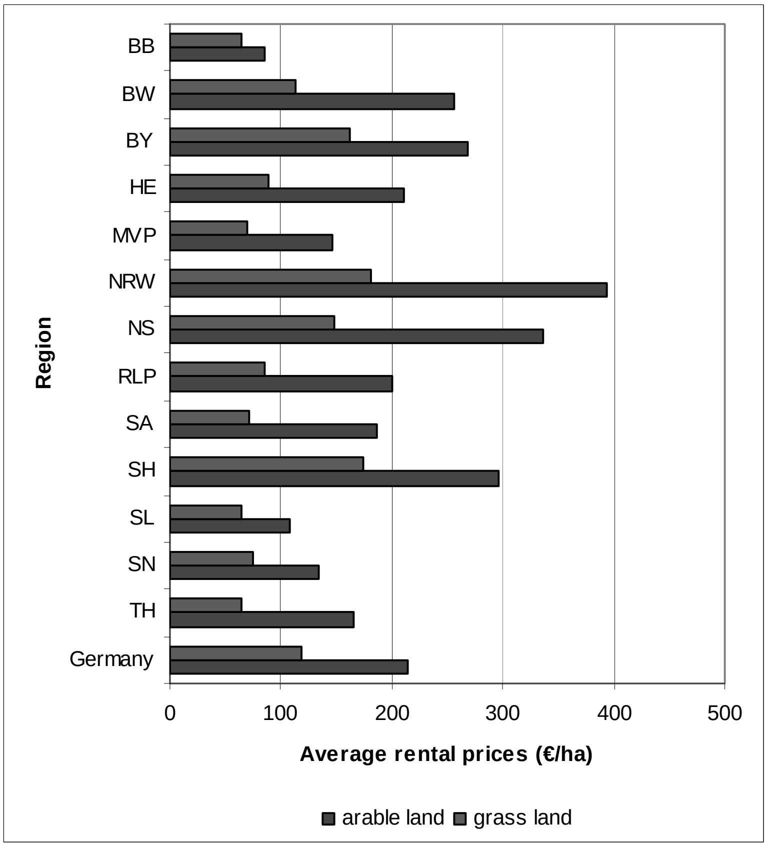
Source: STATISTISCHES BUNDESAMT (1999-2007).

Figure 55. Average land rents in Germany



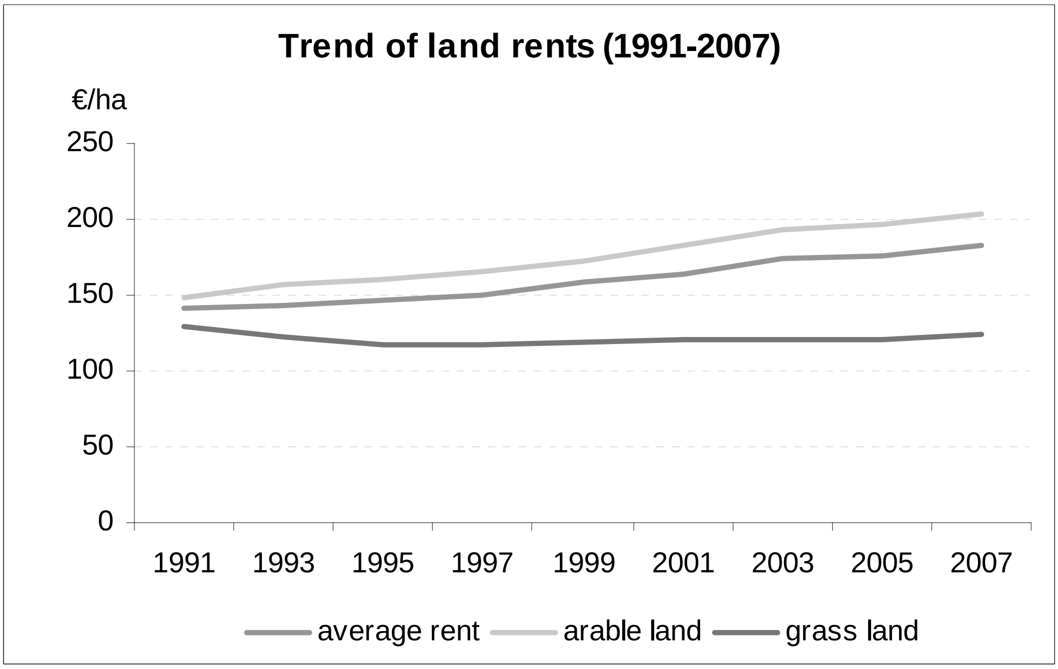
Source: STATISTISCHES BUNDESAMT (2007) values for 2007 are projected based on data from AES for the case study regions.

Figure 56. Rental prices for arable and grass land in Germany on Federal State level in 2007



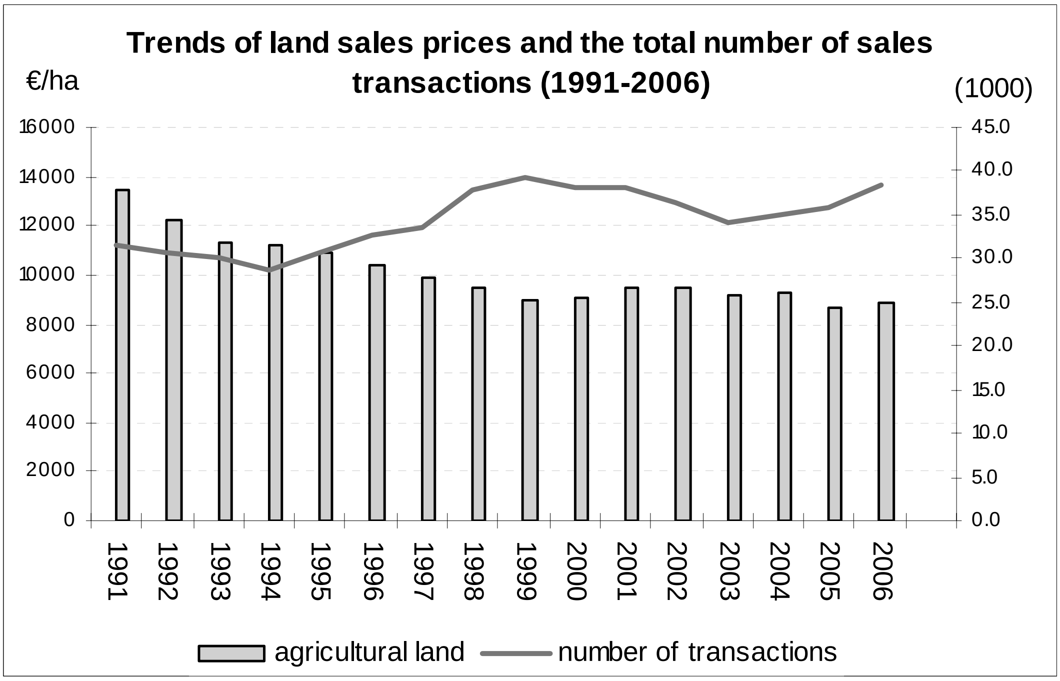
Source: Situtationsbericht (2008).

Figure 57. Trend of land rents in Germany 1991-2007



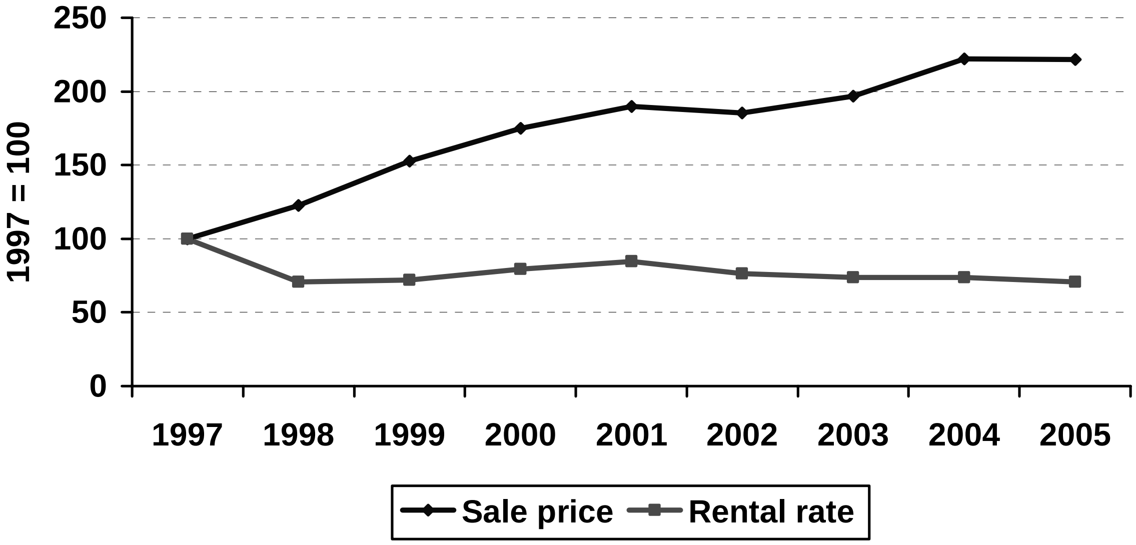
Source: STATISTISCHES BUNDESAMT (2007)

Figure 58. Land sales prices and the total number of sales transactions in Germany 1991-2006



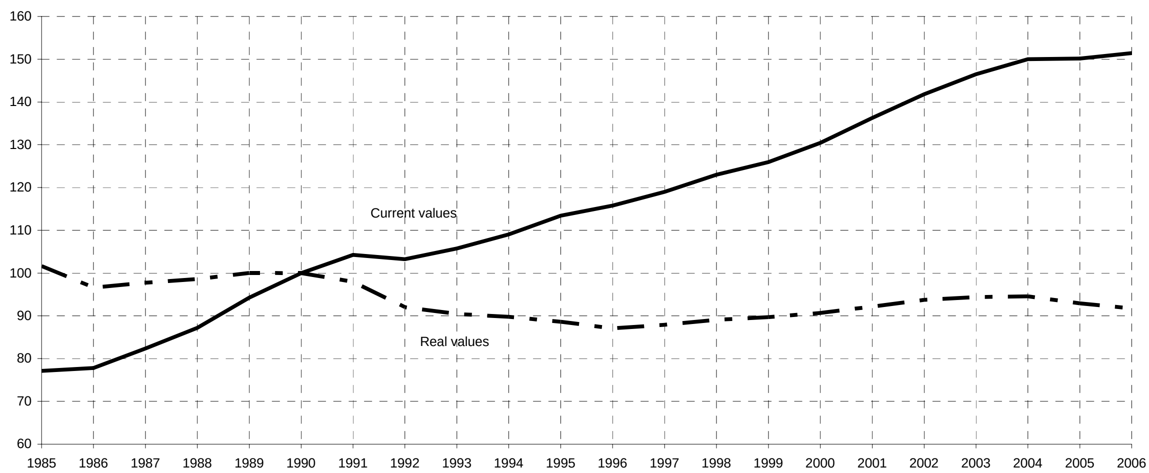
Source: STATISTISCHES BUNDESAMT (2007)

Figure 59. Indices of Irish Agricultural Land Prices and Rental Rates



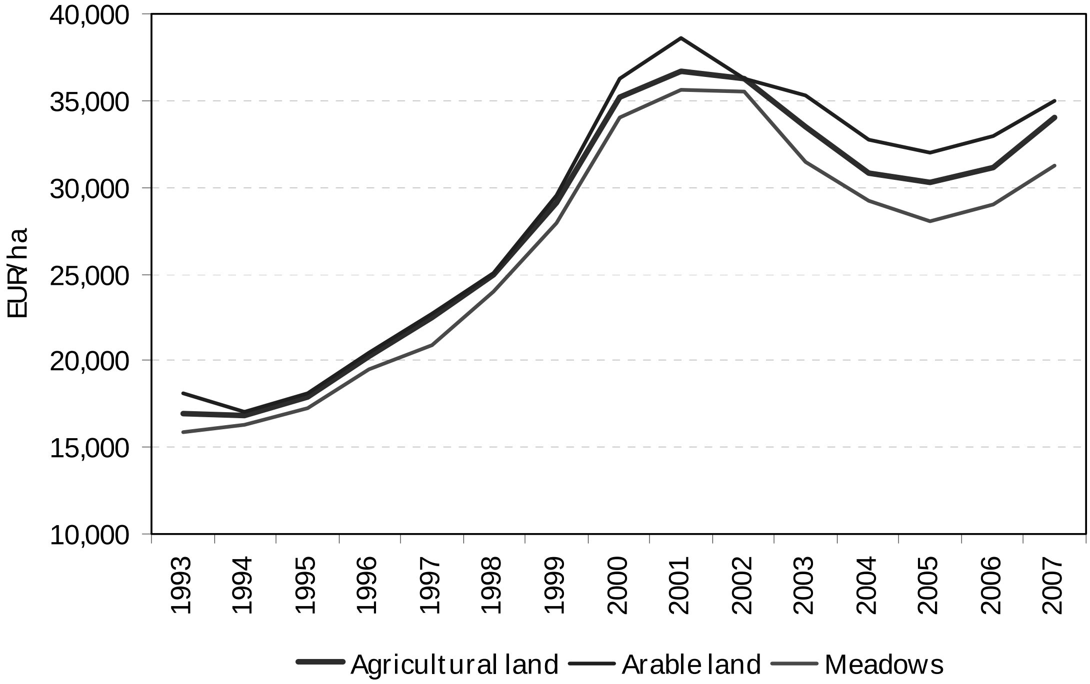
Source: EUROSTAT, NewCronos database.

Figure 60. Trend in land prices in Italy (1990=100)



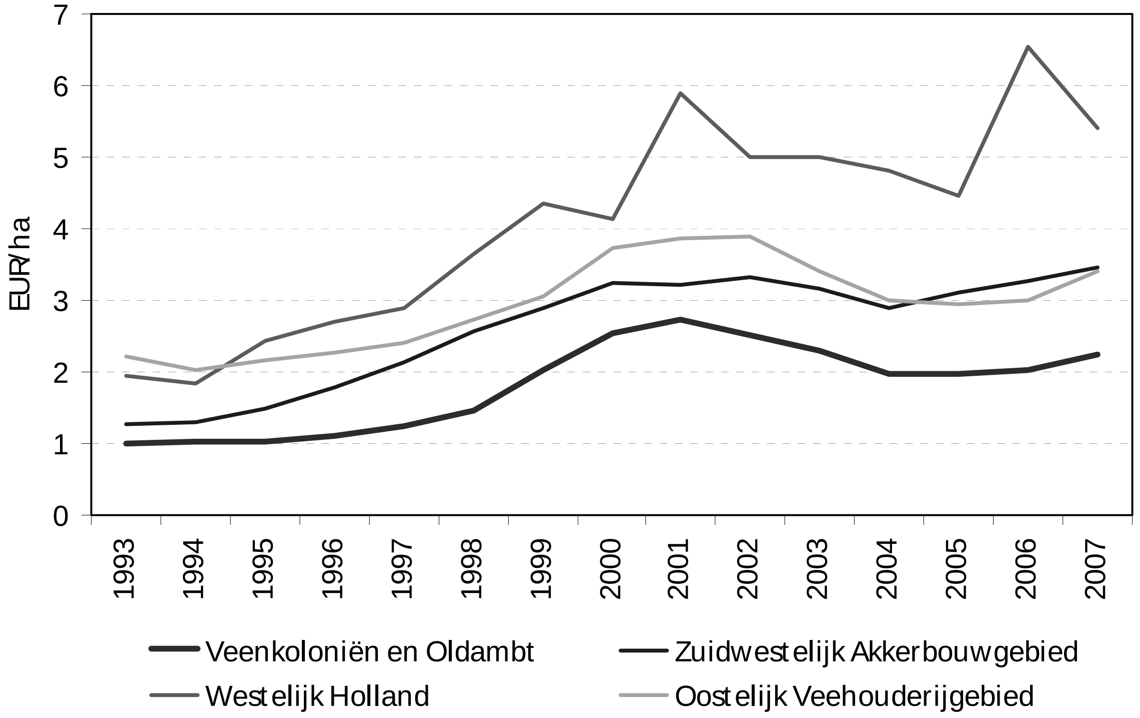
Source: INEA, 2008

Figure 61. Transaction prices for agricultural land in Netherlands



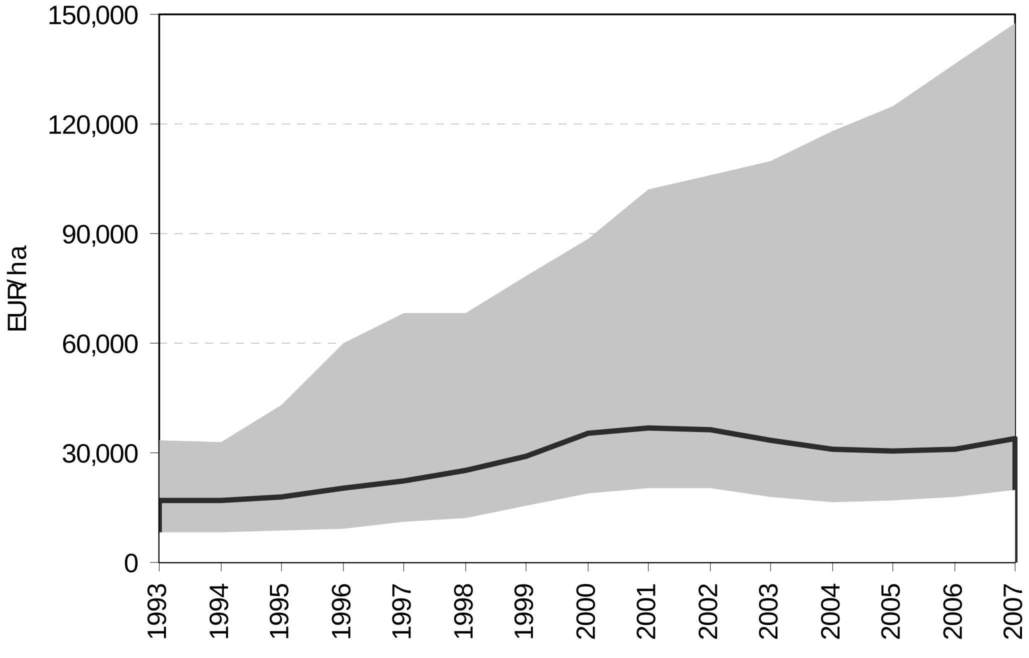
Notes: The index is based on median transaction prices. All transactions of plots < 1ha and sales between members of a family are excluded.
Source: Kadaster

Figure 62. Land price developments for selected Dutch regions



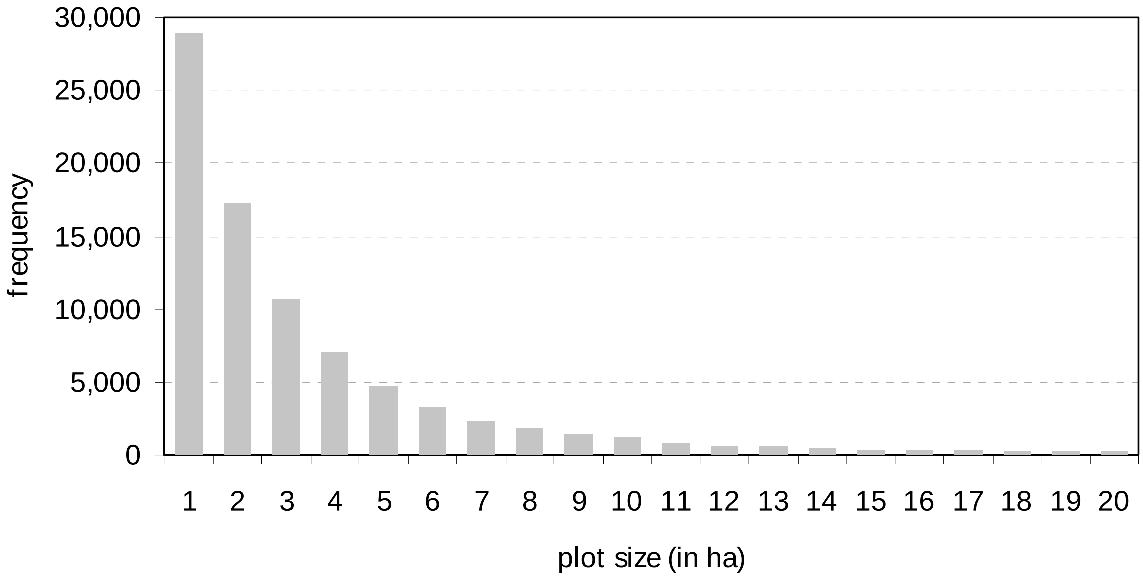
Source: CBS, Eurostat

Figure 63. Distribution of sales prices for arable land in Netherlands



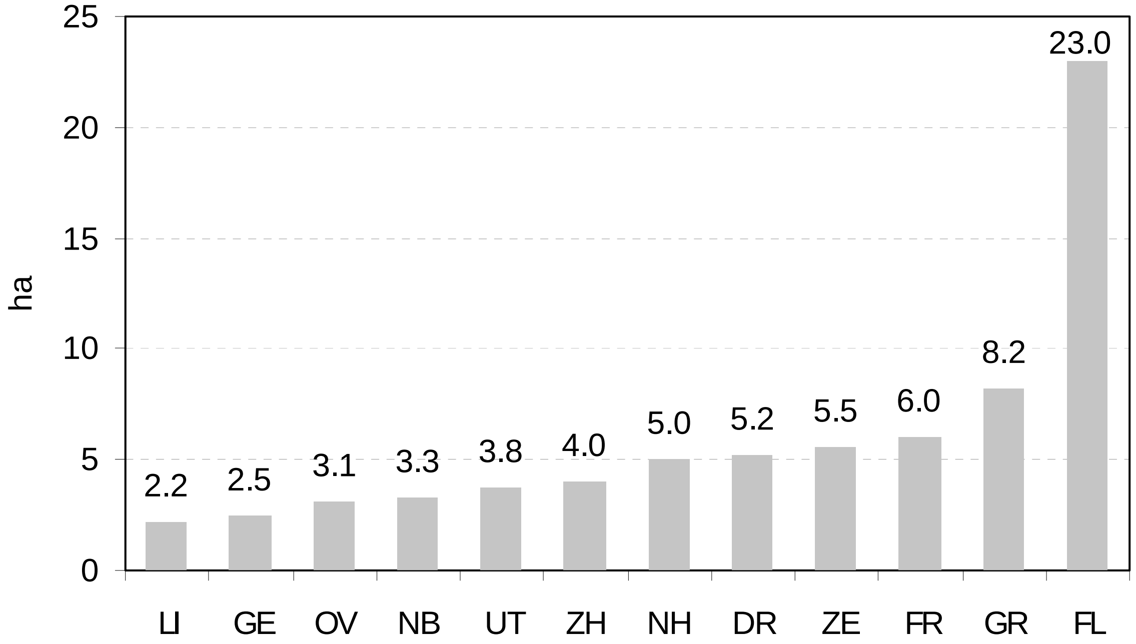
Notes: Shaded area represents range between 10th and 90th percentile; solid line is the median.
Source: Kadaster

Figure 64. Distribution of transacted plot sizes in Netherlands, 1993-2007



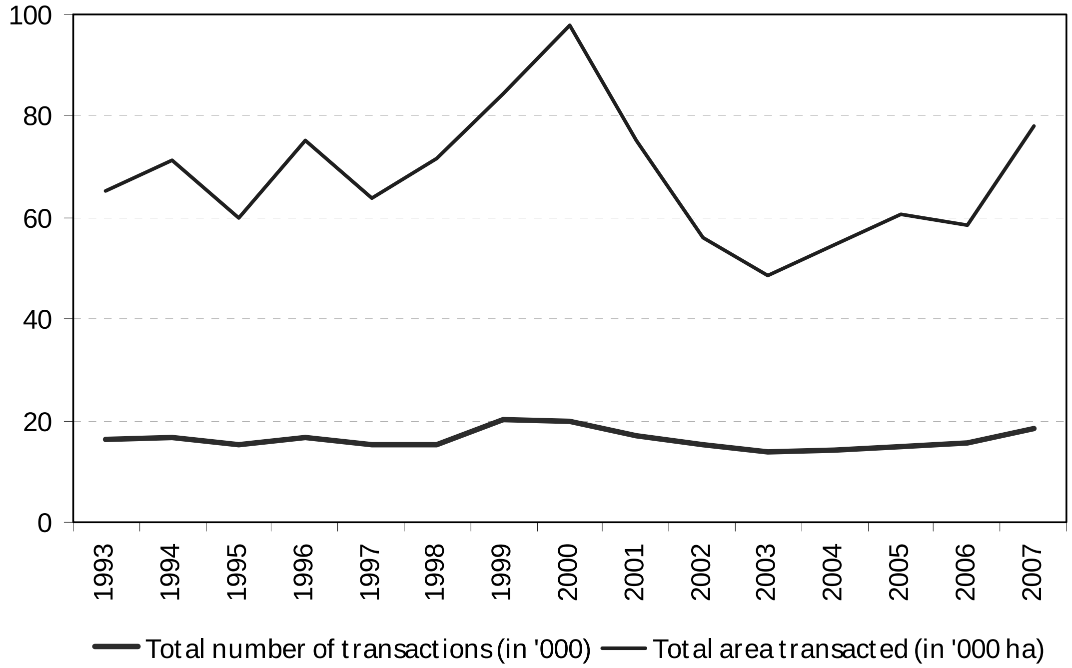
Source: Kadaster

Figure 65. Average transaction size per province in Netherlands



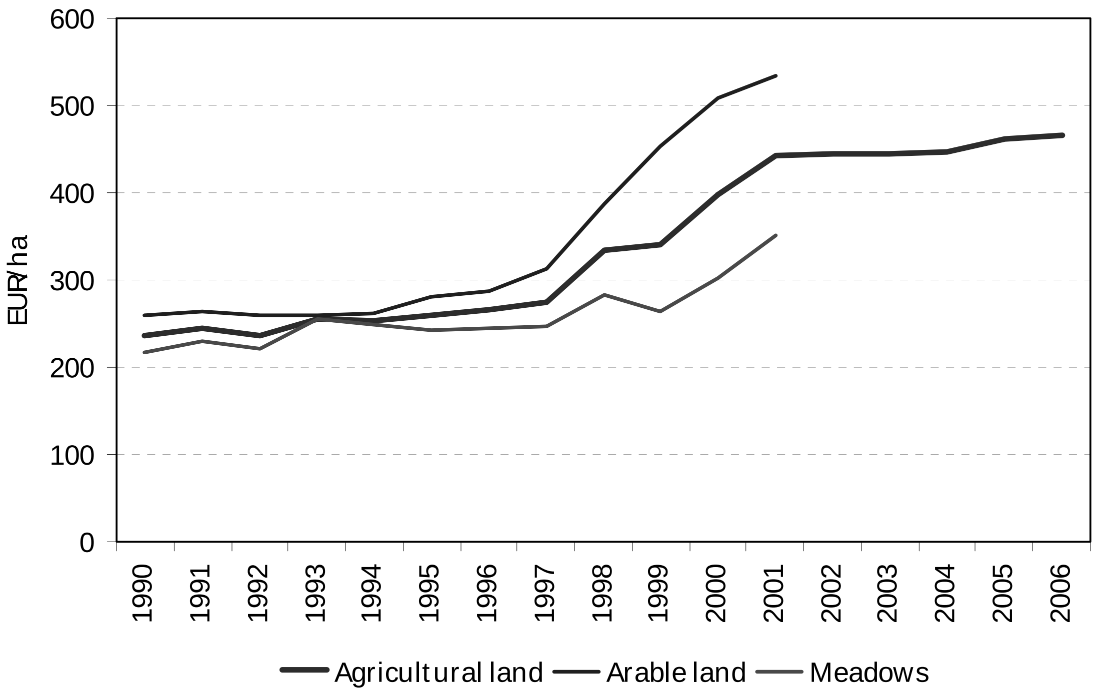
Source: Kadaster

Figure 66. Number of sales and area transacted in Netherlands



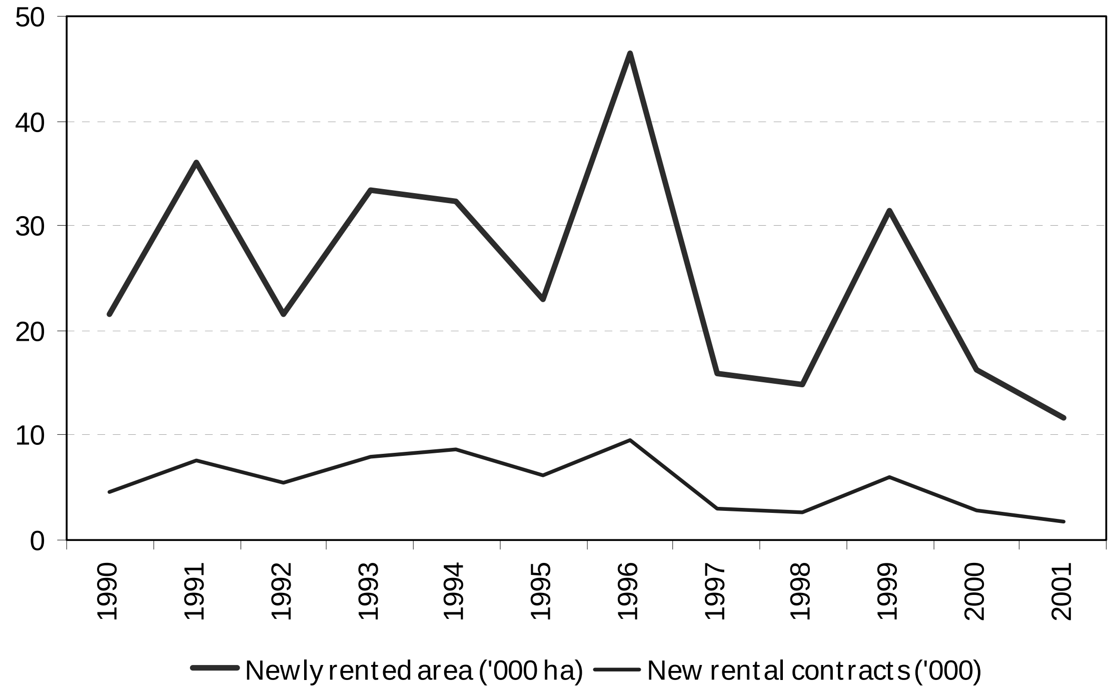
Source: CBS (1990-2001); Eurostat (2002-2006)

Figure 67. Rents for land



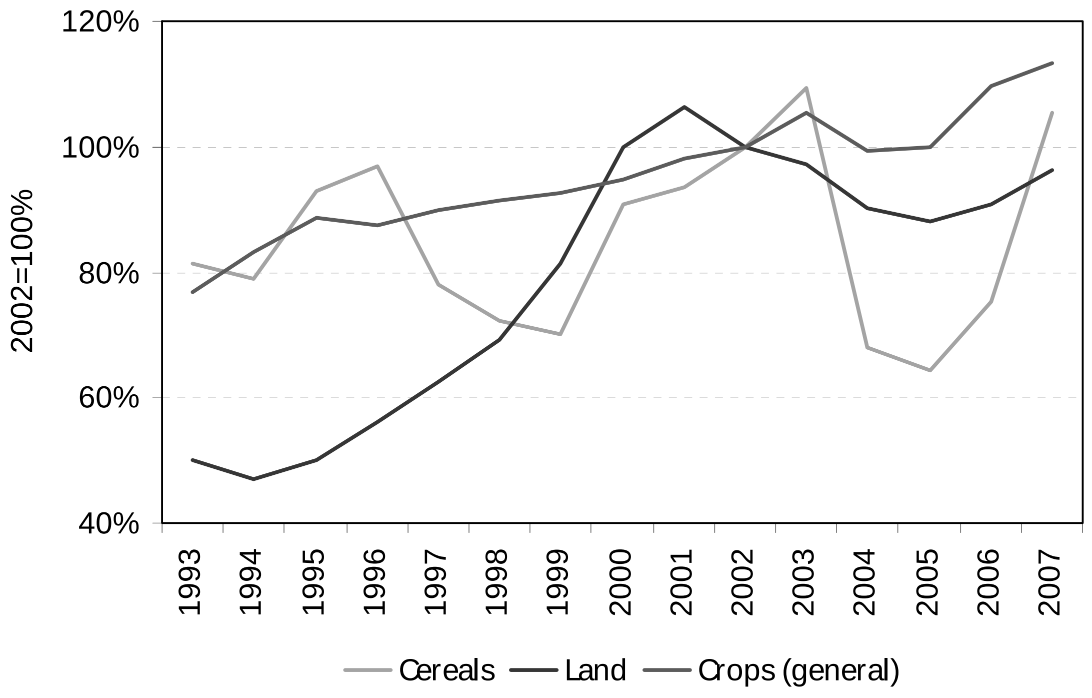
Source: CBS (1990-2001); Eurostat (2002-2006)

Figure 68. New rental contracts and total newly rented area



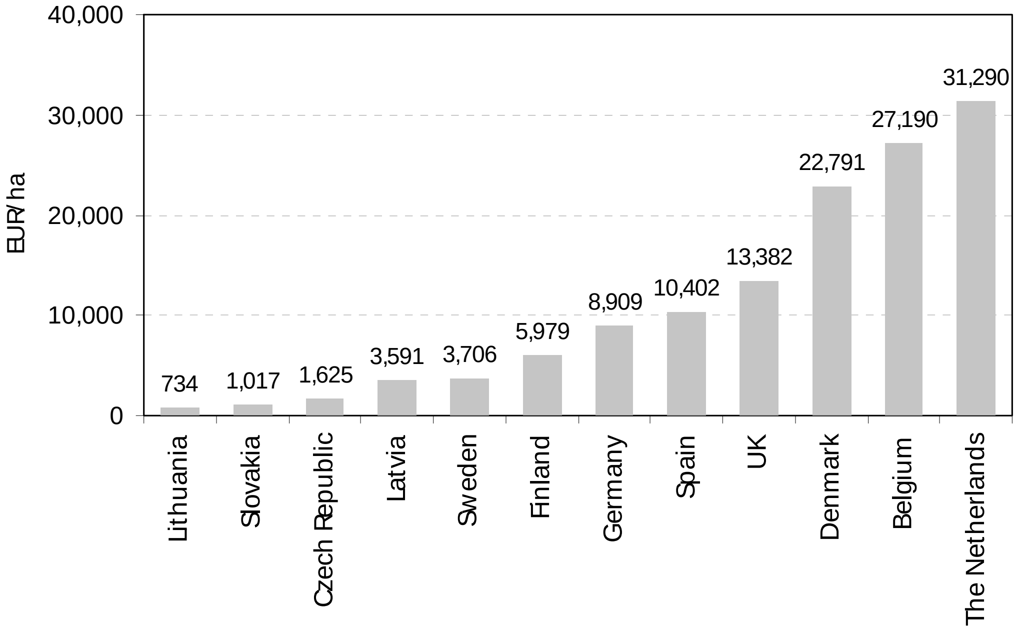
Notes: In general, the area newly rented out is declining. The peak in 1996 is caused by the rental market regulation reform, of 1995. Especially larger plots were newly rented out under less regulated terms.
Source: CBS

Figure 69. Land prices index and index for cereals in Netherlands



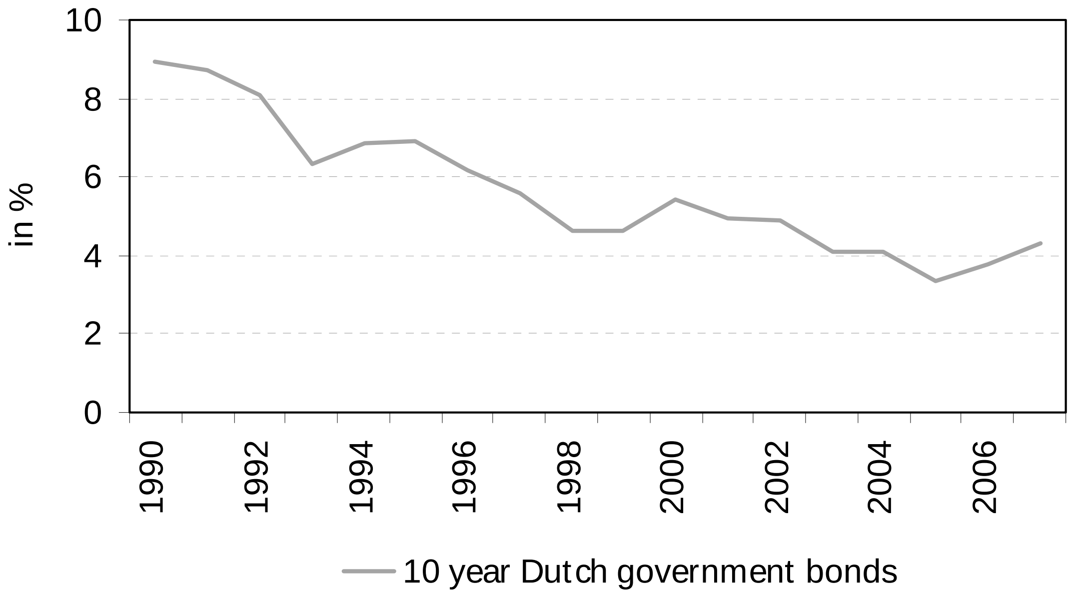
Data: Land – Kadaster; Eurostat – cereals, crops

Figure 70. Prices for agricultural land across Europe in 2006



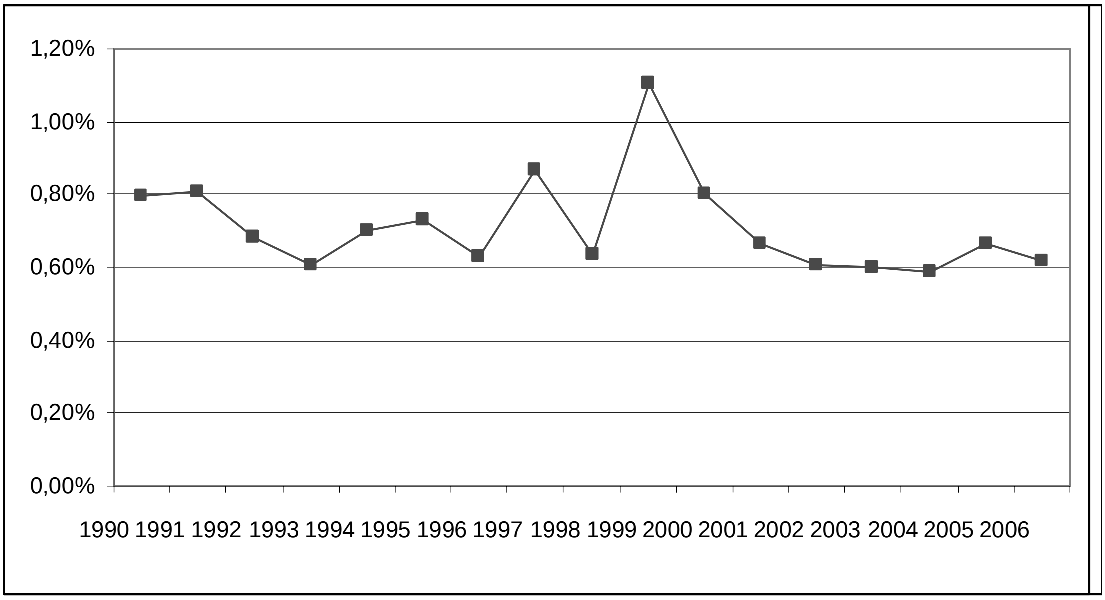
Data: Eurostat

Figure 71. Long term interest rate in Netherlands is falling, reducing cost of financing for farms



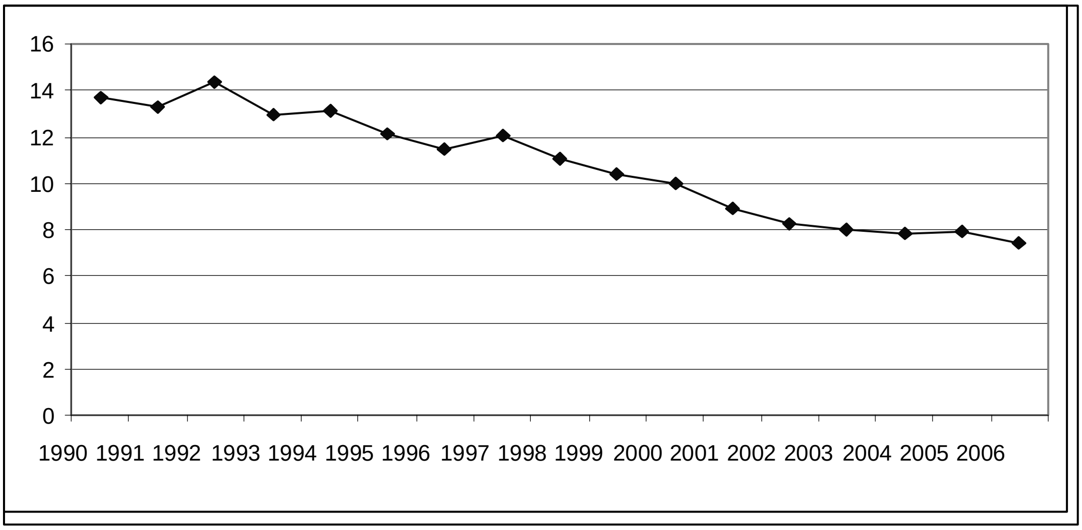
Source: Dutch Central Bank

Figure 72. Share of agricultural land sales in total utilised area in Sweden



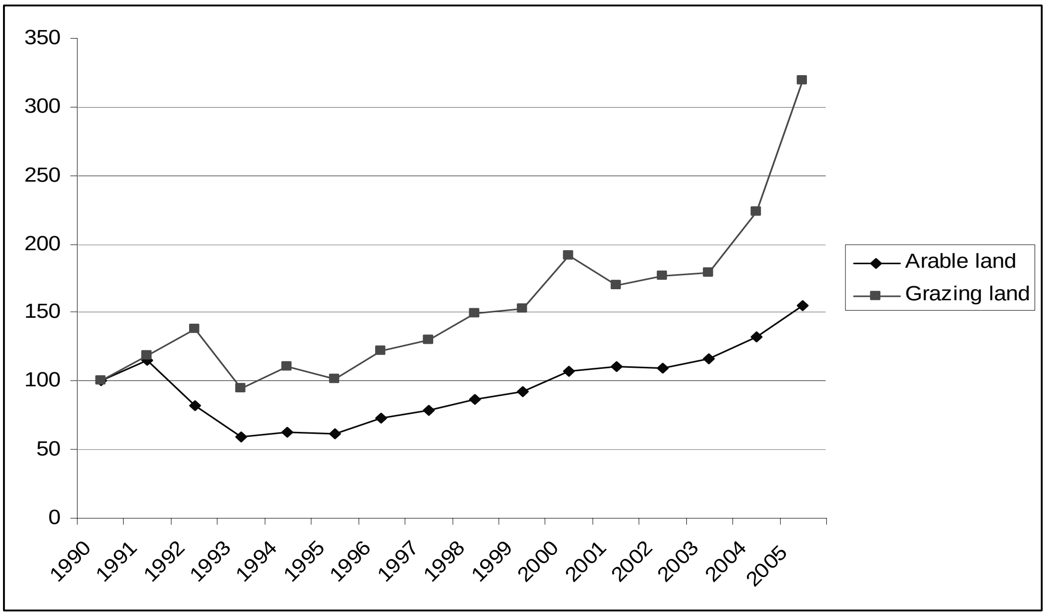
Source: Statistics Sweden (2008) and the Swedish Board of Agriculture (2008)

Figure 73. Average plot size for transacted hectares in Sweden



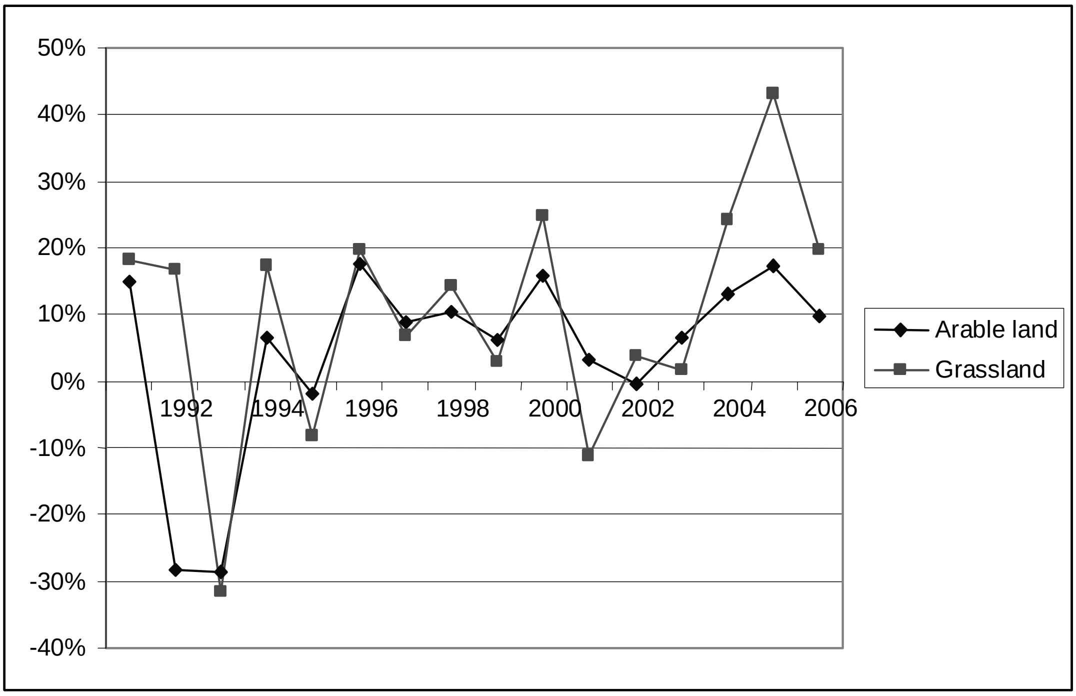
Source: Statistics Sweden (2008) and the Swedish Board of Agriculture (2008)

Figure 74. The development of land sale prices in Sweden, 1990=100



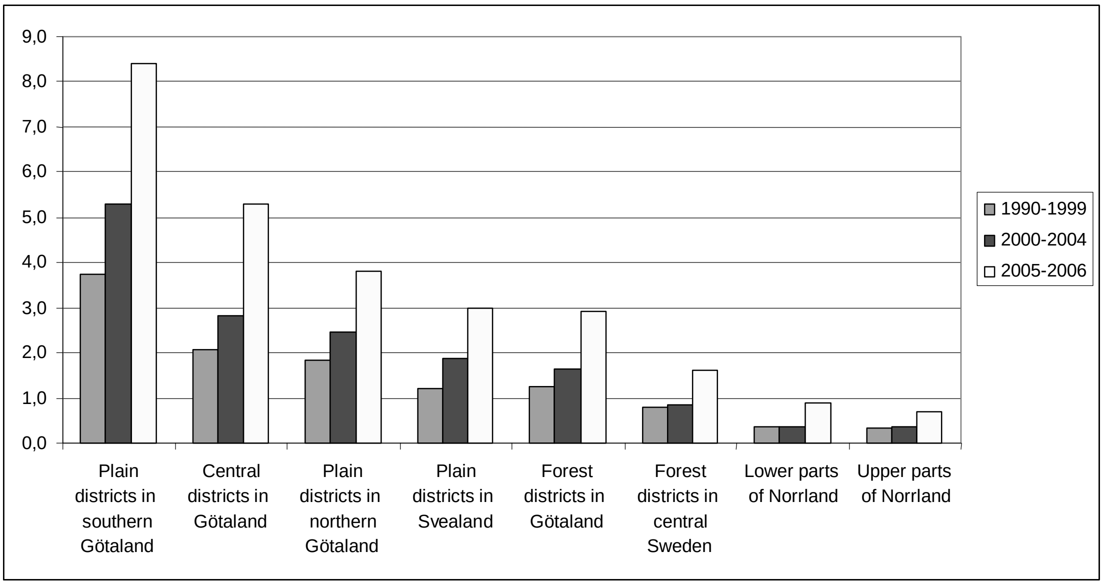
Source: Statistics Sweden (2008) and the Swedish Board of Agriculture (2008)

Figure 75. Yearly changes of land prices in Sweden



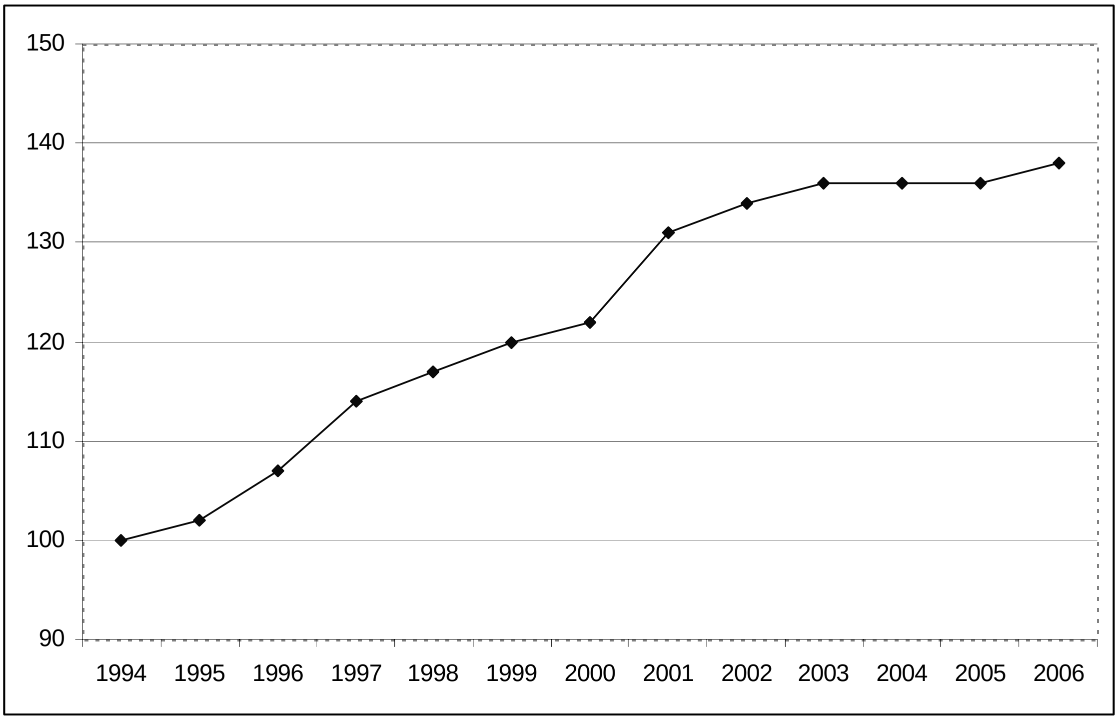
Source: Statistics Sweden (2008) and the Swedish Board of Agriculture (2008)

Figure 76. Regional differences in land sale prices in Sweden, 1000 EUR/Ha



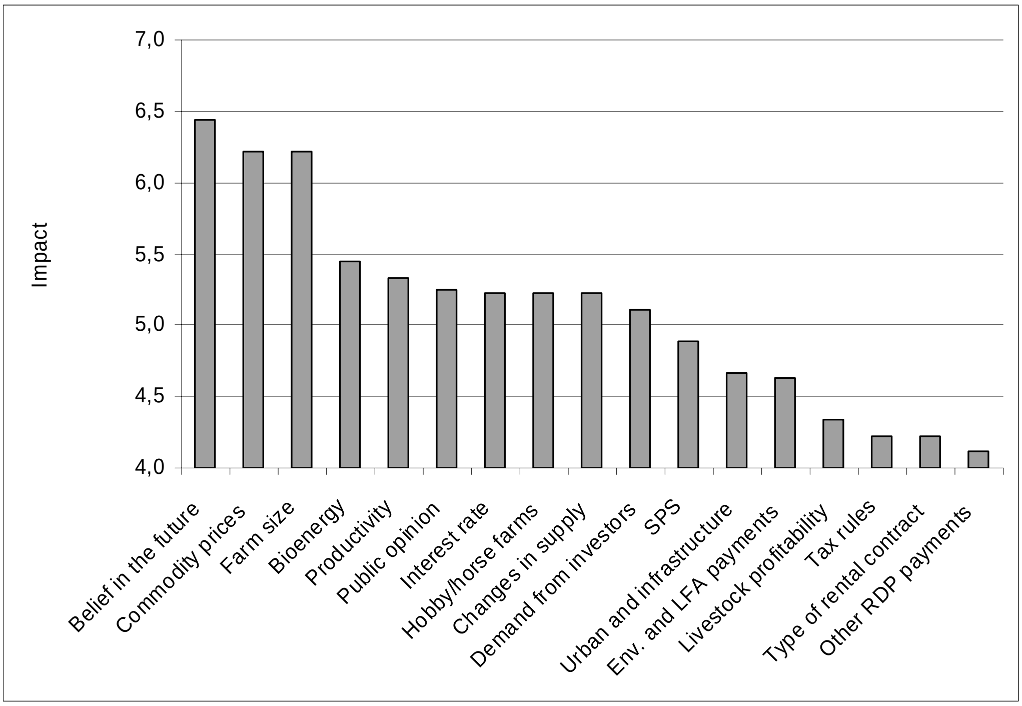
Source: Statistics Sweden (2008) and the Swedish Board of Agriculture (2008)

Figure 77. The evolution of agricultural land rental rates in Sweden 1994=100



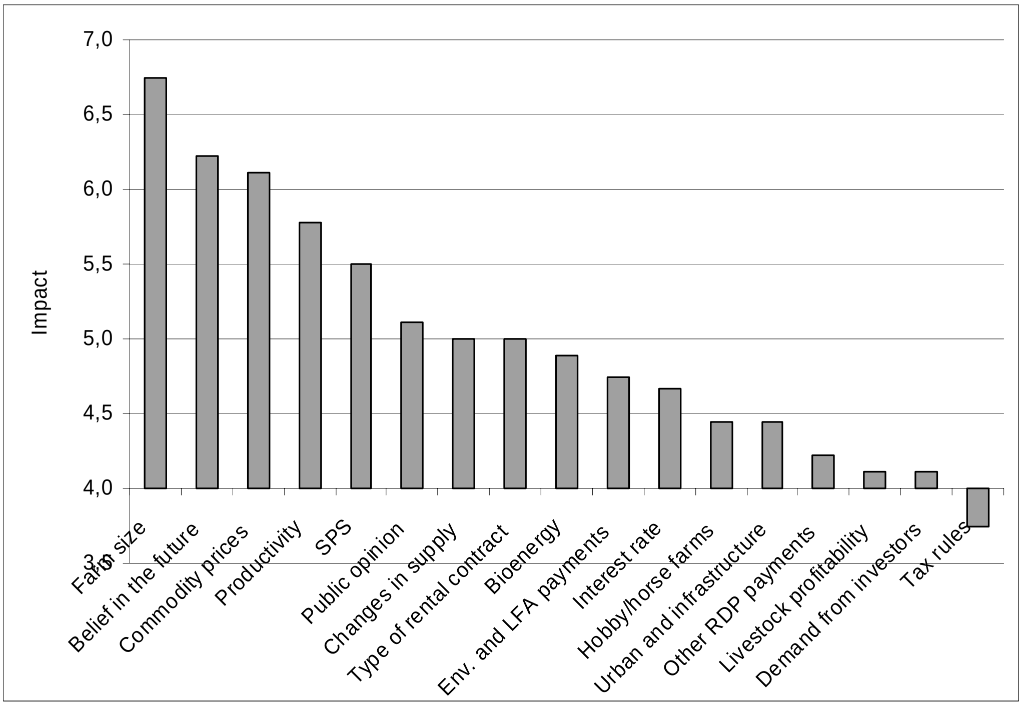
Source: Statistics Sweden (2008) and the Swedish Board of Agriculture (2008)

Figure 78. Impacts of the various drivers on Swedish agricultural land prices during 2003-2007, average from the survey *



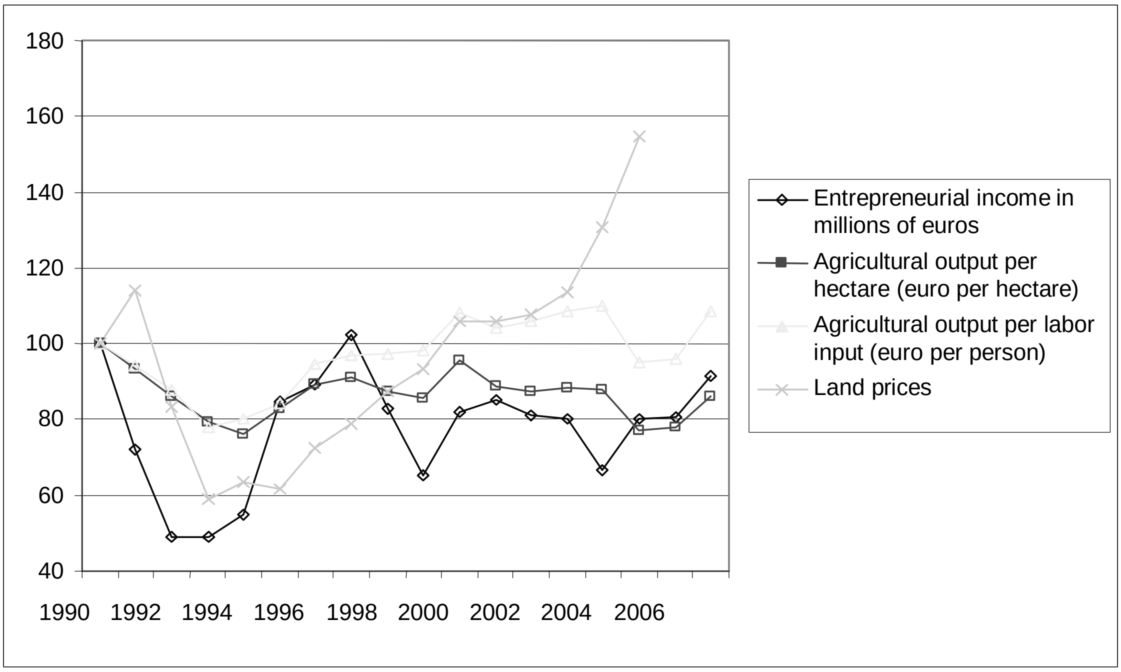
* The impact on land prices is measured on the scale 7. <u>strong increase</u>, 6. <u>medium increase</u>, 5. <u>weak increase</u>, 4. <u>no changes</u>.

Figure 79. Impacts of the various drivers on Swedish agricultural land rents during 2003-2007, average from the survey *



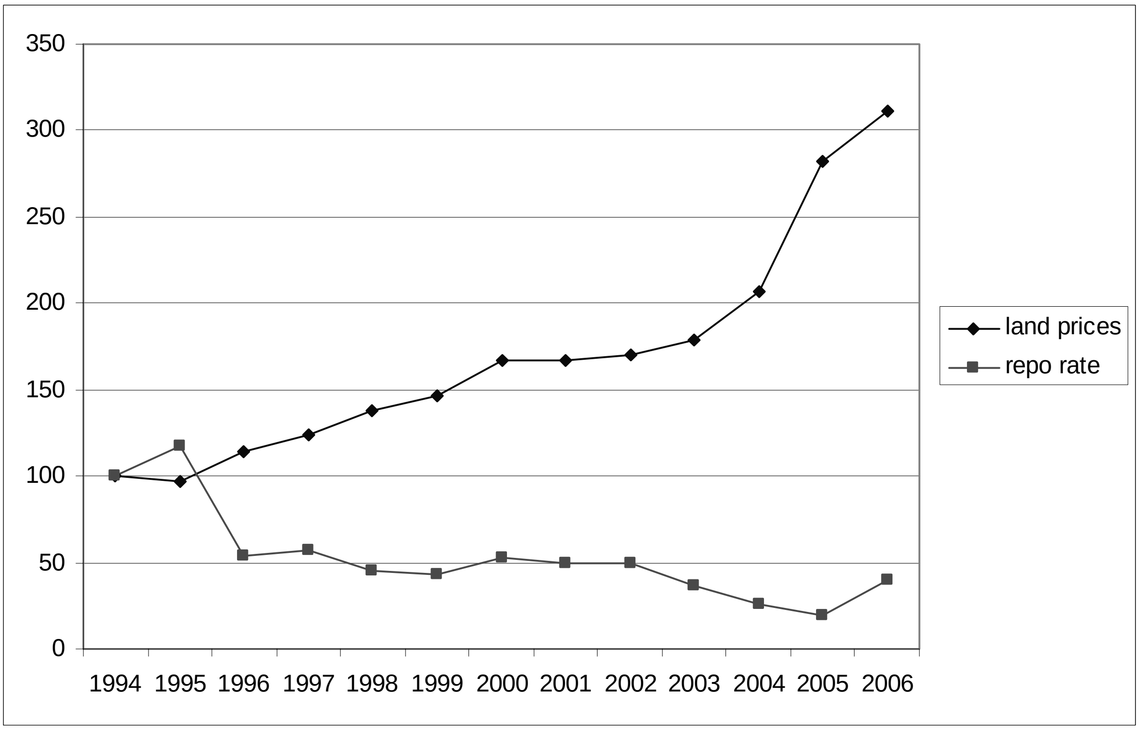
* The impact on land prices is measured on the scale 7. <u>strong increase</u>, 6. <u>medium increase</u>, 5. <u>weak increase</u>, 4. <u>no changes</u>.

Figure 80. Development of productivity, incomes and land prices in Sweden*, 1990=100



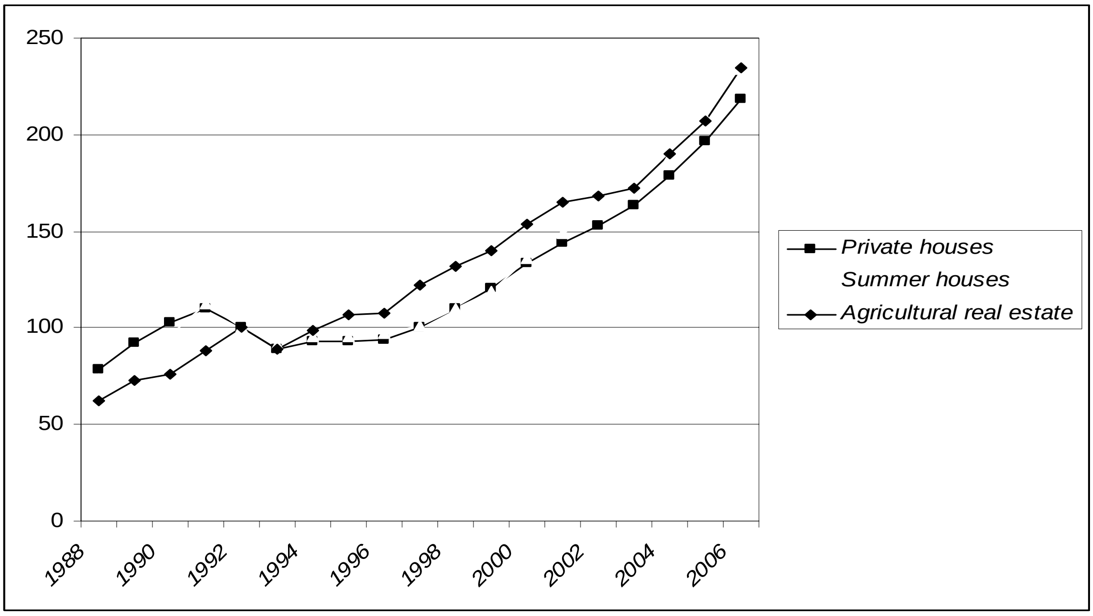
* The price index of land is increasing after 2005 but the figures are not directly comparable with the previous time period, hence they are not presented here.

Figure 81. Repo rate of interest* and land prices in Sweden



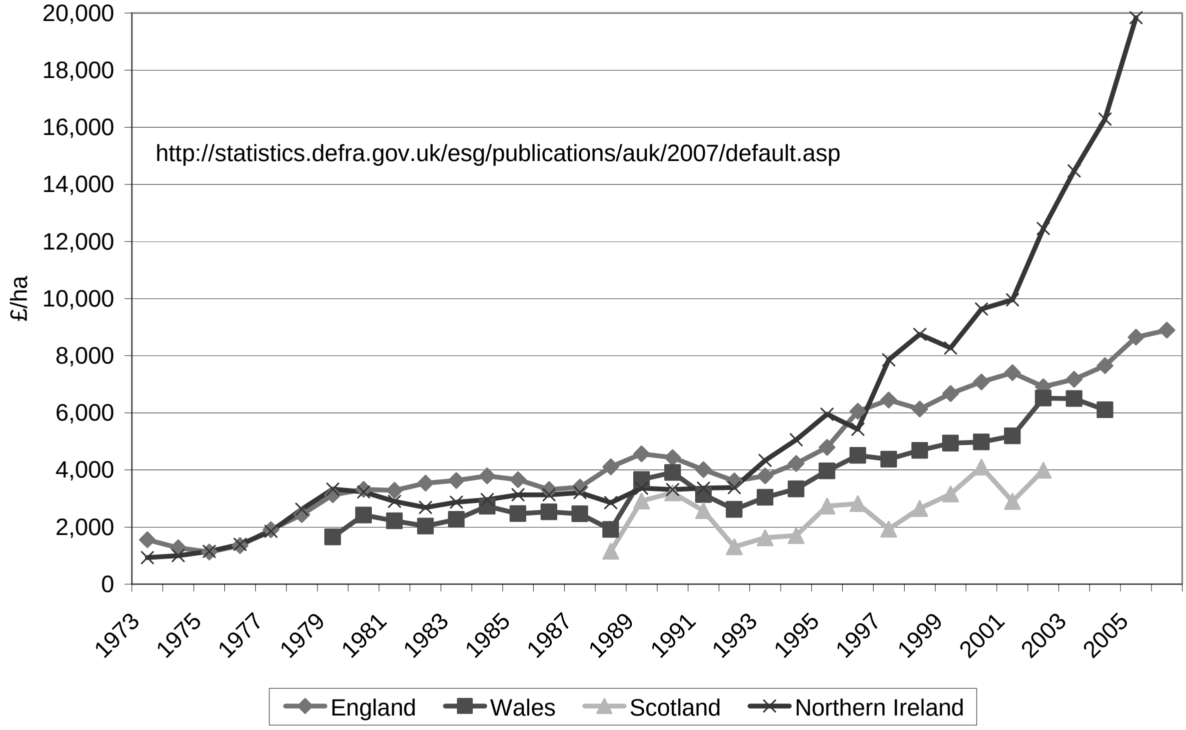
*Interest rate in December each year.

Figure 82. Real estate price index for agricultural property and other property in Sweden 1992=100 *



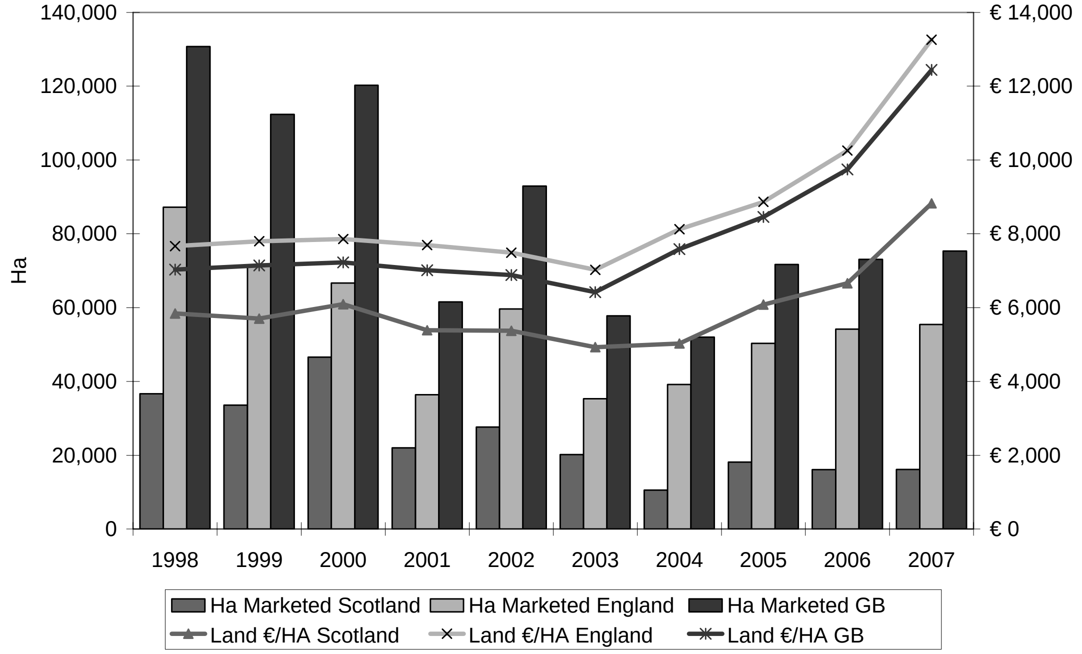
*Private houses: Real estate price index for one and two dwelling buildings for permanent living. Summer houses: Real estate price index for buildings of seasonal and secondary use.

Figure 83. Average All Types Farmland Values in UK (DEFRA)



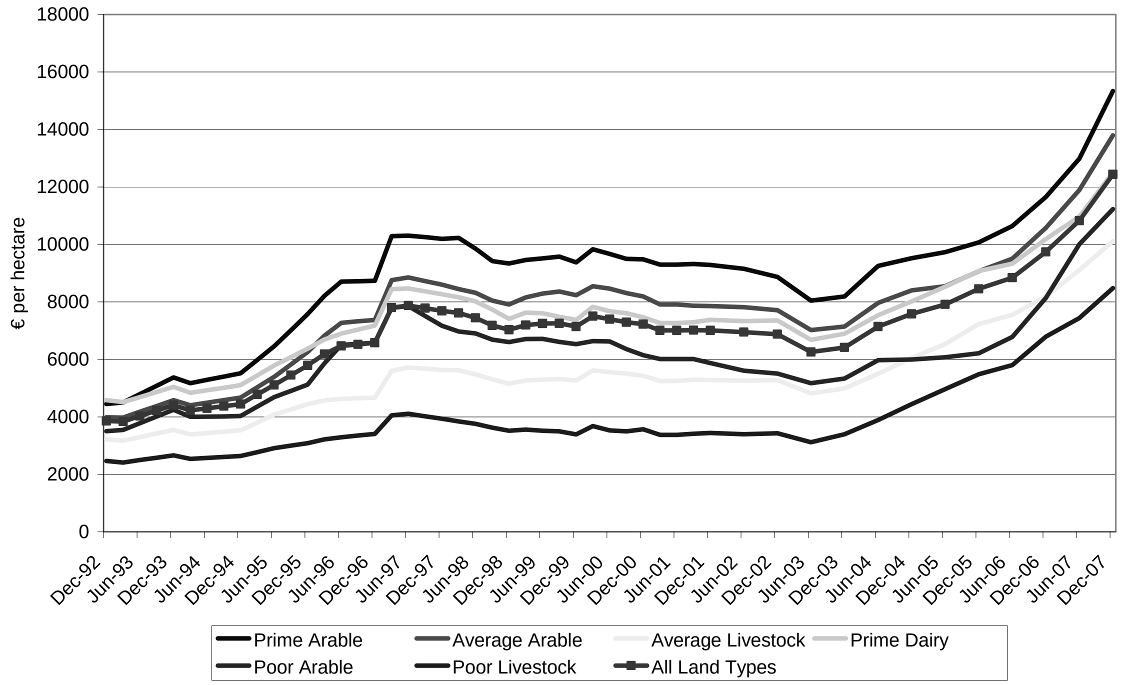
Source: Defra (2008), Agriculture in the United Kingdom 2007.

Figure 84. Average Area of Publicly Marketed Land and Value in UK



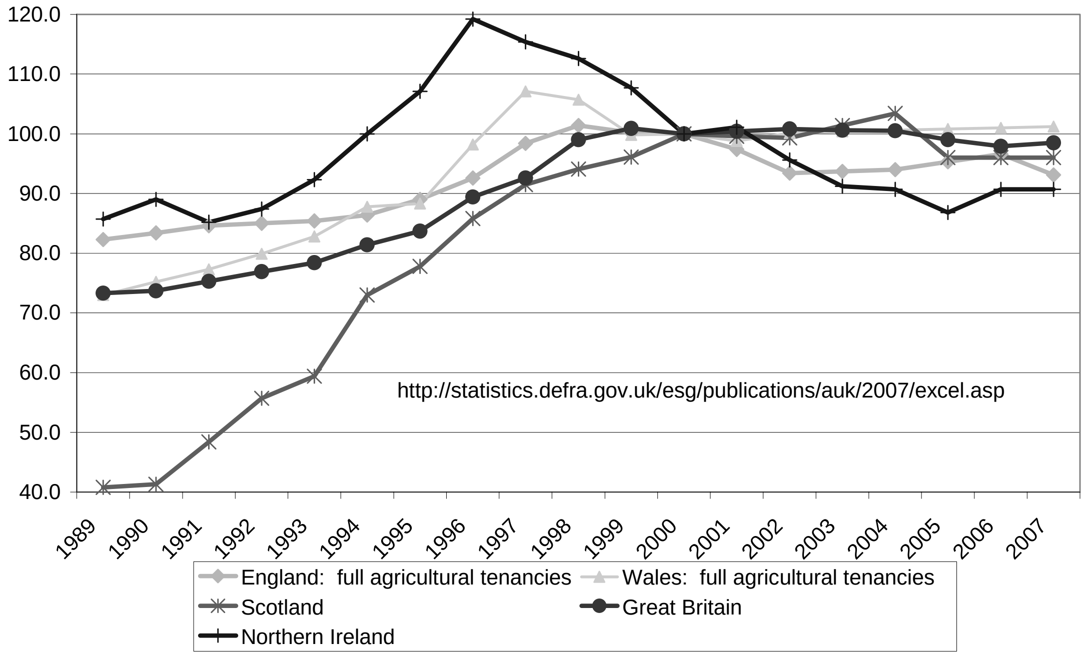
Source: Savills (L&P) Limited (2008).

Figure 85. Value of farmland by land use type in UK



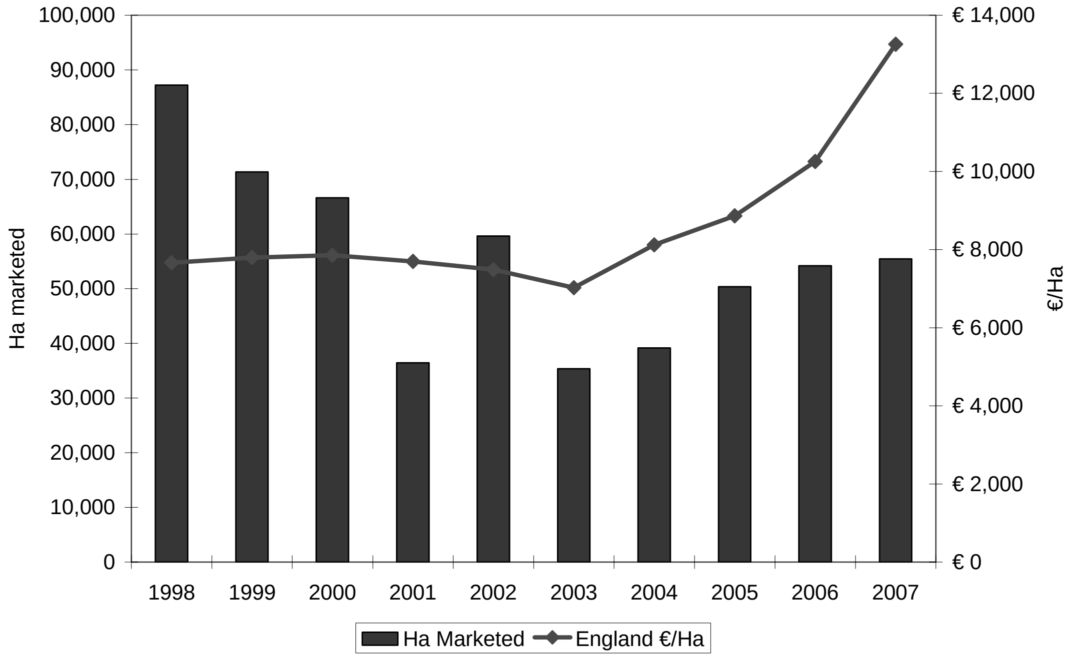
Source: Savills (L&P) Limited (2008).

Figure 86. Index of Average Rent in UK (2000=100)



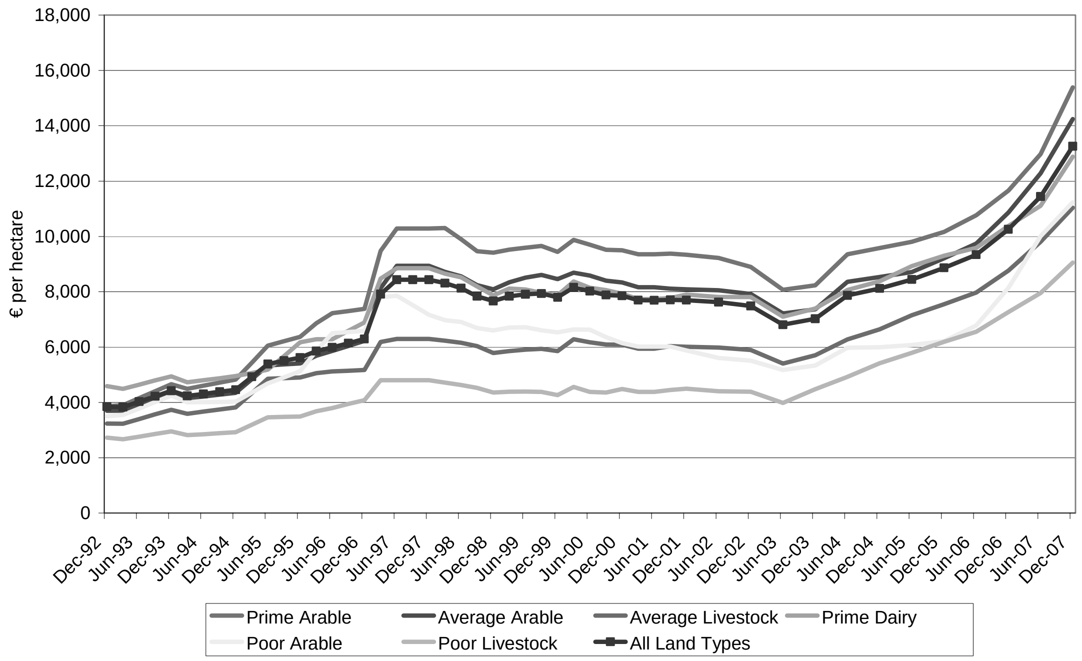
Source: Defra (2008), Agriculture in the United Kingdom 2007.

Figure 87. Average English Land Value and Publicly Marketed Land for Sale



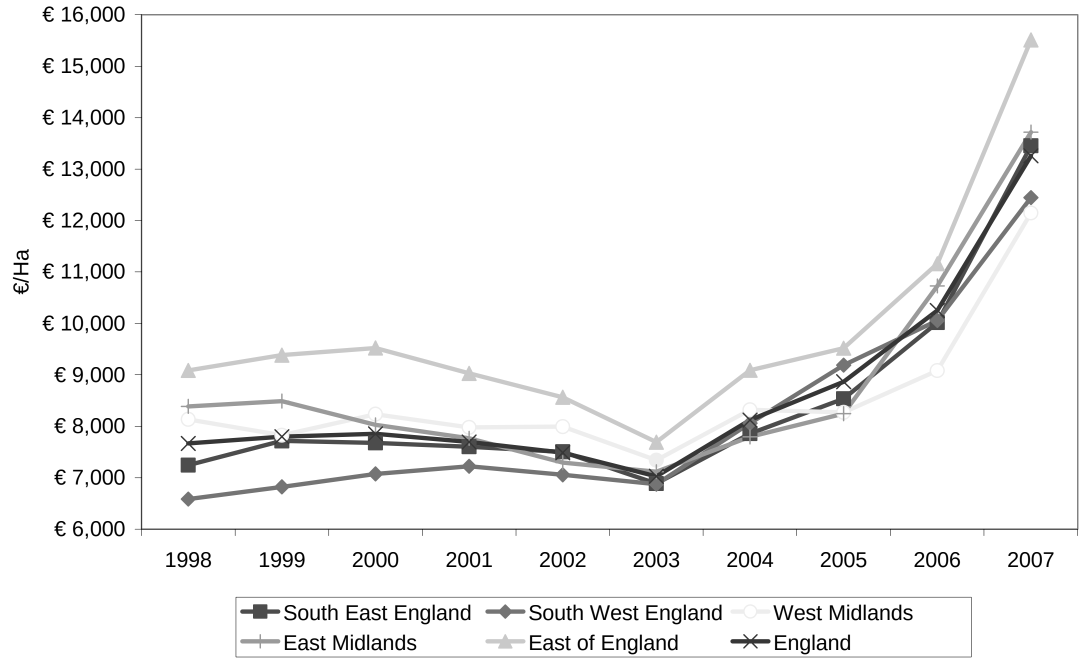
Source: Savills (L&P) Limited (2008).

Figure 88. English Farmland Values by Type



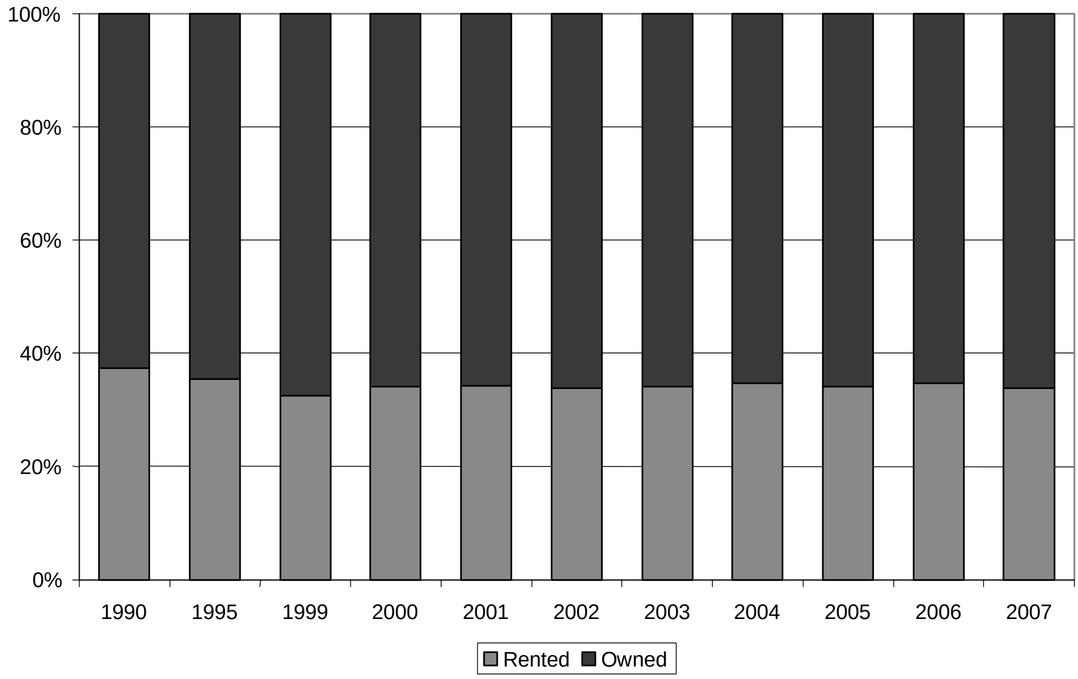
Source: Savills (L&P) Limited (2008).

Figure 89. English Regional Farmland Values



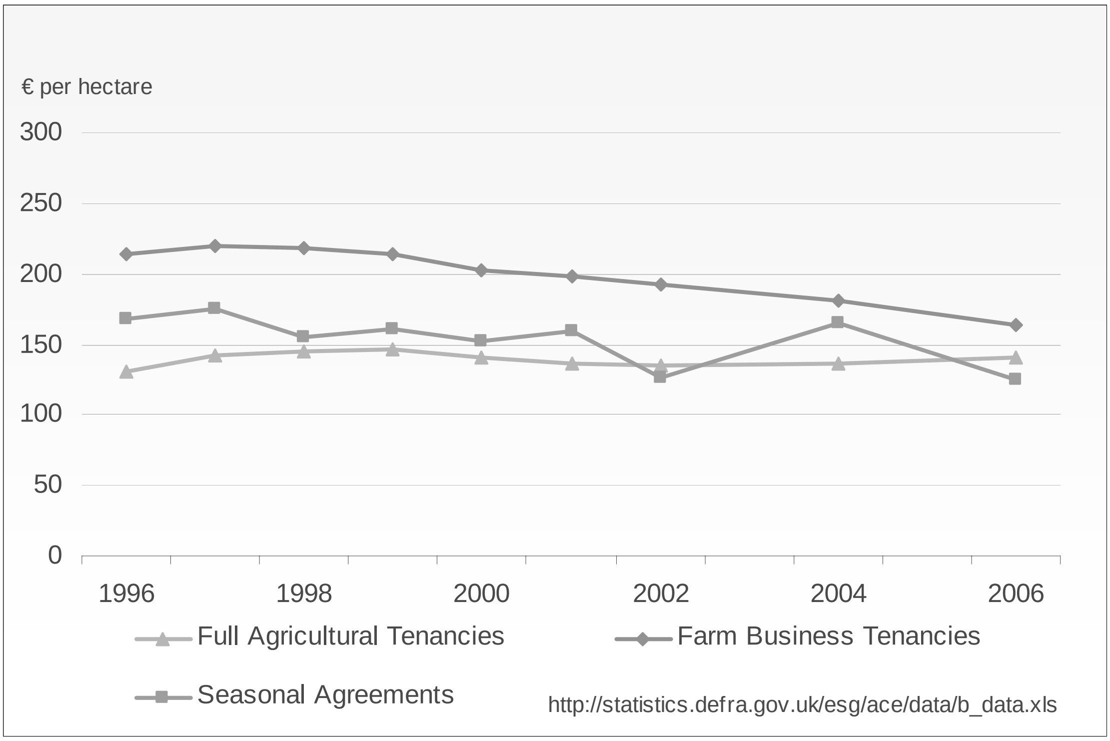
Source: Savills (L&P) Limited (2008).

Figure 90. English Land Tenure



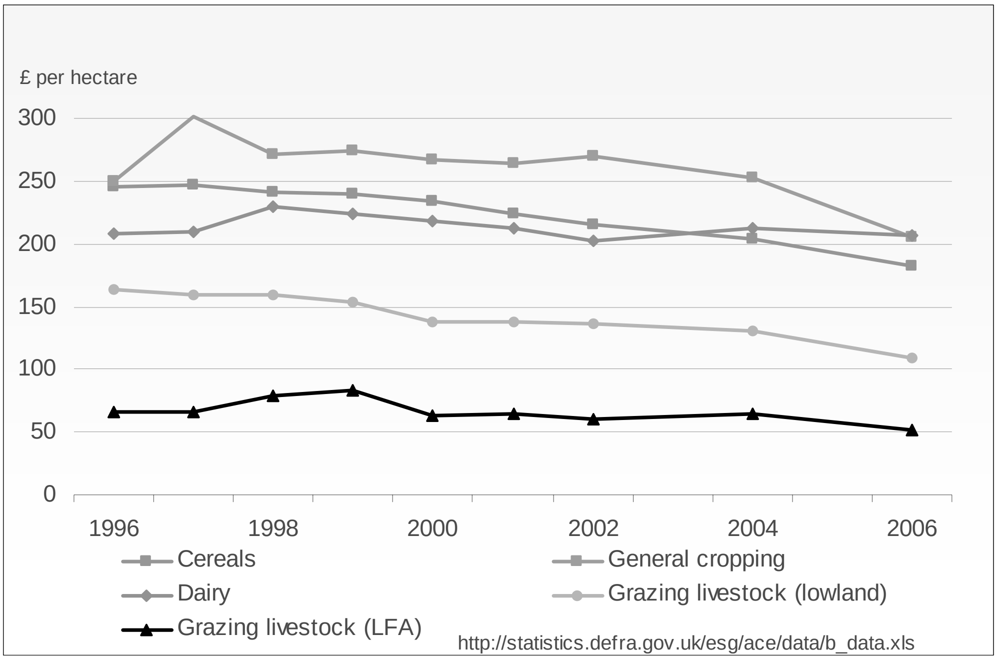
Source: Department of Environment and Rural Affairs (2008). June 2000 Agricultural and Horticultural Census (various years).

Figure 91. Average rents by type of tenure in England



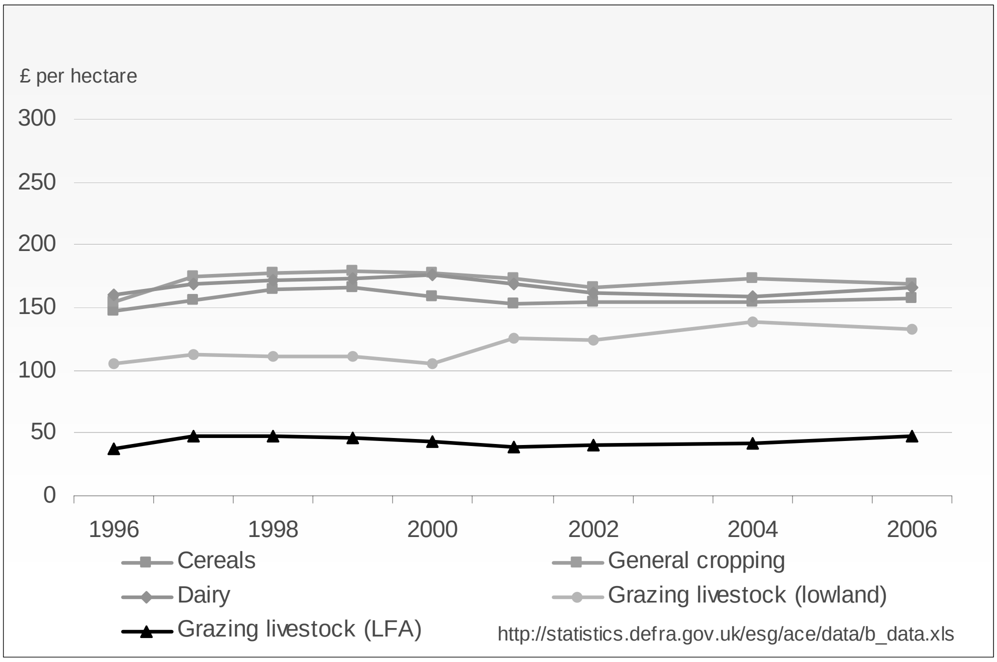
Source: Department of Environment and Rural Affairs (2008). Agricultural Change and Environment Observatory Programme.

Figure 92. Average rents: Farm Business Tenancies in England



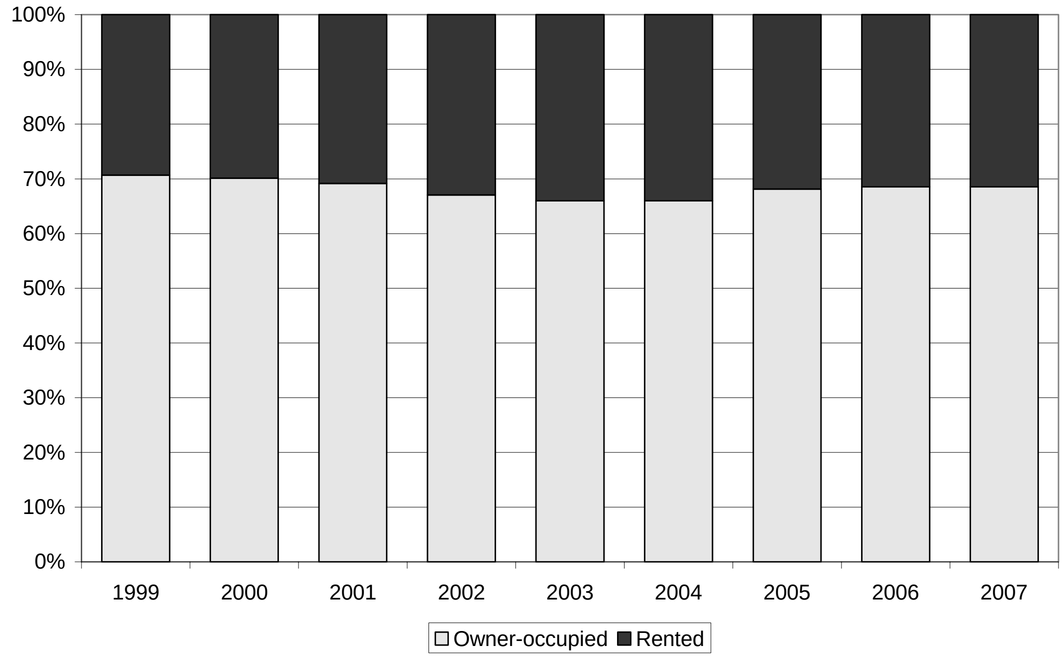
Source: Department of Environment and Rural Affairs (2008). Agricultural Change and Environment Observatory Programme.

Figure 93. Average rents: Full Agricultural Tenancies in England



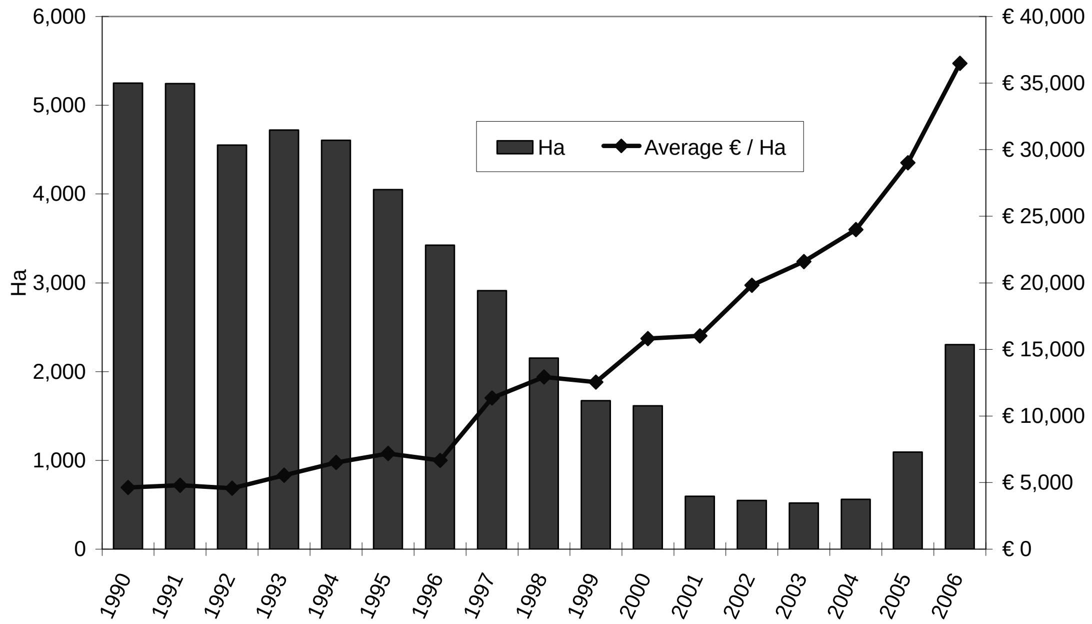
Source: Department of Environment and Rural Affairs (2008). Agricultural Change and Environment Observatory Programme.

Figure 94. Land Tenure in Northern Ireland



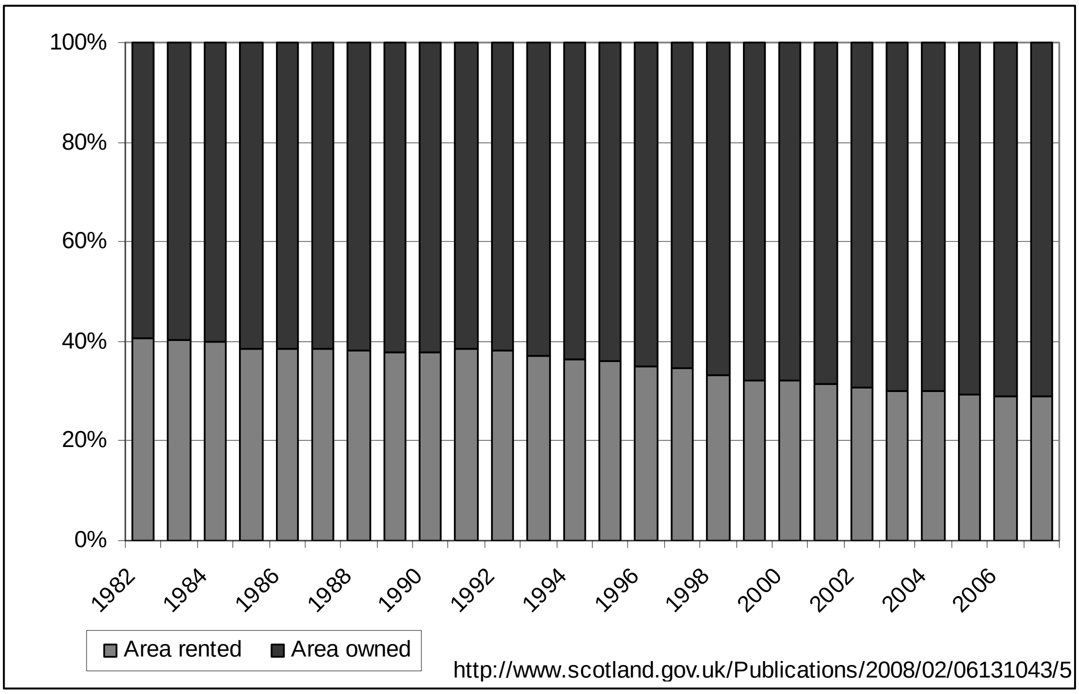
Source: Department of Agriculture and Rural Development of Northern Ireland (Various). Statistical Review of Northern Ireland Agriculture (various editions).

Figure 95. Average area of land sold and value in Northern Ireland



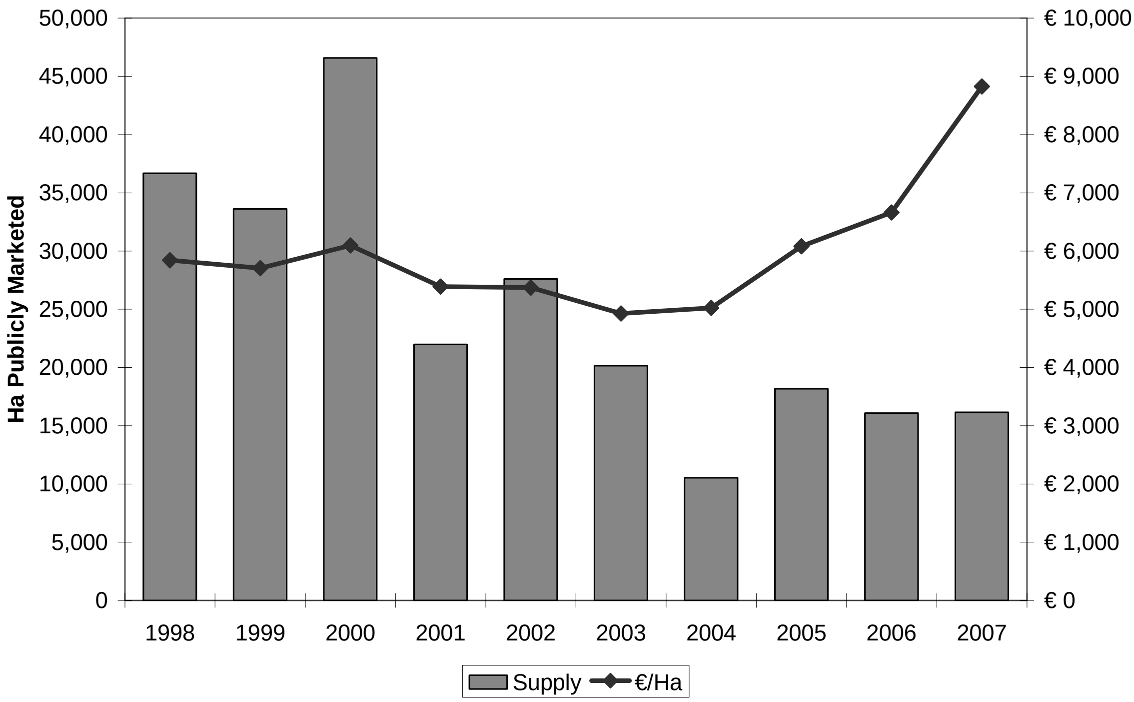
Source: Department of Agriculture and Rural Development of Northern Ireland (Various). Statistical Review of Northern Ireland Agriculture (various editions).

Figure 96. Scottish Land Tenure[92]



Source: The Scottish Government (2008). Abstract of Scottish Agricultural Statistics 1982 to 2007.

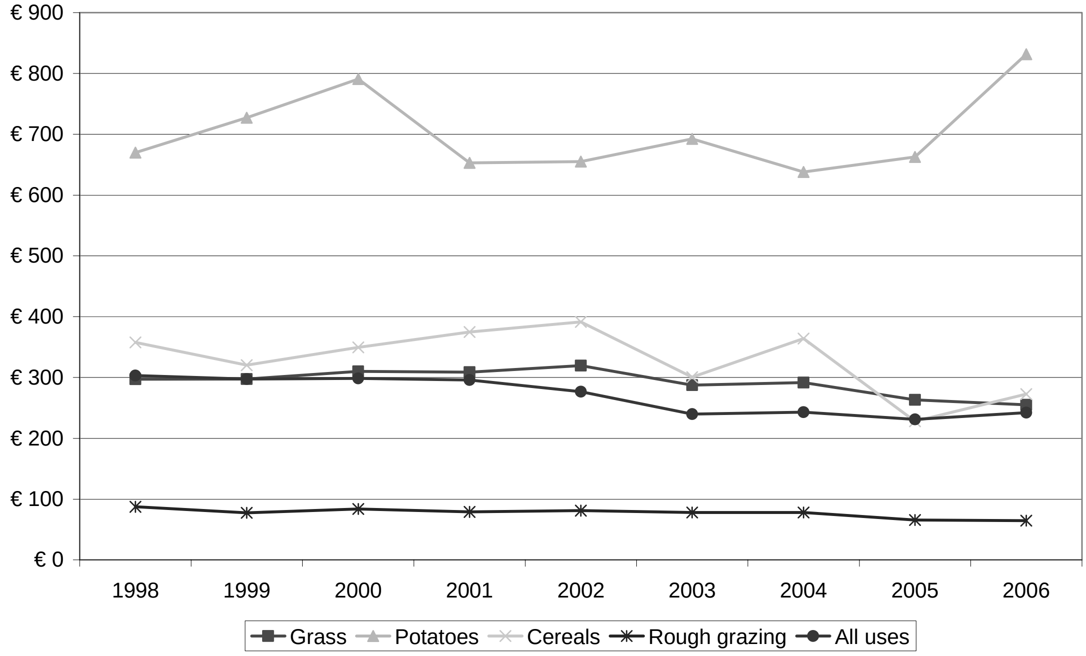
Figure 97. Average Scottish Land Value and Publicly Marketed Land for Sale



Source: Savills (L&P) Limited (2008).

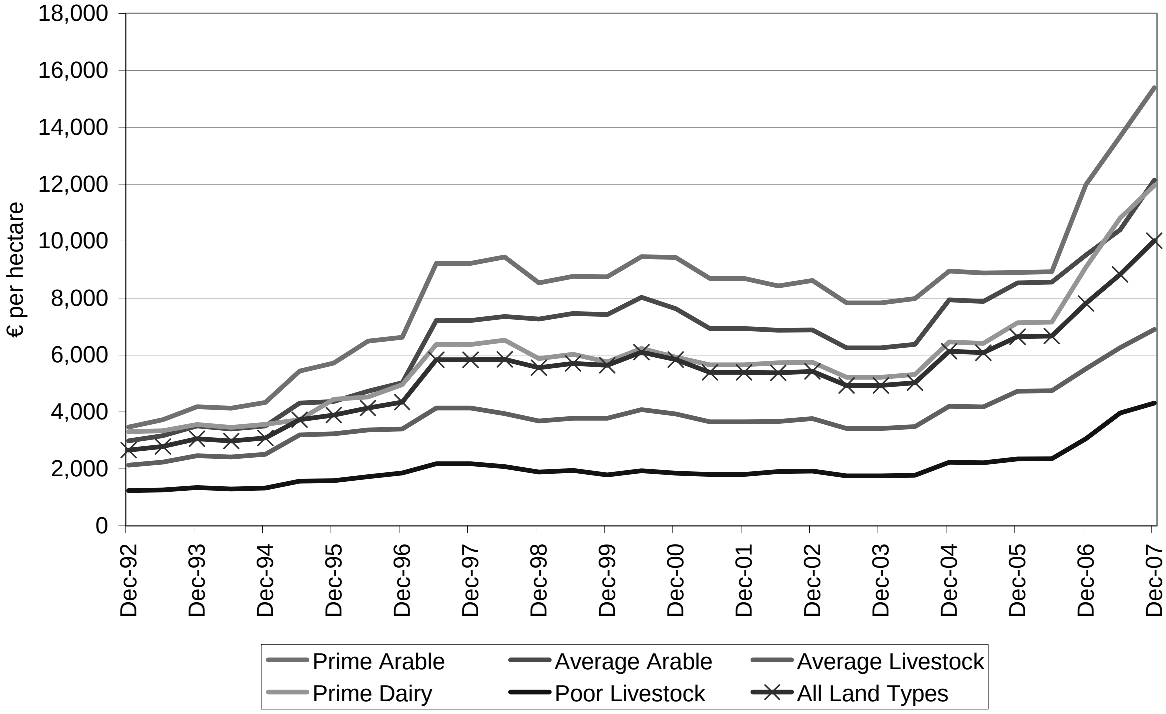
[92] total excludes bare fallow and set-aside

Figure 98. Average Conacre rents in Northern Ireland



Source: Department of Agriculture and Rural Development of Northern Ireland (Various). Statistical Review of Northern Ireland Agriculture (various editions).

Figure 99. Agricultural Land Values in Scotland 1992-2007



Source: Savills (L&P) Limited (2008).

13. APPENDIX 2. LITERATURE REVIEW

13.1. Introduction

Various studies have analysed agricultural policy measures that have been implemented to support farmer income in developed countries: market price support, production subsidies, factor subsidies, coupled and decoupled payments, etc. (see e.g. Hertel 1989; Salhofer 1996; Dewbre, Anton and Thompson, 2001; Alston and James, 2002; Guyomard, Mouel and Gohin, 2004; Ciaian and Swinnen 2006, 2007).

The general result of these studies is that the implemented agricultural policies affect (increase) farmer income, although with varying effects across policies. In addition to the direct first-order effect of increasing farmer income, most of the implemented agricultural policies also induce further second-order adjustments. For example, farm subsidies affect not only the employed factor reward but, through altered farmer incentives, they also affect factor demand, inter-sectoral factor allocation, factor ownership etc. Although, the number of studies looking at these issues has been growing in the last decade, the impact of decoupled policy-induced second-order effects has been investigated insufficiently in the empirical literature (Bullock and Salhofer 2003; OECD 2007; Alston 2007).

One strand of this second-order policy impact assessment literature considers policy impact on land prices and land rents. These insights are crucial as they may help to answer politically important questions, such as who benefits from the subsidies and how much – landowners or farmers renting the land, how is the agricultural productivity affected, how do they affect future policy design?

If agricultural subsidies benefit landowners instead of farmers, negative side-effects may arise. For example, policy-induced land value growth might reduce the efficiency in the agriculture sector. Given that farmers must finance a higher initial investment (entry cost) and face a risk of policy changes affecting the return on that investment, the entry barrier for potential new farmers increases. It also increases the expansion cost of existing farmers. Consequently, the mobility of land between different owners is reduced, further increasing the average cost of production in the agricultural sector.

Further, depending on the exact implementation mechanism, the benefits of support might accrue only to those who are landowners at the time the support was introduced. The later entrants, who have purchased land at higher prices, may benefit less from the policy support. This implies that many active farmers do not receive any or receive only a fraction of the benefits from subsidy support. This implies that, if the policy goal is inter-generational equity, support levels would have to be increased in the future, further inflating land value and entering a spellbound circle of subsidy support that unlikely can be continued forever.

Finally, future reform efforts to reduce support might be rendered more difficult because of the potential impact on land value. Expectations about the level of subsidy support in the future play an important role in the determination of land value. When agricultural support policies become capitalised into land value, existing landowners may resist future policy reform because of vested interests.

Hence, in order to understand the effects of the CAP on land markets, a profound and detailed knowledge about the policies and about the underlying mechanism according to which agricultural subsidies are capitalised into land value and farmland rents is required.

To analyse the influence of the CAP on the functioning of EU land markets, it is useful to draw upon existing studies in the literature both for gaining insights and for developing a theory and methodology. Therefore, in this section we summarise the key findings of previous studies. We first review findings from traditional models which investigate the impact of coupled subsidies, such as market price support measures; then we look at findings from analyses which explicitly consider the impact of decoupled subsidies. Finally, we summarise conditions, under which the theoretical predictions hold empirically, and identify factors which may cause discrepancies between the theoretical predictions and empirical evidence.

13.2. Capitalisation of coupled subsidies

Although the questions related to subsidy capitalisation into land value and farmland rental rates (such as who benefits from the subsidy and how much – landowners or farmers renting the land, how is the agricultural productivity affected, how do they affect future policy design) are both politically important and academically interesting, the existing literature on these issues is not vast.

The classical model for analysing income distributional consequences of agricultural support policies is Floyd (1956). Floyd proposed a model with two factors used to produce one agricultural output. He assumed one land and one non-land (labour and capital) inputs, which are combined in a constant return to scale production function. In his model output market clearing and input market clearing determined the output and input prices. The elasticities of factor supply and the elasticity of demand were assumed to be constant.

According to the Floyd's canonical single output and two input model, price support increases the price of a factor if its supply is not perfectly elastic. A given percentage increase in product price will result in the same percentage rise in all factor prices if inputs are perfect substitutes in production or if the supply elasticities of the two factors are the same. If the factor supply elasticities are not equal, the price of the input with the least elastic supply will raise most.

According to the Floyd's model, income distribution of agricultural support policies depends largely on input supply and input substitution elasticities. For policy purposes we can distinguish between two situations: (i) factor supply is either perfectly elastic or perfectly inelastic and zero elasticity of substitution between factors (the corner solution of the model); and (ii) partially elastic factor supply and positive elasticity of substitution between factors (the interior solution of the model).

First, consider the corner solution when factor supply is entirely inelastic and the elasticity of substitution between factors is zero. According the corner solution of the Floyd's (1956) model, output price support simply inflates input costs, and the value of output support becomes captured in the value of the factor with inelastic supply. If the inelastic factor is land, then the value of subsidies is fully captured into land rental rates, and hence capitalised into land price. If the factor owner is farmer, then the agricultural support policy increases farmer income. Otherwise, the benefit of the agricultural support policy leaves the agricultural sector and is captured by the non-farming landowner.

Moreover, on an intergenerational basis, by increasing the cost structure of production, the agricultural support policy increases the set-up cost for future farmers as they have to "buy" the value of the policy support as a condition for entry into the sector.[93] This in turn implies that to the extent that price support is capitalised, it will benefit active farmers at the time the policy support is introduced more than ex-post start-ups.

Second, consider the interior solution when factor supply is inelastic but the elasticity of substitution between factors is positive. According the interior solution of the Floyd's (1956) model, the effects of output price support on output and factor markets depend on the factor supply elasticity. More precisely, the more inelastic is factor supply, the more output price increase is translated into a higher price of that factor; the more price support indirectly increases the production cost of the output; the smaller the induced increase in the farmer's profit as the value of support provided through the output price is transferred to the owner of the factor.

The main findings of the theoretical literature on coupled policy impacts can be summarised as follows (with area payments being coupled payments as they were in the EU before introduction of the SPS):

- If land supply is fixed then area payments are fully capitalised into land value;
- Coupled production subsidies are fully capitalised into land value if additionally to zero land supply elasticity either the supply elasticity of non-land inputs is perfectly elastic or if factor proportions are fixed;
- In other situations the benefits from coupled subsidies are shared between land and other production factors and, if demand elasticity is not perfectly elastic, the consumers too;
- The agricultural policy impact on the land value may be very large (e.g. fully capturing the subsidies).

[93] In a legal business environment, where farms are more or less inherited free of taxes, charges and compensatory payments to family members not staying in the farm business, the intergenerational equality argument applies only to those farms who want to expand in acreage or newly enter the system.

13.3. Capitalisation of decoupled subsidies

More recently, a new generation of partial and general equilibrium models have been developed to explicitly analyse the impact of decoupled subsidies. Most of this literature, which is still in an early stage of development, is based on behavioural models of profit maximisation. The two most prominent representatives of this class of models are Guyomard, Mouel and Gohin (2004) and Ciaian and Swinnen (2006, 2007).

By their definition, fully decoupled polices should not affect agricultural markets in general and land markets in particular (Cahill 1997; OECD 2001). Ciaian and Swinnen (2006) proposed a partial equilibrium model for analysing income distributional effects of area payments and SPS. They assume two heterogeneous farms competing for land. Each of the two heterogeneous farms maximises profits. Ciaian and Swinnen assume one input (land) and one output. The total land supply was assumed to be fixed.

Ciaian and Swinnen find that a decoupled subsidy that is not linked to output market and to input market does not affect marginal output and marginal input profitability. Hence, a fully decoupled payment does not affect farmers' behaviour and has no income distributional effects. In the same time, truly decoupled policy does not affect long-run adjustments in agricultural sector. Ciaian and Swinnen also show that SPS does not affect land values. These results hold even if the SPS is not fully decoupled because, for example, farmers need to have eligible land to activate SPS.

The main findings of the theoretical literature on decoupled policy impacts can be summarised as follows:

- Fully decoupled farm polices have no impact on land value if markets are perfect;
- Decoupled polices may affect land value only in the presence of (some) market imperfections (such as land market transaction costs or credit constraints).
- The exact impact depends on many factors, such as policy type, supply and demand elasticities, accompanying policy measures, market imperfections, land use opportunity costs, institutions, expectations, etc.

13.4. Determinants of subsidy capitalisation

The exact outcome of the implemented policies in terms of income distribution, inter-sectoral factor allocation and factor productivity is affected by many factors. Policy related factors (determinants) are policy type, policy implementation details, and accompanying policy measures. The key exogenous comparative advantage determinants (endowment and technology) are factor supply and substitution elasticities and inter-sectoral production substitution possibilities (land use alternatives). Land market related determinants include market imperfections, land market institutions and regulations, as well as market transactions costs. Finally, the outcome of the implemented farm support policies depends on the time scale policymakers are looking at and on the responsiveness dynamics of the implemented policies.

In this section we review the most important of these factors which, in a mutual interaction, determine the direction and size of coupled and decoupled agricultural policy impacts on factor income in general, and land rents and prices in particular.

Policy type

Generally, different policies can be implemented to address the policy objective of supporting farmer income, such as input subsidy, output subsidy, export subsidy, decoupled payments, input quota, output quota, etc. An important conclusion from the theoretical literature is that one of the key factors which determine the extent to which subsidies are captured in land value depends on the type of implemented policies. This result holds not only for decoupled versus coupled policies, but there are also important differences between different coupled policies.

For example, consider the impact of output subsidy and area payment. An area payment is targeted directly on land while output subsidy is linked to agricultural output. Because area subsidy is directly linked to the land market, it is expected to have a stronger impact on land value than output subsidy. It decreases farms' land costs, which in turn increases the demand for land. A land subsidy solely decreases land costs, the rest of input costs are not affected. Higher land demand in turn exerts upward pressure on land prices. In contrast, output subsidy affects land price indirectly through higher profitability of agricultural production. Directly, it affects output market and hence consumers' welfare. Indirectly, output subsidy increases demand not only for land but for all farm inputs. Hence, it affects marginal profitability of all farm inputs equally. As a result, the effect of the subsidy is shared equally among all inputs (OECD 2007).

Policy implementation details

The capitalisation rate of subsidies depends also on policy implementation details. For example, depending on whether the subsidies are implemented for a certain period or are 'open-end', their capitalisation into land value may be different. Benefits may flow to landowners but may not be capitalised into land value, if they are not expected to continue into the future. On the other hand, benefits may be capitalised effectively into land value even if the benefits themselves do not flow to land per se.

From the SPS perspective, a particularly important factor is the implemented mechanism of entitlement allocation. If the right to a stream of income is freely transferable separately from land or other assets, then the value of that stream will be capitalised into the entitlement (Alston 2007). However, if entitlements are attached to land and cannot be used or transferred separately from that land, then the subsidy is likely to be capitalised effectively into the value of the land or the farm as a whole. Alternatively, if a right to entitlements is assigned to an individual, separately from land or any other assets and not in any way transferable, it will not be capitalised into any physical assets.

The degree to which the SPS are capitalised into land values also depends on the implementation model (historical, regional or hybrid) and the ratio of entitlements to land (Kilian and Salhofer 2008).

If the number of hectares exceeds the number of entitlements, the single payments are not capitalised into land prices. This is true for all three SPS models. Ultimately, it is the number of suppliers and demanders on the entitlement market, what will determine the outcome. If there is a surplus demand, entitlements will have their own value decoupled from land.

If the number of entitlements exceeds the number of hectares, the outcome is different for all three models. In the case of the historical model, part of the single payments is capitalised into land values. The extent of capitalisation depends on the proportion of single payment entitlements to land and the variability of single payments. In the extreme case of identical single payments for each hectare, the result is the same as in the regional model with all rents from entitlements capitalised into land values. In the case of the hybrid model, the degree of capitalisation lies somewhere between the other two models (given the same overall single payments).

Thus, depending on policy implementation details, decoupled subsidies may be fully capitalised into land or not capitalised into land at all. Depending on the rules determining eligibility to receive the future stream of policy transfers, they may also be only partially capitalised into the land value (Sumner and Wolf 1996; Ciaian and Swinnen 2006, 2008; Kilian and Salhofer 2008).

Accompanying policy measures

In the real world agricultural support policies are combined in policy programmes involving multiple instruments working in the same time, none of which can be considered isolated from the others. Hence, even when farm payments are fully decoupled (as SPS), whether the payments are fully reflected in land rents or capitalised into land value may depend on other policy instruments.

Given that the vast majority of decoupled policies are combined with coupled policy instruments in one way or another, they are not fully decoupled, and hence their final incidence will also depend on the extent to which the incidence is shifted through changes in input use and output, which in turn depend on details of the policies and parameters of supply and demand and so on.[94] For example, decoupled payments and area payments may be subject to cross-compliance, set-aside, or other requirements. If area payments are subject to cross-compliance, then their effect on land value is mitigated due to the fact that the eligibly for subsidy requires farmers to incur certain costs.[95]

[94] According to Alston (2007), in the presence of other policies, the results of econometric studies might be affected by the mechanism how policies are represented in the models. Econometric studies often require some aggregation across different types of subsidies in ways that may cause problems if the nature of the subsidies varies across the observations (for example, the mixture of forms of subsidies varies in a cross section or the details of the instruments change over time).

[95] Ciaian and Swinnen (2006) showed in the case of SPS when entitlements that give right to area subsidy is owned by farms and is allocated to a fixed quantity of land, then the subsidy is not capitalised into land

Factor supply elasticity

As already outlined above, the exact effect of subsidies on land value depends also on the factor supply elasticity.[96] In an extreme case, the factor supply elasticity may even reverse the original effect of subsidies on land value.

In the case of small substitution elasticities, any subsidy will have a substantial impact on land value. With introduction of subsidies, most of the adjustments take place through price changes while adjustments in quantity are small. In the case of area payments a large proportion of subsidies will be capitalised into land price. In the extreme case when the supply elasticity of land is zero then area payments are fully capitalised into land value.

With positive land supply elasticity area payments will affect also prices of other inputs as well as prices of agricultural commodities. In the case of supply elastic inputs, markets respond to policies by strong adjustment in quantity and small adjustment in price. Output subsidy leads to higher increase in price of supply inelastic inputs than the price of supply elastic inputs. Output subsidy is fully capitalised into land value only in the case when supply elasticity of land is zero and when supply elasticity of non-land inputs is perfectly elastic (Floyd 1965; Gardner 1983; and Alston and James, 2002).

In empirical studies the land supply elasticity is usually found to be rather low, mostly due to natural constraints. For example, based on an extensive literature review Salhofer (2001) concludes that a plausible range of land supply elasticity for the EU is between 0.1 and 0.4. Similarly, Abler (2001) finds a plausible range between 0.2 and 0.6 for the US, Canada and Mexico.

Land use alternatives

Usually, land can be used not only in agriculture but also in other sectors of the economy. If there is such an opportunity, land value will reflect this potential alternative land use. In a competitive market land value reflects returns form the most profitable use of land. If the most profitable use of land is non-agricultural use, (e.g. urban housing), then land value will be determined by the profitability of urban housing. However, if the non-agricultural use of land is expected to be profitable in the future then the current land price will reflect the sum of the discounted stream of rents from agriculture up to the time of conversion plus the discounted stream of expected rents from non-agricultural use from that time onward (Plantinga et al. 2002).

Factor substitution elasticity

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value. Instead, subsidies benefit farmers. In this situation the subsidy does not affect marginal return of the rented land. This is contrary to the effect of area subsidy granted per hectare which gets capitalised into land value.

[96] The supply elasticity measures how factor supply responds to price changes. If an input is supply inelastic, then policies will have big impact on price and small impact on quantity of that input.

Substitution elasticity is a further crucial factor determining the distributional consequences of policies.[97] With area payments farms have an incentive to substitute land for other inputs which expands land demand and leads to strong capitalisation of subsidies into land value. Subsidies, which are not targeted on land, have the opposite effect.

High elasticity of substitution between land and other inputs will induce high impact of area subsidy on land value, as high elasticity of substitution allows easy substitution between land and other farm inputs in the production process. In general, a high elasticity of substitution between land and other farm inputs reduces the impact on land value in the case of subsidies not targeted on land (Floyd 1965; Gardner 1983; and Alston and James 2002).

Based on 32 studies Salhofer (2001) reports average elasticities of substitution between land and labour of 0.5, between land and capital of 0.2, and between land and variable inputs of 1.4 for Europe. Similar values are reported in Abler (2001) for the US and Canada.

Market imperfections and transactions costs

In the presence of market imperfections, the realised policy impact might be different than predicted by models with perfect competition. Indeed, several studies show that decoupled payments affect farm behaviour in the presence of market imperfections differently than with perfect competition (e.g. Chau and de Gorter 2005; de Gorter 2007; Hennessy 1998).

Generally, land transaction costs related to land withdrawal from corporate farms in transition countries do not affect the general result that area payments increase land rents and benefit landowners instead of farmers (Ciaian and Swinnen 2006). However, transaction costs depress land prices both with and without area payments. Transaction costs and area payments have the opposite effect on land rents. Transaction costs reduce land rents, while area payments are capitalised in land rents. If the effects are equal then they cancel each other out.

Also credit market imperfections have important implications for the distribution of area payments (Ciaian and Swinnen 2007). In a model with land as a fixed factor and credit market imperfections, area payments increase land rents by more than subsidies. On aggregate, farms may actually loose rather than benefit from the subsidy, only the most credit constrained farms may gain from the subsidy.

Land market institutions and regulations

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[97] Substitution elasticity measures how easy it is to substitute one input for other in the farm production function.

The effect of subsidies on land value in competitive markets can be affected also by land market regulations. The most obvious regulation that will affect the land market is when land prices are regulated (e.g. fixed) by the government (Latruffe and Le Mouël 2006).

Various formal and informal institutions in land markets will also affect the subsidy-land value relationship. For example, if a rent agreement is a pure 'cash' rent agreement, then the farm program payments must go entirely to the farm operator; the landowner is not eligible to receive any payments. Otherwise, under a share rental arrangement, the same subsidy payments may have to be divided between the landowner and the tenant. With crop-sharing contracts the issue is more complicated in that PFCs are supposed to be shared in proportion to crop shares.[98] If the terms of such leases are not adjusted, the landowner will not reap the full benefits. Thus, if subsidy payments increase unexpectedly in the presence of pre-existing leases, tenants holding cash rental arrangement will capture all benefits (and their landowners will receive none), whereas tenants holding share rental arrangement will share the same benefits with their landowners.

Obviously, these regulations govern only the initial distribution of subsidy payments between landowners and tenants, which is almost surely different from the final incidence after markets have adjusted to the new equilibrium with subsidies. Other things equal, one would expect that the rates of cash rent would adjust to equivalence with the corresponding share rental rate, reflecting the subsidies and other determinants of income.

Social capital

Farmers are working and living not only in economic but also in a social and cultural system. Therefore, the actual actions of a farmer on markets are influenced by the intensity and kind of social relation of the parties involved in a transaction and by the societal norms and cultural context (Robinson and Flora, 2003). Studies for the US show that social capital is a pivotal factor for the land market influencing the type of transactions (e.g. Rainey et al., 2005), the price of the land (Robinson et al, 2002) and the partners involved in the transaction (Siles et al., 2000). Thus, the extent to which subsidies are incorporated in farm land values and therefore transferred from the farmer to the land owner depends on the respective local cultural and social setting.

Transactions of land occur mainly between relatives or friendly neighbours (Siles et al., 2000). This group receives a rebate on the land price ranging from 10% (Robinson et al., 2002) to 43% (Tsoodle et al., 2006) compared to total strangers. According to Tsoodle et al. (2006) the influence of the social capital has increased over the last years. With respect to renting contracts social capital influences the type of the contract while

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[98] Barnard et al. (2001) report testimony of a panel of farm managers that with cash rentals, terms of leases are negotiated with "lease rates being bid up until the landowner had captured most of the tenant share of the PFC".

the rental price is inversely correlated to the duration of the relation between land owner and tenant (Rainey et al, 2005).

Time scale and dynamics

The impact of both coupled and decoupled policies varies over time. For example, formal and informal land rental contracts imply that the transmission of changes in policy into rental prices and asset prices for land is not instantaneous. Sluggish adjustment of rental rates implies that the short- and intermediate-run incidence of policies will be different from the long-run outcome with complete adjustment. Moreover, even without contracting, land markets involve lags and dynamics, uncertainty and expectations. For example, rental arrangements are typically multiyear in their nature and often reflect long-term personal relationships, sometimes among members of the same family. Competitive pressures might not take full and immediate effect in such a setting (Gardner 2002).

Further, data on land rents and land value are often based on expert assessments rather than direct evidence from market transactions. These assessments are likely to understate the true movements in rental prices associated with year-to-year variations in income received from the market or the from the transfers. Because contracts are established well in advance of market realisations, they do not precisely correspond to the observed realisation. For instance, land rents are set ex ante whereas subsidy payments can only be observed ex post.

All these factors imply that short-term movements in rental prices will be different (lower) than the long-term impact of permanent changes in subsidies.

13.5. Simulation studies

The theoretical models discussed in the previous section have found application in two types of empirical studies: (i) ex-ante simulations of policy impacts; and (ii) providing functional relationship and hypothesis for econometric estimations. In this section we summarise findings of key simulation studies. More precisely, we review the three most influential studies on land markets in EU, which among other important questions investigate the impact of agricultural subsidies on land value and farmland rental rates: SCENAR2020, GENEDEC and IDEMA.[99]

The SCENAR2020 study simulates the key future trends and driving forces that will form the framework for the European agricultural and rural economy by 2020. Among the key driving forces SCENAR2020 identifies the rural demographic patterns; the agricultural technology; the agricultural markets; and the natural and social constraints on land use that are likely to exist in 2020.

[99] GENEDEC and IDEMA have been financed by the 6th EU Framework Programme for Research and Technological Development (FP6). SCENAR2020 was financed by the European Commission, Directorate-General Agriculture and Rural Development.

By comparing the reference scenario with two alternative scenarios ('liberalisation' and 'regionalisation'), the SCENAR2020 project investigates and compares the impact of three different policies. In the baseline (reference) scenario all current policies are considered to continue into the future, with modifications over time that are reasonably certain to happen according to the current political situation. In the regionalisation scenario there is a sustained policy preference to promote regional economic strength and social welfare; to some extent this is also an emphasis on the maximum degree of support for agricultural supply that is possible under the current, and likely, WTO framework. In the third – liberalisation scenario – policy intervention in the economy and in social welfare, including environmental protection is reduced to a socially acceptable minimum.

Simulation results of the SCENAR2020 study suggest that factor markets have general trends that are rather independent of policy, except for agricultural land prices, which decrease significantly because of market liberalisation. The simulated development of factor prices shows that especially land prices are very dependent on the implemented policy instruments. The direct payments and profitability of agriculture accrue partly in the price of the fixed factor land. In the regionalisation scenario direct payments stay highest and agriculture is more profitable relative to other scenarios, and land prices are the highest. In the liberalisation scenario land prices decline considerably, because all direct payments are abolished and profitability in agriculture decreases. Declining prices of agricultural land imply lower asset values for the landowners. This might affect the viability of landowners that are heavily indebted. Depending on whether landowners are farmers and whether they live in urban areas, this might cause adjustment costs in rural areas which might justify adjustment policies.

GENEDEC undertakes socio-economic and environmental assessments of decoupling measures, by using a set of simulation models for various regional levels. More precisely, it provides insights into the workability, the efficiency and the impacts of various scenarios of decoupling, it addresses quantitative assessments of decoupled support scheme impact on production, land use and land prices. Thanks to a complete set of databases (including the FADN farm level data), GENEDEC covers the whole European Union.

The GENEDEC project adopts a simplified approach to assess impacts of subsidy decoupling on land value – dual values of land equations: (i) single farm groups; (ii) land trade constraint for all farms within regions. GENEDEC compares the total shadow price to the rental land value, taking account of the fact that here labour is not accounted for (the difference between the shadow price and the rent could be considered as a proxy of the average marginal value of the labour time spent on one hectare).

GENEDEC relates different compounds of the land shadow prices to the prices and to the constraints existing in the model for which the total utilised agricultural area (UAA) is explicitly used. GENEDEC relates the “land” compound to the availability of the land fixed factor UAA, and the shadow price implicitly takes account of all payments related to agricultural activities.[100][101]

In a case study for Italy GENEDEC simulates the percentage changes in factor prices. They find that only the price of land varies regionally. In the Total Decoupling Scenario the simulated regional land price increases are following: land national +16.28%, land North +20.39%, land Centre +12.30% and land South +14.86%. These simulation results suggest that higher land prices, especially in the North Italy, are expected to curb transactions of land properties, but may activate the rental market for land.

The IDEMA study provides a comprehensive socio-economic assessment of the impact of decoupling on the EU farming sector. The project assesses the impact of decoupling on market demand and supply, trade, localisation of production, land use, environment, land markets, structural change, farm income, and farmers' entry/exit behaviour. The IDEMA project is organised around three complementary empirical approaches: (a) survey-based analysis of farmers' strategic decisions, (b) dynamic farm based regional modelling and (c) sector level and general equilibrium modelling.

By performing numerical simulations IDEMA analyses socio-economic impacts of decoupling EU agricultural support in three distinct decoupling scenarios: (i) actual implementation of the 2003 CAP reform (as implemented in each member state); (ii) full decoupling with fully decoupled direct payments and top-ups; and (iii) a Bond scheme, where the SPS is linked to the farmer and not to land.

IDEMA’s results reveal that the impacts of the 2003 CAP reform are moderate, compared with a continuation of Agenda 2000. According to the IDEMA’s simulation results, there is no significant evidence that farmers would intend to drastically change their strategic decision to exit agriculture. In fact, IDEMA’s results indicate that structural change slows down when direct payments are decoupled. One reason for this effect is that grassland management becomes an additional income source for farmers. Another key finding of IDEMA is that the decoupled payments may reduce farmers’ off-farm labour supply. In the New member states (NMS), the impact of accession dominates the effects of decoupling. According to the IDEMA's simulation results, the introduction of CAP payments results in a greater willingness to stay in farming and more competition for land. Increased payments are capitalised in higher land (rental) prices.

IDEMA's simulation results suggest that the Bond type decoupled payment would lead to a strong increase in average farm size compared to the 2003 CAP reform. Many farmers would leave the sector if off-farm jobs were available, as the decoupled payment is granted to a farmer independent of land or any farming activity (it is only based on historical production). However, in most cases profits per hectare do not

[100] The “set-aside constraint” refers to the link between the UAA and the set-aside level (the stylised introduction of the set-aside constraint).

[101] The “entitlement” refers to payments when they are directly related to the available eligible area.

change or even increase under the Bond scheme, due to significantly lower land (rental) prices and structural change.

Findings from the EU simulation studies suggest that agricultural policies do affect land prices and land rental rates. In line with the theoretical literature on subsidy capitalisation, the performed scenario analysis suggests that subsidy capitalisation into land values and land prices depends on many both policy and non-policy assumptions, which were compared across scenarios.

13.6. Empirical studies on land (sales) price

The empirical attempts to estimate the impact of agricultural support policies on land rents and land prices can be regrouped into two broad categories: land value/price studies and land rent studies. Whereas the former study policy impact on farmland prices, the latter investigate the policy impact on the farmland rental rates. The main reason why authors use one instead of the other approach is usually data: the availability of either land value (typically from regional datasets) or rental data (typically from farm-level surveys) generally determines the choice of the models.

It is important to point out that virtually all of the existing studies are on North America (the US and Canada). To our knowledge, only three cover EU countries (Trail, 1980; Goodwin and Ortalo-Magné, 1992; Duvivier, Gaspart and de Frahan, 2005). Moreover, none of these measures the impact of the SPS (see Table 37).[102]

Goodwin and Ortalo-Magné (1992) estimate an empirical model relating land value to the expected level of producer support, expected yield and expected producer prices net of subsidy support in six wheat producing regions in France, the US and Canada between 1979 and 1989.[103] The subsidy support is proxied by the producer subsidy equivalent (PSE).

Goodwin and Ortalo-Magné estimate that a 50 percent reduction in producer support for wheat growers would lead to a \$60-\$120 land price decrease in France, and a \$50-\$60 decrease in the US and Canada. This means that, on average, a one percent increase in the producer subsidy equivalent would increase land value by 0.38%. Goodwin and Ortalo-Magné also find that land prices are more responsive to government-based returns than to market-based returns.

Barnard, Whittaker, Westenbarger and Ahearn (1997) undertake a separate approach using pooled cross-sections in order to assess the degree of capitalisation. For

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[102] The large majority of empirical studies performed to date have estimated the present value of land as a function of government payments and other explanatory variables. The main reason for the relative dominance of land price studies is given by the data availability - usually regional data is more broadly available (typically used in land price studies) than farm-level data (typically used in land rent studies).

[103] US Kansas and North Dakota, Canada Manitoba and Saskatchewan; French Centre and Picardie regions; Canada Saskatchewan region.

investigating the effect of public support on farmland prices they adopt an alternative framework to the PVM. Relying on a hedonic price model Barnard et al. regress the cropland value on government subsidies.[104] They measure government payments by the county-level averages of the annual amount of direct payments received par acre for twenty U.S. regions. In order to account for possible land conversion, they included proxies for alternative uses of land in their regression. The other explanatory variables they include are agricultural productivity, non-agricultural influence and state-specific institutional environments and others.

Barnard et al. find that, depending on the region, the elasticity of cropland value to the government subsidies ranges from 0 to 0.69. Based on these results they conclude that the sensibility of farmland value to government support is spatially variable. Two elements can explain this spatial variability; (i) whether or not the dominant crops in a given region are eligible to the support, and (ii) the level of agronomic flexibility of a given region that determines the ability to adjust output in response to changing government policy. However, Barnard et al. fail to account for omitted variables that might determine both subsidies and land values, thereby likely failing to identify a causal relationship.

In a follow-up study Barnard, Nehring, Ryan and Collender (2001) analyse county-level farmland value data from the 2000 Agricultural Resource Management Study (ARMS). As in the 1997 study, Barnard et al. ran hedonic land price regressions to estimate the effect of farm commodity program payments on farmland value, while controlling for soil quality, urban influence, availability of irrigation, and other factors.[105] Thus, their regressions include land value per acre as a function of commodity program payments received, soil quality, availability of irrigation, urban influence, and other factors.

The Barnard et al (2001) hedonic pricing model's results suggest substantial effects of government payments on land values. They estimate that $61.6 billion of the $312.3 billion value of land harvested for eight program crops (wheat, corn, soybeans, sorghum, cotton, rice, barley, and oats) was attributable to program payments. Since payments received in 2000 for these programs amounted to about $21 billion, it appears that each $1 of payments generates about $3 of land value. Their results suggest that payments have the highest proportional effect in the Heartland region, accounting for 24% of farmland value. The effect is similar in the Prairie Gateway region (23%) and the Northern Great Plains region (22%).

Barnard et al. note that the very high land-value counties are in urbanised areas where their prices are unlikely to be caused by commodity programs. In order to account for effects of urbanisation, they estimate separate regressions for different regions of the

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[104] This approach relies on the idea that the land price is determined by the meeting of sellers' and buyers' bids, based on their respective maximised profit. However, in the hedonic price framework determinants of land price are often chosen in an ad hoc way (see Annex A).

[105] They explained the value of farmland per acre at the county level, as reported by farm operators in the 2000 ARMS conducted by USDA.

country and include additional right-hand-side variables. Barnard et al. also realise that the current level of payments is not the source of all program effects on land values. For example, Barnard et al note that in 2000 a larger payment proportion than usually was made up of LDPs, and these would be expected to have a smaller effect on land values than PFCs because LDPs have the additional effect of causing lower commodity prices. More broadly, land values are expected to reflect not only the current year level of payments, but all discounted expected future benefits. The observational basis for farmers' expectations about these benefits is not only current payments but recent past payments and commodity market conditions underlying forecasts of future payments.

Gardner (2002) uses pooled cross-sections to estimate farm subsidy impacts. Gardner finds that an additional dollar per acre in program payments would have increased the average growth rate in U.S. land value from 1950 to 1992 by 0.017 percent. The estimated coefficient implies that increasing payments by $1 per acre would increase the rate of growth of farmland value by 0.017 percent. Given that the mean value of 1992 payments per acre in these counties was $15, the elimination of the programs would have caused the rate of increase of farmland values to decline by 0.26 percent; i.e., instead of growing by 1.76 percent annually during 1950-92, without the programs the rate of growth would have been 1.5 percent.

Overall, Gardner concludes that the evidence from these county data that farm programs have increased farmland values is inconclusive and weak. Gardner also admits that the coefficient of government payments is not robust to alternative specifications that include other right-hand side variables.

Goodwin, Mishra and Ortalo-Magné (2003) use farm-level data for 1998-2001 drawn primarily from ARMS to estimate the determinants of farmland values. They estimate the capitalisation rate of government payments (PFC payments and disaster-relief payments (which include MLA payments)) into farmland value. They rely on the fact that the formation of land value is based upon expectations about the long-run stream of returns attached to land. To represent the expected payment, Goodwin et al. use a four-year average value of the realised payments at county level. In addition, they augment the canonical NPV framework to account for possible land conversion.

Goodwin et al. first consider the aggregation of all support programs into one single category. They show that using the actual realised payment of each farm as proxy of the expected rent gives a coefficient of 5.40. With the county average, they obtain a coefficient of 6.09.

In addition, Goodwin et al. estimate program-specific marginal impacts of per acre subsidies on land value that range from $2.59 and $7.78, depending on the source of the program payment. Assuming a discount rate of 5 percent (10 percent), their results suggest that landowners capture between $0.13 and $0.39 ($0.26 and $0.78) of the marginal subsidy dollar in the form of higher land rents, and that this incidence varies by program, i.e., they show that the rate of capitalisation of one dollar of payment is program specific.

Breaking out the overall measure of government payments into their individual components, they quantify the capitalisation rate for each type of support program.

Goodwin et al. find that the impact of an additional dollar of PFC payments $4.90 per acre, which is statistically significant. They also find that disaster-relief payments have a statistically significant impact on farmland values, with the impact of an additional dollar of payments about $4.70 per acre. These results suggest that both PFC and disaster-relief payments are captured at least partially by landowners, and that landowners were anticipating a continuation of payments beyond the life of the FAIR Act.[106]

Similar to Barnard et al. (1997), Goodwin et al. find that the extent to which support policies affect land value is spatially variable. They also point out that the implied effect of a support instrument on land value differs from year to year. As the authors note, one caveat to their results is that year-to-year fluctuations in government payments may not capture changes in long-run cash flow expectations that drive land values. When the authors modified their model to allow the effects of government payments on land values to differ from one year to another, they found substantial differences in payment impacts across years.[107]

Duvivier, Gaspart and de Frahan (2005) estimate the impact of the 1992 and subsequent CAP reforms on arable farmland price in Belgium. Using a panel of 42 Belgian districts from 1980 to 2001, they observe that the sales price of arable farmland is affected by the compensatory payments.

Estimation results of Duvivier et al. suggest that, besides the time dummies and other control variables, the expected land rent from market sales exert an important effect on arable farmland price. Depending on the year and region considered, the elasticity of arable farmland price to compensatory payments ranges from 0.12 to 0.47. These results suggest that, by creating a rent that capitalises into land value, the new CAP instruments also benefit landowners. Because about two thirds of the Belgian agricultural land is rented by farmers, non-operators capture an important share of agricultural subsidies. The results of Duvivier et al. also indicate that a temporal variability exists in the elasticity of arable farmland value to compensatory payments. They show that the sensitivity of arable farmland values to compensatory payments increases during the 1993-2001 period.

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[106] Goodwin et al. (2003) also included LDPs in their model. The impact of an additional dollar of LDP payments on land values is about $6.60 (2003) per acre. The impacts of LDPs are somewhat larger than those estimated for PFC or MLA payments, but the authors do not indicate whether these differences are statistically significant.

[107] Goodwin et al. (2003) realise several econometric issues associated with their estimations. Assuming that the realisation of a particular source of return correctly reflects the long run expectations could lead to an error in variable problem. Error in variable problems result in inconsistent estimators. They also note that the use of the farm observed payments may result in an attenuation bias that forces the implied capitalisation rates toward zero. Because the four-year county average, payments are more representative of the long run benefits, hence, a larger coefficient is obtained.

The main results of the key studies of subsidy impact on farmland value are summarised in Table 37. Based on the estimates reported in Table 37 we may conclude that depending on the data used and regression technique adopted the estimated effect of subsidy payments on farmland value is strongly varying across different studies. A general finding of land price studies is that the estimated elasticities of land prices with respect to coupled program payments are rather small. However, the total share of land value determined by support payments can be sizeable.[108] On the other hand, the estimated elasticities of land prices with respect to decoupled program are surprisingly comparable with the estimated elasticities of market returns or coupled subsidies. The capitalisation of decoupled subsidies varies between 0.2-0.5, while the capitalisation of market returns and coupled subsidy vary between 0.2-0.8 and 0.24-2.74, respectively.

13.7. Empirical studies on land rent

Land rent studies typically use farm-level variation in subsidy payments and farm revenues to explain variation in farmland rental rates, controlling for observable covariates and fixed effects when panel data are available.[109] As already mentioned above, usually the availability of data and not the theoretical considerations determine the choice between land rents and prices. The main results of the key studies of subsidy impact on agricultural land rents are summarised in Table 38.

Lence and Mishra (2003) use a behavioural model of profit maximisation, to investigate the effect of agricultural policy on land rents. More precisely, they examine the impact of PFC, MLA, and other government payments on cash rents using county-level panel data from the state of Iowa for 1996-2000. Using panel data they are able to control for additional heterogeneity.

Their statistical tests for spatial autocorrelation suggest that it is present and significant (i.e. correlation across space in the random factors outside their model that influence cash rents). Unlike most other studies on land values and rents, Lence and Mishra control for spatial autocorrelation. For comparison purposes, when they ran their model assuming no spatial autocorrelation, the impact of an additional dollar of MLA payments on cash rents drops to about $0.50 while the point estimate of the impact of an additional dollar of PFC payments becomes greater than $1, which is implausible.

[108] For example, Shaik, Helmers, and Atwood (2005) estimate the share of land value generated by program payments between 1940 and 2002 at 30 percent, although this share has fallen from a peak of 40 percent in the 1960s and 1970s to between 15 and 20 percent in recent years. Weersink, et al. (1999) find that agricultural support payments and farm revenues are discounted at different rates, with the latter being discounted more steeply.

[109] Whitaker (2006) points out that land rents may be empirically superior for investigating the effects of domestic support on land value for at least two reasons. First, rental rates are observed in the market while land value is often stated by the owner and therefore subjective. Second, rental rates are less affected by urban pressures and other non-agricultural factors when contracts are for short periods of time, and may therefore reflect the value of agricultural activity on the land (when contracts are for longer periods, the impact of support on land value may be less important than other factors not related to agriculture).

Lence and Mishra find positive marginal impacts of support payments per acre that range from \$0.25 to \$0.86 in additional rent per acre. On average, an additional dollar of PFC or MLA payments leads to an estimated increase in cash rents of approximately \$ 0.85. These results indicate that landowners capture most of the benefits from PFC and MLA payments. However, in one specification the estimated impact of LDPs on cash rents was negative and statistically significant, which raise concerns of misspecification and/or data problems.

Roberts, Kirwan, and Hopkins (2003) use 1992 and 1997 farm-level panel data from the US Census of Agriculture with a sample size of about 60,000 farmers. Similar to Lence and Mishra (2003), as a conceptual framework Roberts et al. use a behavioural model of profit maximisation. In their model, they divide land rent into two components: variable profits (revenues net of variable costs), and government payments.[110]

In their estimations Roberts et al. lump all government payments together into one single variable. Their calculations for 1997 suggest that approximately \$6.1 billion of the total payments to farmers were derived from Production Flexibility Contracts (PFCs) and the balance of \$1.7 billion was associated with conservation programs. The most statistically robust estimates of Roberts et al. suggest an increase in cash land rents of between \$0.34 and \$0.41 per acre for each additional dollar of government payments.

In a related study Kirwan (2005) uses the same 1992 and 1997 farm-level panel data from the US Census of Agriculture for a sample of over 113 000 farmers who reported paying cash rent in both years to analyse how government payments were divided between landlords and renters. Similar to Roberts et al., Kirwan lumps all government payments together and does not break out PFC or MLA payments from other payments.

Controlling for farm, county, and time fixed effects that may affect cash rents, Kirwan (2005) found that about 25% of each additional dollar of government payments was reflected in increased rental rates.[111] The remaining 75% represented a net gain to the

[110] According to Kirwan (2005), using the former component as a proxy for market-based income to land is not unproblematic - since it treats land as the residual claimant for agricultural income, which is inappropriate in general but perhaps especially so in a model designed to test whether it is so. Using variable profits as a proxy for market-based income to land may result in a biased estimate of the coefficient on the latter land rent component in the regression.

[111] The siseable sample and repeated program data allows Kirwan to addresses several important econometric issues through a government program instrumentation strategy. For example, he points out that production decisions are based upon expectations of future farm revenues and support payments. These expectations will not be completely accurate, thus creating a measurement error problem if observed realisations of these variables are used in estimation. As a result of expectation errors, estimated coefficients will be biased. In order to address this issue, Kirwan exploits the fact that program payments made in 1997, after the 1996 FAIR Act was introduced, were known more than a year in advance, making it highly unlikely that farmers would have made any expectation errors with respect to support payments. Furthermore 1997 payments will be highly correlated with earlier program payments, given that the former were a deterministic function of previous program acreage, but 1997 payments should not be correlated with any expectation errors made with respect to support in 1992. Recognising this, Kirwan predicts 1992 payments using 1997 payments.

renter.[112] According to Kirwan's estimates, on average landowners capture between \$0.20 and \$0.40 of the marginal per acre subsidy dollar depending on the region and farm size.

In summary similar can be concluded as for the land sale prices. The estimated elasticities of land rents with respect to decoupled subsidies are surprisingly comparable with the estimated elasticities of market returns or coupled subsidies. The capitalisation of decoupled subsidies in land rents varies between 0.3-0.9, while the capitalisation of market returns and coupled subsidy vary between 0.3-0.4 and (-0.24)-(0.8), respectively.

13.8. Summary

Based on findings from the theoretical models, the discussed simulation studies and the reviewed empirical analysis, we may summarise our conclusions in four key results.

1. Coupled agricultural support policies do increase land rents and land prices, although less than the theory predicts.[113]

Land rents/prices do not appear to capture the full value of coupled subsidies, at least in the short to medium run, but they do capture a substantive amount of subsidy payments (20-80%). The reviewed literature on land value and land rental rate determination suggest that land prices and land rental rates are determined by a large number of factors, such as policy support, land use alternatives, competition on the land market, inflation etc., which may explain these discrepancies between theory and empirical evidence.

2. Decoupled policy payments do affect land rents and land prices, although the theory predicts they do not if markets are perfect.[114]

One way how to interpret these results is that in the real world there are no truly decoupled subsidies. All decoupled subsidies applied in EU or US impose certain restriction on farms or are accompanied by other measures (e.g. cross-compliance). Therefore, it is rather difficult to compare the empirically estimated impact of decoupled and coupled policies. Perhaps, the subsidy that most closely resembles the decoupled subsidy definition is Production Flexibility Contract (PFC) Payments introduced in 1996 by the Federal Agricultural Improvement and Reform (FAIR) Act in the US. The act decoupled subsidies from contemporaneous production and removed all

[112] As noted by the author, a caveat of these estimates is that rental rates may adjust slowly in the presence of long-term rental contracts. Landowners might capture all or nearly all gains from government payments in the long run, but a 5-year time frame could be too short to capture this.

[113] The "coupled subsidy" literature predicts that output subsidy is fully capitalised into land value when either land supply is inelastic and the supply elasticity of non-land inputs is infinite or factor proportions are fixed. Floyd's model also predicts that if land supply is inelastic then area payments are fully capitalised into land value.

[114] The theoretical decoupled subsidy literature shows that fully decoupled agricultural support polices have no effect on land value, if markets are competitive and transaction costs are not prohibitive. It also shows that decoupled polices may affect land value only in the presence of some market imperfections.

planting restrictions, including set-aside requirements. With the exception of certain fruits and vegetables, producers were given complete planting flexibility, while they still received subsidies based on their 1985 program yield and their 1995 acreage base.[115]

3. Landowners benefit from all support programs both coupled and decoupled.

All reviewed studies find that one additional unit of payment results in an increase of less than one land price unit. While these findings are not surprising in relation to decoupled subsidies, most of the above discussed econometric work relates to coupled subsidies that would be expected to have most (if not all) of their final incidence on land. However, the reviewed studies have found a surprisingly small share of coupled subsidy benefits going to landowners.

4. The difference of the estimated impact of coupled and decoupled subsidies in not statistically significant.

Comparing the empirical results from different studies, we find evidence that coupled payments do not have a significantly different impact on land value from decoupled payments. For example Duvivier et al., 2005 finds that the elasticity of land value with respect to partially coupled support (compensatory payments) is between 0.17 and 0.34. Kirwan (2005) estimates that the marginal effect of all government subsidies in US on farmland rental rates is between 0.2 and 0.4. In contrast, Taylor and Brester (2005) find that the elasticity of land value with respect to market price support is between 0.16 and 0.32.

There are only few studies, which compare how the subsidy capitalisation differs between decoupled and coupled subsidies (Goodwin et al., 2003; Lence and Mishra (2003). Goodwin et al. (2003) finds that, as predicted by the theory, coupled subsidies (LDP)[116] have a higher impact on land value than decoupled subsidies (PFC). The estimated marginal effect on land value is 6.6 for LDP and 4.9 for PFC. In contrast, the results of Lence and Mishra (2003) suggest that decoupled payments (PFC and MLA)

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[115] Additionally to PFC payments, Marketing Loss Assistance (MLA) Payments are decoupled in US. MLA were introduced as part of “emergency assistance” provided to US agriculture in 1999. As part of an appropriations act signed into law in October 1998, $2.857 billion in additional payments were made to farmers to compensate them for the loss of markets for 1998 crops. Subsequent acts provided additional MLA payments of $5.5 billion for 1999 crops, $5.465 billion for 2000 crops, and $4.6 billion for 2001 crops. For the crops eligible for PFC payments, the MLA payments were proportional to the PFC payments made in that year, with a maximum payment per person of $19 888. Hence, the MLA payments can be viewed to be supplementary or “top-up” PFC payments (OECD 2005). MLA payments have sometimes been referred to as “double AMTA” payments (Goodwin and Mishra 2002).

[116] The Federal Agriculture Improvement and Reform Act of 1996 (the 1996 FAIR Act) initiated a non-recourse marketing assistance loans and loan deficiency payments (LDP) program for 16 crops, including corn and soybeans. The purpose of this program was to provide producers a financial tool to help farmers market their crops throughout the year. The non-recourse loans allow farmers to store production and sell it when market conditions are favourable. The crop is employed as collateral for the loan. The loans are non-recourse in that the farmer has the option of repaying the loan by delivering the crop to the Commodity Credit Corporation at loan maturity.

have a stronger impact on rents than coupled subsidies (LDP). Moreover the coupled subsidies are found to decrease rents. These estimates suggest that rents increase by about 85 cents for each dollar paid per hectare under the PFC and MLA. In the case of LDP land rent is estimated to decrease by around 24 cents per each subsidy dollar.

13.9. Figures and tables

Table 37. Estimated impact of subsidies on farmland value

Study	Dependent / explanatory variables (Country)	Land price elasticity of 1% increase in subsidies/returns	Estimated effect of $/EUR 1 on land value increase	Estimated value/NPV of subsidies (market return)*	
				r=5%	r=10%
Market return					
Duvivier, Gaspart and de Frahan (2005)	Arable land prices / Market return (Belgium)	0.18-0.24			
Goodwin, Mishra and Ortalo-Magné (2005)	Land price / Market return (US)		6.4-7.2	0.32-0.36	0.64-0.72
Taylor and Brester (2005)	Land prices / Market return (US)	0.16-0.32	3.85-7.58	0.19-0.38	0.39-0.76
Coupled subsidies					
Goodwin, Mishra and Ortalo-Magné (2003)	Farmland value / LDP (US)		6.6	0.33	0.66
Duvivier, Gaspart and de Frahan (2005)	Arable land prices / Cereal compensatory payments (Belgium)	0.12-0.47			
Goodwin, Mishra and Ortalo-Magné (2005)	Land price / LDP (US)		8.3-27.4	0.42-1.37	0.83-2.74
Latruffe, et al., (2006)	Land price/direct payments (area or animal payments) (Czech R.)	0.13			
Goodwin, Mishra and Ortalo-Magné (2003)	Farmland value / Disaster-Relief Payments (US)		4.7	0.24	0.47
Decoupled subsidies					
Goodwin, Mishra and Ortalo-Magné (2003)	Farmland value / AMTA (PFC) payments (US)		4.9	0.25	0.49
Goodwin, Mishra and Ortalo-Magné (2005)	Land price / AMTA(PFC) (US)		3.7-4.9	0.19-0.25	0.37-0.49
All subsidies					
Barnard, et al. (1997)	Cropland prices / All direct payments received par acre (US)	0.12-0.69			

Source: Authors' tabulation based on the respective study data.

Note: The values in these columns are calculated by dividing the estimated effect of subsidies/market return on land price with the net present value of subsidies/market return. If the number is equal to one it implies full capitalisation of subsidies in land prices. A lower value then one implies partial capitalisation of subsidies in land prices.

Table 38. Estimated impact of subsidies on farmland rents

Study	Dependent / explanatory variables	Estimated effect of $ 1 on land value increase
Market return		
Goodwin, Mishra and Ortalo-Magné (2005)	Land rent/Market return (US)	0.35
Lence and Mishra (2003)	Land rent/Market return (corn revenues and soybean revenues) (US)	0.30-0.38
Coupled subsidies		
Goodwin, Mishra and Ortalo-Magné (2005)	Land rent/LDP (US)	0.83
Lence and Mishra (2003)	Land rent/LDP (US)	-0.24
Decoupled subsidies		
Goodwin, Mishra and Ortalo-Magné (2005)	Land rent/AMTA(PFC) (US)	0.29
Lence and Mishra (2003)	Land rent/PFC (US)	0.71-0.86
Lence and Mishra (2003)	Land rent/MLA (US)	0.84-0.90
All subsidies		
Roberts, Kirwan, and Hopkins (2003)	Land rents / All government payments (PFCs + conservation programs) (US)	0.34-0.41
Kirwan (2005)	Land rents / All government payments (PFCs + conservation programs) (US)	0.20-0.40

Source: Authors’ tabulation based on the respective study data.

14. APPENDIX 3. THE CONCEPTUAL FRAMEWORK

14.1. Introduction

The main objective of this section is to develop a theoretical/conceptual model, which will allow us to:

- identify the theoretical effects of agricultural support on land markets;
- identify the mechanisms through which other factors (including policy, institutional, and economic variables) interact with the effects of agricultural support;
- derive testable hypotheses and identify ways of measuring the impact of the various effects which will be related to the relevant EU policies, land markets and rural conditions in the member states;
- suggest the need for a pragmatic methodological approach.

In order to meet these conceptual framework requirements, we adopt a profit maximisation model of Ciaian and Swinnen (2006, 2007), which will allow us to analyse the impact of area payments and SPS on income distribution effects.

The canonical model of Ciaian and Swinnen (2006, 2007) considers an agricultural economy with two heterogeneous farms.[117] The output of each farm is assumed to be a function of the amount of rented land (A). Output price is assumed to be exogenous to farms and fixed. We assume that only land can be rented. Land is supplied by land owners, which are not farmers. Farms are assumed to maximise their profits (revenue from output sales plus subsidies minus rental costs). The total agricultural land (A^T) is assumed to be fixed. Farms compete for land and choose a land quantity that maximises their profits. (Marginal) profits from land determine the rent that farms are willing to pay for every rented hectare. [118]

Figure 100 shows land market. The horizontal axis represents the amount of land. Land rented by farm 1 (A^1) is shown from the left to right on the horizontal axis. Land rented by farm 2 (A^2) is shown from the right to left on the horizontal axis with $A^2 = A^T – A^1$. The vertical axis measures the rental price. Land demand of farm 1 is D^1.[119] It represents the rent that farm 1 is willing to pay for each rented hectare. The more land it rents, the less it is willing to pay per hectare. Farm land demand is given by D^2. Similarly, it represents the rent that farm 2 is willing to pay for each rented hectare and

[117] Alternatively one may assume that farm of type 1 represents n farms of the same type and that farm of type 2 represents m farms of the same type.

[118] Similarly, Kilian and Salhofer (2008) analysed the effect of SPS on land prices.

[119] If farm of type 1 represents n homogenous farms then the land demand D^1 is an aggregation of land demands over all farms of type 1. Similar holds for farm type 2.

it decreases with the amount of rented land. The land market equilibrium is at the intersection of land demand of farm 1 and land demand of farm 2. The equilibrium rent is r^* and the equilibrium land allocation is A^*. Farm 1 rents A^* hectares of land ($A^1 = A^*$) and farm 2 rents $A^2 = A^T - A^*$ hectares of land.

14.2. Static effects of the SPS

In this section we analyse the SPS impacts from a static perspective with respect to the tradability, conditionality and size of entitlements. First, we briefly introduce the model, which we use for the analysis.

14.2.1. The model

Consider an agricultural economy with two farms.[120] We assume that farm 1 represents *n* farms of the same type and farm 2 represents *m* farms of the same type. The output of each farm is assumed to be a continuous and increasing function of the amount of land used (A^i with $i = 1, 2$). The output price (p) is assumed fixed and the same to all farms. The entire land is owned by land owners, which rent it to farmers.[121] Farms maximise their profits (Π^i) which is the difference between sales revenue and land rent:

(1) $\Pi^i = pf^i(A^i) - rA^i$

where r is rental rate and $f^i(A^i)$ is a well-behaved production function with $f^i_A > 0$, $f^i_{AA} < 0$, for $i = 1, 2$. Farms compete for land by renting the amount of land that maximises their profits:

(2) $pf^i_A = r$ with i = 1, 2

Figure 100 illustrates the land market. The horizontal axis represents the amount of land. The total agricultural land (A^T) is assumed to be fixed. Land rented by farm 1 (A^1) is shown from the left to right on the horizontal axis and land rented by farm 2 (A^2) is shown from the right to left with $A^2 = A^T - A^1$. The vertical axis measures the rental price and subsidies. The land demand of farm *i* is D^i.[122] The equilibrium rent is r^* and the equilibrium land allocation is A^*. Farm 1 rents A^* hectares of land ($A^1 = A^*$) and farm 2 rents $A^2 = A^T - A^*$ hectares of land.

The regional model SPS implementation model is illustrated in Figure 100. We define E^1 (area *FH*) as the total SPS payment for farm 1, and A^1_E as the maximum amount of

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[120] The model is based on Ciaian and Swinnen (2006; 2007).

[121] This distinction between landowners and farmers is convenient for our explanation but is not essential for the analysis and the derived results.

[122] D^1 is an aggregation of land demands over all farms of type 1, and D^2 of type 2.

eligible area for the SPS payments.[123] The payment per eligible hectare (the entitlement), e^1, is equal to $e^1 = E^1 / A_E^1$. Analogously, $e^2 = E^2 / A_E^2$, where E^2 is the total SPS payment for farm 2 (area *GK* in Figure 100), A_E^2 is the eligible area for payments,[124] and e^2 is the entitlement. Under the regional SPS model, the per hectare value of entitlement is the same for all farms, $e^1 = e^2 = e$.

Under the historical SPS implementation model, the variation in the entitlement value between farms depends on the variation of subsidies which farmers received in the reference period. The historical model is shown in Figure 101, where we assume that the per hectare entitlement value of farm 1 is higher than of farm 2, $e^1 > e^2$.

Proposition 1: *In a static framework and with all land eligible for the SPS, the SPS benefit farms with and without tradability of entitlements and with implementation of either historical model, regional model, or hybrid model. In other words, the SPS is not capitalised into land values.*

First considered that the entire land which farms used before the introduction of the SPS is eligible for the SPS. Figure 100 illustrates this situation.[125] Before the introduction of the SPS, the equilibrium set of land allocation and rent is (A^*, r^*). This implies that the eligible area of farm 1 is equal to A^* ($A_E^1 = A^*$) and the eligible area of farm 2 is equal to A^T - A^* ($A_E^2 = A^T - A^*$). First, we consider the case when entitlements are non-tradable, and afterwards we analyse what changes with trade in entitlements.[126]

14.2.2. Non-tradable entitlements

Under the regional SPS model the value of entitlement is equal for both farms, $e^1 = e^2 = e$. Farms do not receive payments for land that they rent above the eligible area, A_E^1 and A_E^2 in Figure 100 respectively. First consider the case when farm 1 wants

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123 A_E^1 corresponds to the maximum number of entitlements which farm 1 can receive.

124 A_E^2 corresponds to the maximum number of entitlements which farm 2 can receive.

125 For the sake of brevity, the paper reports the graphical analysis results. The formal proofs can be obtained from the authors upon request.

126 In reality entitlements may not be fully tradable due to regulatory constraints. However, partial tradability of entitlements does not change the equilibrium distribution of land and rental price compared to fully tradable entitlements or non-tradable entitlements, and hence the partial tradability is not analysed separately.

In this section we show that in the static framework in the two extreme cases regarding the tradability of entitlements (i.e. with non-tradable entitlements and with fully tradable entitlements) the SPS benefit farms. The same holds with partial tradability of entitlements, which is a more realistic assumption.

to rent more land than the eligible area (A_E^1). Given that the total land supply is fixed, in equilibrium farm 2 has to rent less land than its eligible area (A_E^2). In this case, i.e. over the domain $A^* - A^T$, the respective land demand functions are determined by:

(3) $pf_A^1 = r$

(4) $pf_A^2 + e = r$

For the additional land without entitlements farm 1 cannot pay more than the marginal profitability of land. In contrast, farm 2 is willing to pay a higher rent up to *e*.

Next, consider the inverse case when farm 2 wants to rent more land than its eligible area (A_E^2). In this case the corresponding demand functions over the domain $0 - A^*$ are defined by:

(5) $pf_A^1 + e = r$

(6) $pf_A^2 = r$.

In this case the reverse logic holds. The SPS payments increase the land demanded by farm 1. The rent that farm 1 is willing to pay is increased by *e*.

Equations (3) and (5) for farm 1 and equations (4) and (6) for farm 2 imply kinked land demand functions with the SPS. This is illustrated in Figure 100. Starting from the right hand side in Figure 100 and following the thick lines, the land demand of farm 1 is given by $D_e^1\ D^1$ whereas land demand of farm 2 is given by $D^2\ D_e^2$. At A^* the land demand for both farms coincide, which is represented by thick vertical line.

The land market equilibrium with the SPS is (A_e^*, r^*). Compared to the equilibrium situation before the SPS implementation, both land allocation, $A^* = A_e^*$, and equilibrium rent is the same. If farm 1 wants to rents marginally more land than A^*, it is willing to pay only r^* (determined by D^1). Similarly, if farm 2 wants to rent marginally more than $A^T - A^*$, then the rent that farm 2 is willing to pay is r^* (given by D^2). Hence, the equilibrium land rent is r^*. Given that no farm is willing to pay more than its marginal profitability for additional land, farmers gain all SPS subsidies, equal to area *FGHK* in Figure 100, which represents the total value of the SPS. Gains of farm 1 are equal to area *FH* and gains of farm 2 are equal to area *GK*.

Under the historical SPS model, the value of entitlements may differ between farms. In Figure 101, the per hectare entitlement value of farm 1 is larger than the per hectare entitlement value of farm 2, $e^1 > e^2$. As above, assume that the entire land, which farms used before the introduction of the SPS is eligible for subsidies. Similar to the regional model, in equilibrium, the marginal willingness of renting additional land is not affected by *e*. Given that farms are not eligible for more entitlements than their eligible area ($A_E^1 = A^*$ for farm 1 and $A_E^2 = A^T - A^*$ for farm 2), the equilibrium is at (A_e^*, r^*) which is equal to the regional model and equilibrium before the SPS implementation. All SPS benefits accrue to farms (area *FGH* in Figure 101), which is equal to the total SPS value. The gains of farm 1 are equal to area *FG* and the gains of farm 2 are equal to area *H*. The only difference from the regional model is that farm 1 gains more from the SPS than farm 2.

14.2.3. Tradable entitlements

The tradability of entitlements does not affect these static results. Also with tradable entitlements farms will retain the entire benefit from the SPS. In other words, the SPS will not be capitalised into land values. First we explain the impact of entitlement tradability for the regional model and then for the historical model.

As shown in Figure 100, when farms want to rent more land than the eligible area, in equilibrium they are willing to pay a rent equal to land productivity. Their marginal willingness to pay for rented land is not affected by e. This is because farms are not eligible for additional entitlements for rented land exceeding the eligible area. However, if the entitlement price (say p_{e1}) is lower than the value of the entitlement ($p_{e1} < e$), the marginal gains of buying additional entitlements are positive (equal to $e - p_{e1} > 0$), implying that farms want to rent more land and buy additional entitlements. Competition for land driven by competition for entitlements will bid the market price of entitlements up to $p_e^* = e$. In equilibrium neither land allocation nor equilibrium rent will be affected (A_e^*, r^*) and the equilibrium price of entitlements will be $p_e^* = e$. The entire SPS benefits will accrue to the owners of entitlements. However, given that farms do not have incentives to adjust their amount of rented land, there will be no trade in entitlements even though the entitlement price will be $p_e^* = e$.[127]

As in the regional model, the SPS does not affect the equilibrium marginal profitability of land under the historical model. Hence, allowing for tradability in the historical model will not change the above results that all benefits accrue to farms. In equilibrium, the market price of entitlements (p_e^*) will be equal to the entitlement value. However, the market price will not be the same for all entitlements, because the per hectare value of entitlement differs between farms ($e_1 > e_2$ in Figure 101). Potential buyers of entitlements will be willing to pay a price up to the value of the entitlement. The equilibrium price of entitlement of farm 1 (p_{e1}^*) will be equal to e^1 ($p_{e1}^* = e^1$) and the equilibrium price of entitlement of farm 2 (p_{e2}^*) will be equal to e^2 ($p_{e2}^* = e^2$). As above, trade in entitlements will not take place in this static case.

14.2.4. Conditional SPS payments

Depending on the nature of the conditions, farm gains from the SPS may be reduced. If the additional requirements imposed by the SPS were not present before implementation

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[127] Note that in a multi-period model perfect credit market may be required to allow tradability. The farmer can activate the purchased entitlement on a yearly basis. In competitive markets the value of the entitlements will be equal to the net present value. The farm must have access to capital (equal to the price of the entitlement) in order to be able to finance the purchase of entitlements.

of the SPS and are not required for non-participating farms, then net benefits from the SPS may be squeezed by the cross-compliance implementation costs.

Proposition 2: *Conditional SPS payments may reduce farm benefits from the SPS, depending on the nature of the conditions, but they do not affect land capitalisation (which is equal to zero).*

If cross-compliance does not cause additional costs to farms ($c=0$), then farm benefits from the SPS are not affected. However, the evidence from the study Alliance Environment (2007), which is based on expert survey on cross-compliance in the EU Member States, indicates that in most cases cross-compliance is expected to have an effect on compliance with SMRs and GAEC obligations. Evidence further suggests that cross-compliance tend to result in additional costs for both farmers and the public administration in most Member States. The cross compliance costs vary between the EU Member States, regions, and the cross-compliance instruments.[128]

To show the impact of cross-compliance on farm benefits, we model cross-compliance as an additional cost (c) which farms face to be eligible for the SPS.[129] First, consider the regional SPS implementation model with positive compliance costs for each eligible hectare, $c>0$. The effect of positive compliance costs is illustrated in Figure 100. As shown above, the rented area and the rental price equilibrium with and without the SPS is (A_e^*, r^*). However, because of compliance costs c for each hectare, the net benefit per entitlement reduces to $e - c$. Compared to the case with zero cross-compliance costs, the net farm benefits from the SPS are reduced by area *HK*. The net farm gains from SPS with compliance costs are equal to area *FG* in Figure 100: farm 1 gains area *F* and farm 2 gains area *G*.

If entitlements are allowed to be traded, then the SPS compliance costs also affect the market price of entitlements. Buyers are willing to pay a reduced price because of the compliance costs. In the case of the regional model, the equilibrium price of tradable entitlements is $p_e^* = e - c$.

In addition, the enforcement of cross-compliance is an important issue (Bartolini et al. 2008). The net effect of cross-compliance requirements on farm gains from the SPS

[128] According to the European Commission (2007), farmer's administrative costs of SPS in Denmark, France, Germany, Italy and Ireland were calculated in the range 5-29 euro/ha. This represents between 3 and 9% of the total CAP payments.

[129] Alternatively, one can endogenise the compliance costs. For example Bartolini, et al (2008) develop a principal-agent approach under moral hazard where farmers can choose the degree of compliance. In equilibrium, the optimal level of compliance (hence compliance cost) depends on monitoring, the size of sanction and the size of SPS.

depends on how strictly they are enforced. If the enforcement is weak, then the effective compliance costs (c) might be lower and gains from the SPS higher for the deviating farms. In the extreme case, when there is no enforcement ($c=0$), the SPS gains are unaffected.

14.2.5. Relative size of allocated entitlements

In this section we will relax the assumption that the size of the allocated entitlements is equal to the total eligible land area. As above, we analyse how the size of the allocated entitlements affects equilibrium rent distribution under different SPS implementation models and tradability assumptions.

Proposition 3: *If the total size of allocated entitlements is larger than the eligible area, then the SPS gets capitalised into land values. Under the regional model the SPS is then fully capitalised into land values. Under the hybrid and historical models the SPS is then partially capitalised into land values.*

14.2.5.1. Non-tradable entitlements

Assume that farms receive entitlements such that $A_E^1 > A^*$ and $A_E^2 > A^T - A^*$. The effect of the excess supply of entitlements under the regional model is illustrated in Figure 102. Given that the total number of entitlements is larger than the total eligible area $A_E^1 + A_E^2 > A^T$, and farms need land to activate their entitlements, farms will not be able to activate all their entitlements. Profit maximizing farms will compete for land in order to activate their unused entitlements. Competing farms will underbid the market price for land until its marginal profitability. As a result, the entire SPS will be capitalised into land rents. The equilibrium rented area and rental rate are A_e^*, r^*+e. This result is driven by the assumption of competitive markets where a large number of farms compete for land, implying that if a farm would not be willing pay rent r^*+e, then landowners could always find another farm with unused entitlement willing to pay this rent. Hence, under the excess supply of entitlements all benefits from the SPS (area FG in Figure 102) accrue to landowners.

Under the historical model the entitlements may be distributed differently between farms. First, assume that farms receive entitlements such that $A_E^1 = A^*$ and $A_E^2 > A^T - A^*$. Hence, the total number of entitlements is larger than the total eligible area $A_E^1 + A_E^2 > A^T$. In Figure 103 the equilibrium set is (A_e^*, r_{eh}^*). Farm 2 cannot use all its entitlements and, as a result, will bid the rent up to r_{eh}^* ($= r^* + e^2$). As above, if farms would not pay this rent, then landowners could always find another farm with unused entitlements who is willing to pay rent r_{eh}^*. Part of benefits from the SPS (area *GH* in Figure 103) accrue to landowners. Gains of farm 1 are equal to area *F.* Farm 2 does not benefit from the SPS.

Next, assume that farms receive entitlements such that $A_E^1 > A^*$ and $A_E^2 \geq A^T - A^*$. The land allocation will change compared to the equilibrium land allocation without the SPS, which is given by A^* in Figure 104. Because farm 1 has entitlement with a higher value than farm 2 ($e^1 > e^2$), it can offer a higher rent for additional land than farm 1. As a result, the amount of rented land by farm 1 increases whereas the land rented by farm 2 declines. In Figure 104 the equilibrium set is (A_e^*, r_{eh}^*). Part of benefits from the SPS (area *FMHKL*) accrue to landowners. Gains of farm 1 are equal to area *BG*. Farm 2 looses (does not gain) area *KL*. Thus, the SPS is partially capitalised into land values.

14.2.5.2. Tradable entitlements

First, we analyse how entitlement tradability affects the distributional impacts, if the total number of entitlements is larger than the eligible area, under the regional model. If farms own more entitlements than the total area A^T, then trade in entitlements will not emerge. Given that farms have unused entitlements, they are willing to sell them. However, farms are not willing to buy additional entitlements because they cannot be activated. Hence, the distributional effects with tradable entitlements are the same as in the case with non-tradable entitlements.

Under the historical model we consider two different entitlement distribution schemes. When $A_E^1 = A^*$ and $A_E^2 > A^T - A^*$, the results are equal to the regional model and non-tradable entitlements: trade in entitlements will not emerge, as there are no buyers of entitlements.

When $A_E^1 > A^*$ and $A_E^2 \geq A^T - A^*$, the equilibrium will shift from (A_e^*, r_{eh}^*) to (A^*, r_{et}^*) in Figure 104. However, the set (A_e^*, r_{eh}^*) cannot be a long run equilibrium. Given that at rent r_{eh}^* the marginal benefit of additional entitlement for farm 2 is positive (it gains $r^* + e^1 - r_{et}^* > 0$), farm 2 is willing to bid for entitlement e^1 from farm 1 up to price $r^* + e^1 - r_{et}^*$. The marginal entitlement benefit of farm 1 is zero at A_e^*. Because there are mutual gains from trade in entitlements, farm 2 will buy entitlements from farm 1 that exceed A^*, i.e. ($A_E^1 - A^*$). Hence, farm 2 will exchange its lower valued entitlements for higher value entitlements from farm 1. Competition for entitlement e^1 will drive the equilibrium price of entitlement to $p_e^* = r^* + e^1 - r_{et}^*$. Also farm 1 will benefit from trade in entitlements. Compared to a situation without the SPS, the land allocation is not affected while the land rent is higher. The land market equilibrium is at (A^*, r_{et}^*).

14.3. Dynamic effects of the SPS

In this section we investigate how distributional effects change if the SPS implementation induces structural adjustments in the economy. We consider two dynamic effects: the effect of a change in the productivity of incumbent farms, and the effect of a change in farm population through farm entry and exit.

14.3.1. Distribution of SPS benefits with productivity change130

Up to now we assumed that the introduction of the SPS does not induce a change in farms' productivity. However productivity is likely to change, either because of technological or institutional innovations, or in the presence of imperfect rural credit markets, the SPS itself may reduce farms' credit constraints and thereby increase productivity[131] (see Ciaian and Swinnen 2008). We now analyse how the SPS in combination with productivity changes affect land values and the distribution of the SPS benefits. The analysis considers two key dimensions: symmetry in the productivity changes and tradability of entitlements.

14.3.1.1. Symmetric productivity change and the SPS

Productivity changes cause a shift in farmland demand. When productivity change causes the same shift in the demand for all farms – which we refer to as a "symmetric change" – the effect is shown in Figure 105. The initial land demand of farm 1 is D^1 and the initial land demand of farm 2 is given by D^2. The equilibrium rented area and rental price are (A^*, r^*). A symmetric productivity change implies an equal shift in land demand of both farms. Assuming a symmetric technological improvement, the land demand of farm 1 shifts to D_1^1 and of farm 2 to D_1^2. The new equilibrium set is (A^*, r_1^*). Land allocation is not affected. Land rent increases from r^* to r_1^*. The rent increase is driven by productivity increase.

Proposition 4: *With symmetric productivity changes the SPS only benefit farms, with or without tradability of entitlements and under all SPS models.*

To show this, consider first the regional SPS model with non-tradable entitlements. As shown above, farms' land demand is kinked with the SPS. This is illustrated in Figure 106. Without productivity change, farm 1's land demand is given by D_e^1 D^1 and farm 2's demand is given by D^2 D_e^2. At A^* the land demand of both farms is represented by thick vertical lines, which coincide. The equilibrium with the SPS without productivity change is (A_e^*, r^*). Productivity change shifts land demands up to D_{e1}^1 D_1^1 for firm 1 and to D_1^2 D_{e1}^2 for firm 2. Again, at A^* land demands of both farms are represented by vertical lines, which coincide.

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[130] In this section we consider a situation when the SPS entitlements are allocated based on land allocation equilibrium at the time of the SPS introduction and then analyse the SPS effect with productivity changes. Similar results hold for the situation when the allocation of the SPS entitlements among farms is not based on the land allocation equilibrium at the time of the SPS introduction, but on a past land allocation equilibrium. Indeed, the SPS allocation was started in 2005, whereas the allocation of entitlements was based on land distribution in the reference period 2000-2002.

[131] We focus on positive productivity change. The derived results are analogous for negative productivity change.

The SPS does not affect farm profitability at the margin with symmetric productivity change. The new equilibrium (A_e^*, r_{e1}^*) is equal to equilibrium without the SPS and with productivity change. Land allocation is not affected and the rent increase is driven solely by the productivity increase. The SPS does not affect the equilibrium land rent. Farmers gain all SPS subsidies, which is equal to area *FG* in Figure 106. The gains of farm 1 are equal to area *F* and the gains of farm 2 are equal to area *G*.

This result is general. It is not affected by the tradability of entitlements or by the SPS implementation model.[132]

14.3.1.2. Asymmetric productivity change and the SPS

If productivity change affects different farms differently, the land demand shifts asymmetrically between the farms. For simplicity, we assume that only farm 1 experiences a productivity increase. In Figure 105 the land demand of farm 1 shifts from D^1 to D_1^1. The land demand of farm 2 is not affected and stays at D^2. The new equilibrium set is (A_1^*, r_2^*). Because of higher productivity, farm 1 expands its rented area in detriment of farm 2.

Proposition 5: *With asymmetric productivity changes and with non-tradable entitlements it holds that:*

1. *part of the SPS benefit landowners (i.e. the SPS is partially capitalised into land values);*
2. *the SPS constrain restructuring;*
3. *historical and hybrid models may or may not have stronger effect than the regional model on the capitalisation of the SPS and restructuring.*

Again, first consider the regional SPS model. The effect of asymmetric productivity change is illustrated in Figure 107. The benchmark equilibrium with the SPS and no productivity change is (A_e^*, r^*). For simplicity we consider the extreme case, when only farm 1 experiences a productivity change.[133] With asymmetric productivity increase the land demand of farm 1 shifts up from D_e^1 D^1 to D_{e1}^1 D_1^1. The upward shift in land demand results in a significant increase in the rental rate, but does not change land allocation. The new equilibrium set is (A_e^*, r_e^*). The increase in the rental price ($r_e^* - r^*$) is identical to the demand increase for land of farm 1 due to higher productivity. Because the increase in productivity is insufficient to overcome the gap in subsidies between farm 1 and farm 2 for renting additional land beyond A_e^*, there is no land

[132] For the sake of brevity we do not include proofs of this result. However, both the graphical analysis and the formal proofs can be obtained from the authors upon request.

[133] However, the derived results are more general and hold for any asymmetric productivity shock.

reallocation, Even with increased productivity, the marginal value of additional land for farm 1 at A_e^* is equal to r_e^*, which is less than r^*+e, the marginal value of land for farm 2 at A_e^*.[134]

Without the SPS and with asymmetric productivity change, the equilibrium rented area and rental rate would be (A_1^*, r_1^*). Hence, the SPS constrains land reallocation (restructuring) from farm 2 to farm 1 ($A_1^* > A_e^*$), and part of the SPS is capitalised into land values. The equilibrium land rent with asymmetric productivity change and with SPS is r_e^*, while the equilibrium land rent with asymmetric productivity change and without SPS is r_1^*, where $r_e^* > r_1^*$. The total value of the SPS is given by area *FGK* in Figure 107. Landowners' gains are equal to area *HK*. Area *H* is productivity gain and area *K* is gain from the SPS. The total gains to farms are equal area *FG*. Farm 1 gains the full SPS (area *F*) while farm 2 gains less than the total allocated SPS (area *G*). Part of the SPS (area *K*) farm 2 uses to compete for land with farm 1.

In contrast to the symmetric case, both the non-tradability of entitlements and the SPS implementation model can change the results with asymmetric productivity change. The mechanisms of the effect under the historical and hybrid models are similar to the regional model, but the magnitude of the effects is different. The variation in the value of entitlements between farms may cause a larger or smaller effect on the capitalisation of the SPS into land values and on agricultural restructuring. The net effect depends on which type of farms have higher value of entitlements. If farms whose productivity increases less own entitlements with higher value compared to farms whose productivity increases more, then there will be a stronger capitalisation of the SPS into land values and the SPS will constrain restructuring more. Otherwise, if farms, whose productivity increases less own entitlements with lower value, than farms experiencing a stronger productivity increase, the impact on the capitalisation of the SPS into land values and on restructuring is smaller.

Proposition 6: *With asymmetric productivity changes and with tradable entitlements it holds that:*

1. *all SPS implementation models benefit farms;*
2. *the SPS does not constrain restructuring;*
3. *there is no difference between the SPS models.*

First, consider the regional SPS model. In the previous analysis it was shown that, when entitlements are tradable, the equilibrium price of the entitlement is $p_e^* = e$ (see Figure 107). However, with asymmetric productivity changes, tradable entitlements and the SPS, the set (A_e^*, r_e^*) cannot be a long run equilibrium. Both farms would profit from

[134] Only if the increase in productivity is larger than the per unit subsidies (e) there will be restructuring.

land market transactions. At land allocation A_e^* the net benefit per hectare of farm 2 is $r^* + e - r_1^*$. If farm 2 sells one entitlement and reduces the rented area by one hectare, its net gain per hectare is e obtained from the entitlement sale, where $r^* + e - r_1^* < e$ (see Figure 107). Hence, for farm 2 it is profitable to reduce the rented area by A_1^* - A_e^* and to sell the equivalent number of entitlements. Farm 1 will have an incentive to rent more land (to take over land A_1^* - A_e^* from farm 2) because with asymmetric productivity change its land profitability has increased compared to farm 2. Hence, the equilibrium with tradable entitlements, with SPS and with asymmetric productivity change is (A_1^*, r_1^*), which corresponds to the equilibrium without SPS and with asymmetric productivity change. Restructuring is not affected and the entire SPS benefits accrue to farms (area *FGK* in Figure 107). Landowner gains are given by *HK*, which are driven solely by productivity increase but not by the SPS.

This result holds in general, for all SPS models.[135]

14.3.2. Distribution of SPS benefits with farm entry

The results derived in the above analysis are conditional upon support linked to the current farms.[136] The entrants (who are potentially more dynamic and productive and therefore a source of productivity growth) are excluded from the SPS support system. To address these concerns, it was decided to create a 'reserve' of subsidy entitlements for entrants.[137] In this section we analyse how these reserve entitlements affect the SPS rent distribution.

Proposition 7: With new farms entering the sector it holds that:[138]

1. *If entrants are not eligible for entitlements: then the SPS benefit incumbent farmers both in static and dynamic frameworks and with tradable and non-tradable entitlements. Only with asymmetric productivity change and non-tradable entitlements do part of the SPS also benefit landowners.*[139]

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[135] For the sake of brevity we do not include proofs. However, both the graphical analysis and the formal proofs can be obtained from the authors upon request.

[136] In the static analyses only the incumbent farm 1 could use e to bid up the rent up to the land area A_E^1 (=A^*), while for the rest of the area, A_E^2 (=$A^T - A^*$), only the incumbent farm 2 was able to do so. Entrants were not eligible for e.

[137] There are also other cases when entitlements can be allocated from the reserve. For example, entitlements from the reserve can be granted to farmers located in areas subject to restructuring to avoid farms abandoning land.

[138] Here we consider the case when the total number of the allocated entitlements is smaller than or equal to the eligible area.

[139] This was shown in Propositions 1, 4, 5, and 6 where it was assumed that entrants were not eligible for SPS.

2. *If entrants are eligible for entitlements: then the SPS benefits will shift to landowners with and without tradability of entitlements. The extent of capitalisation of the SPS into land values depends on the implementation model and on the extent to which entrants are eligible for entitlements.*

14.3.2.1. Non- tradable entitlements

In this section we illustrate the effect of entitlement non-tradability in a static framework. However, the presented results are general, they hold for both static and dynamic framework. The effect of non-tradable entitlements under the regional SPS implementation model is illustrated in Figure 100. Granting the SPS entitlement to entering farms will induce a rise in land rent from r^* to r_{er}^*.[140] The increase in land rent is equivalent to the per hectare payment e. Because of higher demand for land at the margin, landowner may rent their land to the entering farm if the incumbent farm does not pay this rent. If new farms are eligible for the SPS, then their marginal benefit of cultivating land equals the marginal value product of land plus the per hectare payment e. As a result, they can offer a higher rental price for land. The incumbent farms are willing to bid the rent up to $r^* + e$ (see Figure 100). Hence, farms will bid for land until the rental rate will reach $r_{er}^* = r^* + e$. Thus, the reserve entitlements granted to entering farms makes the effects of the SPS very similar to the effects of the area payments (Ciaian and Swinnen, 2006). Hence, under the regional model with entrant eligibility for entitlements, the SPS is fully capitalised into land rents and all subsidies accrue to landowners. Landowner gains are equal to area *FGHK* in Figure 100.

Next, we consider the historical SPS implementation model. In this case the impact of the SPS on land capitalisation depends on the value of entitlement (e^R) which entering farms receive from the reserve. The SPS may be partially or fully capitalised into land values. Under the historical SPS implementation model the value of entitlement may differ between farms, e.g. $e^1 > e^2$. If $e^R \le e^1$ then the SPS is partially capitalised into land values. In this case the entrant can bid the rent up to r_{eh}^* (= $r^* + e^R$). This is illustrated in Figure 101 where it is assumed that $e^R = e^2$. Landowners' gains are equal to area *GH* in Figure 101. Only farm 1 with high value of entitlement benefits from the SPS - it gains area *F*. Farm 2 does not benefit from the SPS.[141]

If $e^R = e^1$ then SPS is fully capitalised into land values. In this case farms that own entitlements with a value smaller than e^R (farms of type 2) will be competed out by the entrants. Given that the entering farms can obtain an entitlement with a higher value

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[140] It is assumed that new farms enter the sector if their profits from farming are higher than the opportunity costs. A marginal farm which does not enter the sector without the SPS earns just less in farming than the opportunity costs. If the SPS increases farm profits then this farm will have an incentive to enter farming.

[141] If $e^R < e^2$ then also farm 2 gains from the SPS.

$e^R > e^2$, they will compete out the incumbent farms for land. Entrants will bid the rent up to $r^* + e^R$ and the SPS will be fully capitalised into land rents.

14.3.2.2. Tradable entitlements

The tradability of entitlements will not affect the results obtained above, as tradability does not change farms' marginal conditions. Hence it does not affect farm willingness to pay for land use. The market price of tradable entitlements (p_e^*) will be zero, $p_e^* = 0$ under the regional model, because the SPS is fully capitalised into land values. Given that farms do not benefit from the SPS, they are not willing to pay for entitlements. Moreover, the entrants can obtain entitlements for free. A farm buying the entitlement would therefore be unable to compete for land with the entrant. As a result, making entitlements available for free from the reserve eliminates market for entitlements and makes the issue of tradability irrelevant.

Under the historical SPS model the price of entitlements will be positive only when the SPS is partially capitalised into land values (i.e. when $e^R < e^1$) and only entitlements with value larger than e^R will have a positive market price (i.e. entitlements of farm 1 in Figure 101). Only entitlements with value larger than e^R benefit farms[142]. The rest of entitlements will have zero market price.[143] However, tradability does not change farms' marginal conditions. Hence the tradability of entitlements does not affect the results obtained for the case when entitlements from the reserve are allocated to the entrants.

14.3.2.3. Full versus partial eligibility for entitlements

In reality, new entrants may not be eligible for entitlements for the entire area that they want to rent. If only part of the entrant land is eligible for entitlements, the SPS benefits both farmers and landowners, i.e., the SPS rents will be shared between landowners and farmers. The more constrained is the entitlement acquisition to entering farms, the more the SPS benefits farms.

On the other hand, the more constrained is the distribution acquisition to later entering farms, the more unequal is the rent distribution from the inter-generational perspective. Hence, the optimal policy of entrant eligibility for entitlements faces a trade-off between benefiting resource owner versus users on the one side and inter-generational equity on the other side.

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[142] In equilibrium shown in figure 2, the benefits of farm 1 per entitlement are equal $e^1 - r^*_{eh}$.

[143] However, even though the price of the entitlements with the highest value (e^1) will be positive under the historical model, the entitlements will not be traded in the static framework with symmetric productivity change, because the land rented by farm 1 with the entitlements e^1 will not change in the static framework with symmetric productivity change. Only the entrants may acquire entitlements from the reserve.

Table 39 summarises the key results of the capitalisation of the SPS into land values in a static framework, for full, partial and zero entrant eligibility for entitlements and under different SPS implementation models. The SPS is fully capitalised into land values with full entrant eligibility for entitlements under the regional model (see Table 39). The SPS may be fully capitalised into land values either under the historical model or the hybrid model when the value of entitlement which new entrants receive from the reserve equals the highest value of the incumbent farms' entitlements. Otherwise, the SPS is partially capitalised into land values under the historical model and hybrid models with full entrant eligibility. Under the other extreme, when no entrants' have access to entitlements, there is no capitalisation of the SPS into land values and the SPS benefit farms.

In all other cases there is a partial capitalisation of the SPS into land values. Everything else equal, for a given value of entitlement which entrants receive from the reserve, the capitalisation is stronger under the regional model than the historical or hybrid models. Between the two latter, the capitalisation is stronger under the hybrid model than under the historical model. This result is due to a stronger variation in the value of entitlements under the historical model than under the two other models.

Table 40 summarises the effect of the SPS on land capitalisation with asymmetric productivity change for full, partial and zero entering farm eligibility for entitlements under different SPS implementation models. The effects with asymmetric productivity change are similar to the effects shown in Table 39 for the static framework. However, with asymmetric productivity change the tradability of entitlements does not affect the results. Given that productivity change triggers land reallocation and adjustment in land rent, this was less important in the static framework. If entitlements are non-tradable, then less productive farms will use the SPS to compete for land and induce distortions in the land markets including capitalisation of the SPS into land values. With fully tradable entitlements less productive farms would choose to sell entitlements because of higher benefits from selling compared to making use of entitlements and continuing renting equivalent amount of land.

Figure 103 reports zero capitalisation of the SPS into land values in the case with tradable entitlements and with no new entrant eligibility for entitlements. Full capitalisation occurs with full entrant eligibility for entitlements. In other cases there is partial capitalisation of the SPS into land values.

Additionally, with asymmetric productivity change and constrained tradability of entitlements, the SPS may constrain restructuring. The entrants' eligibility for entitlements has an opposite effect on restructuring. Given that entrants can use the entitlements they receive from the reserve and compete out less productive farms which use the SPS to compete for land, entrant eligibility for entitlements will stimulate restructuring. Hence, with non-tradable entitlements, the restructuring is more constrained the more entrants are constrained to obtain entitlements. However, with full tradability, restructuring is not constrained irrespective of whether the entering farms are or are not eligible for entitlements.

14.3.3. Distribution of benefits from the SPS with farm exits

The effect of farm exits from the agricultural sector is analogous to the effect of a negative productivity change. With farm exits there is a downward shift in the aggregate land demand rather than an upward shift with productivity growth. If this effect is symmetric (i.e. if farm exit is equal between farms of type 1 and type 2), then the SPS will benefit farms both with tradability and without tradability of entitlements. The effect is similar to a symmetric productivity change.

The SPS will affect land values only if there is an asymmetric shift in land demand, which takes place e.g. when farms of one type exit more than farms of the other type. This asymmetric shift leads to changes in the relative willingness to pay for the rented land between farms, which triggers land reallocation and adjustments in land rent. The relative willingness to bid for land of the more exiting type farms will decrease compared to the less exiting type farms. Hence, without the SPS, the land demand of the more exiting type farms will decrease and the equilibrium land rent declines. However, the SPS payments may hamper these adjustments and the SPS may be capitalised into land values. Similarly to asymmetric productivity change (proposition 5), this will be the case with non-tradable entitlements and with asymmetric shift in land demand induced by farm exit. Part of the SPS will benefit landowners and the restructuring will be constrained. With tradable entitlements SPS will benefit farms and restructuring will not be constrained, which is equivalent to the case shown in proposition 6.

14.4. Summary

In this paper we study the distributional effects of decoupled Single Farm Payments in the European Union. The main findings of the paper can be summarised in the following results:

- In a static world the SPS benefit only farmers, irrespective of the implemented SPS model and irrespective of whether entitlements are tradable or not. In other words, the SPS is not capitalised into land values.

- However, if the total number of the allocated entitlements is larger than the eligible area, then the SPS gets capitalised into land values and benefit landowners.

- Conditional SPS payments may reduce farm benefits from the SPS, depending on the nature of the conditions.

- If new entrants are eligible for the SPS, then under the regional (historical and hybrid) model the SPS is fully (partially) capitalised into land values.

- With symmetric productivity change, the SPS benefit farms with or without entitlement tradability under all three types of the SPS models.

- With asymmetric productivity change and with non-tradable entitlements: part of the SPS benefits landowners; the SPS constrains restructuring; and the historical and hybrid models may or may not have stronger effect than the regional model.

- With asymmetric productivity change and with tradable entitlements: all SPS implementation models benefit farms; the SPS does not constrain restructuring; and in terms of land rents there are no differences between the historical, hybrid and regional models.

- With asymmetric productivity change and with new entrant eligibility for entitlements: all SPS models benefit landowners; the SPS may constrain restructuring only with historical or hybrid models; and the historical model is fully capitalised into land values; the hybrid and regional models are partially capitalised into land values.

14.5. Figures and tables

Table 39. SPS capitalisation into land value

		SPS model		
		Regional	**Historical**	**Hybrid**
New entrant eligibility for entitlements	**Full**	Full, $\alpha_r^f = 100\%$	Partial or full, $\alpha_h^f \leq \alpha_r^f$	Partial or full, $\alpha_m^f \geq \alpha_h^f$
	Partial	Partial, $\alpha_r^p < \alpha_r^f$	Partial, $\alpha_h^p < \alpha_r^p$	Partial, $\alpha_m^p > \alpha_h^p$
	No	Zero, $\alpha_r^n = 0$	Zero, $\alpha_h^n = 0$	Zero, $\alpha_m^n = 0$

Notes: α_i^j measures capitalisation of the SPS into land value. If $\alpha_r^f = 100\%$, this implies full capitalisation of SPS into land values. Subscripts *i* = *r*, *h*, *m*, denote the implementation model: *r* stands for regional model, *h* stands for historical model and *m* stands for hybrid model. Superscripts *j* = *f*, *p*, *n*, denote new entrant eligibility for entitlements: *f* stands for full new entrant eligibility for entitlements, *p* stands for partial new entrants eligibility for entitlements and *n* stands for stands for no new entrants eligibility for entitlements.

Table 40. SPS capitalisation into land value and effects on restructuring with asymmetric productivity change

			SPS model			**Restructuring**
			Regional	***Historical***	***Hybrid***	
Entrant eligibility for entitlements		***Full***	Full	Partial or full	Partial or full	May be constrained, with historical and hybrid M.
		Partial	Partial	Partial	Partial	Constrained
	No	***Non-tradable entitlement***	Partial	Partial	Partial	Constrained
	No	***Tradable entitlement***	Zero	Zero	Zero	Not constrained

Figure 100. The effect of the regional SPS model on the land market

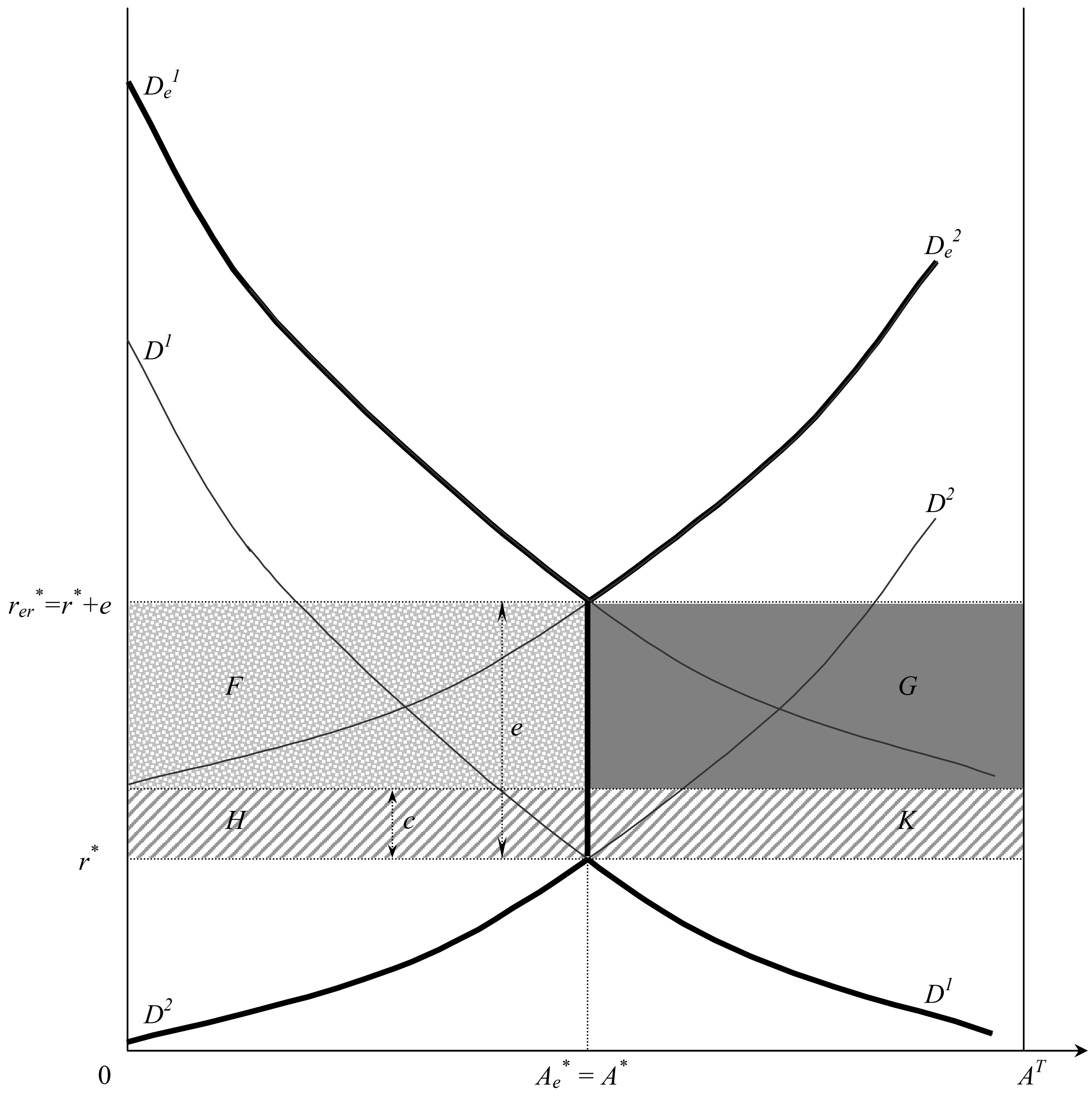


Figure 101. The effect of the historical SPS model on the land market

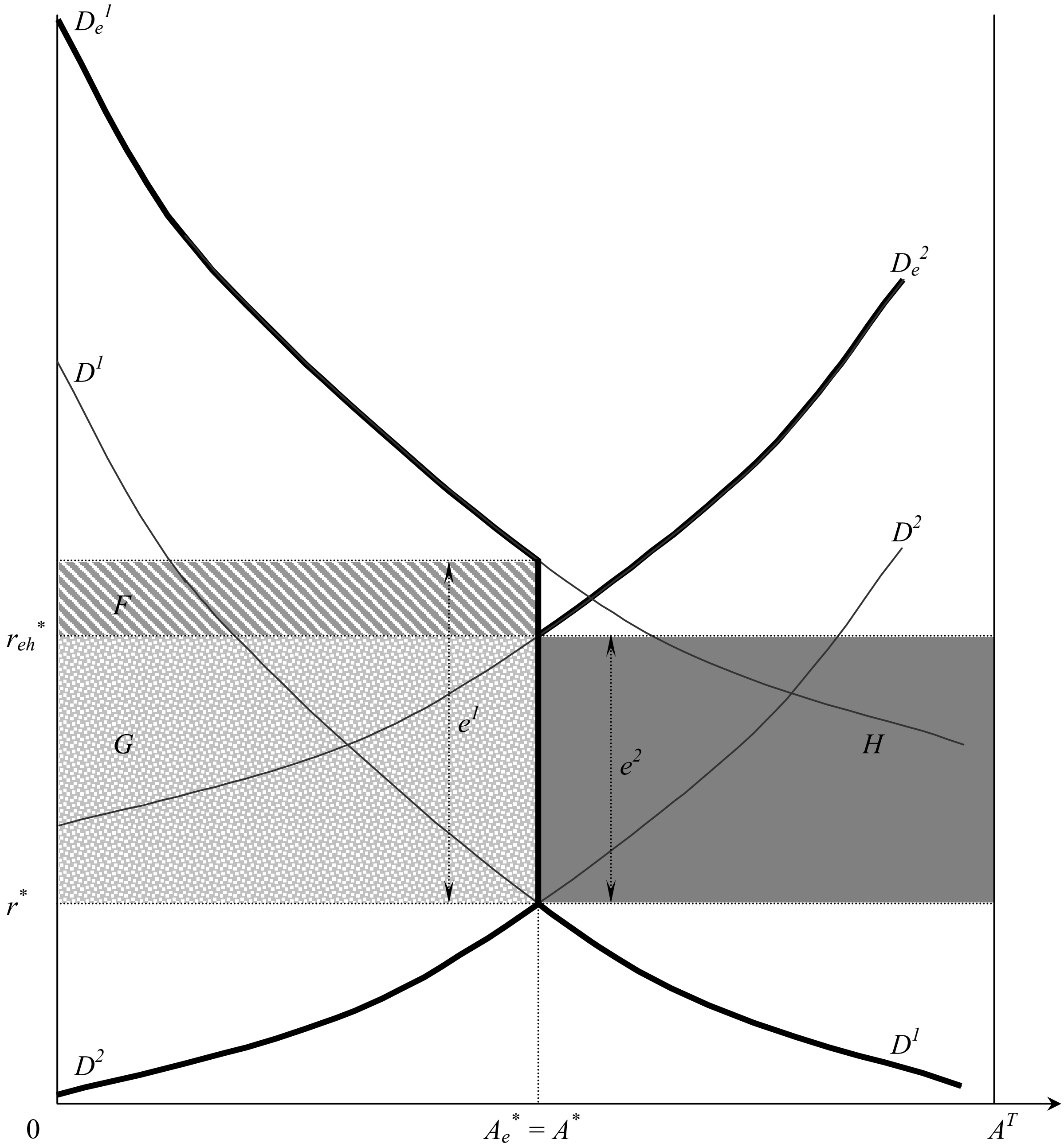


Figure 102. The effect of the regional SPS model on the land market with the size of allocated entitlements larger than the eligible area

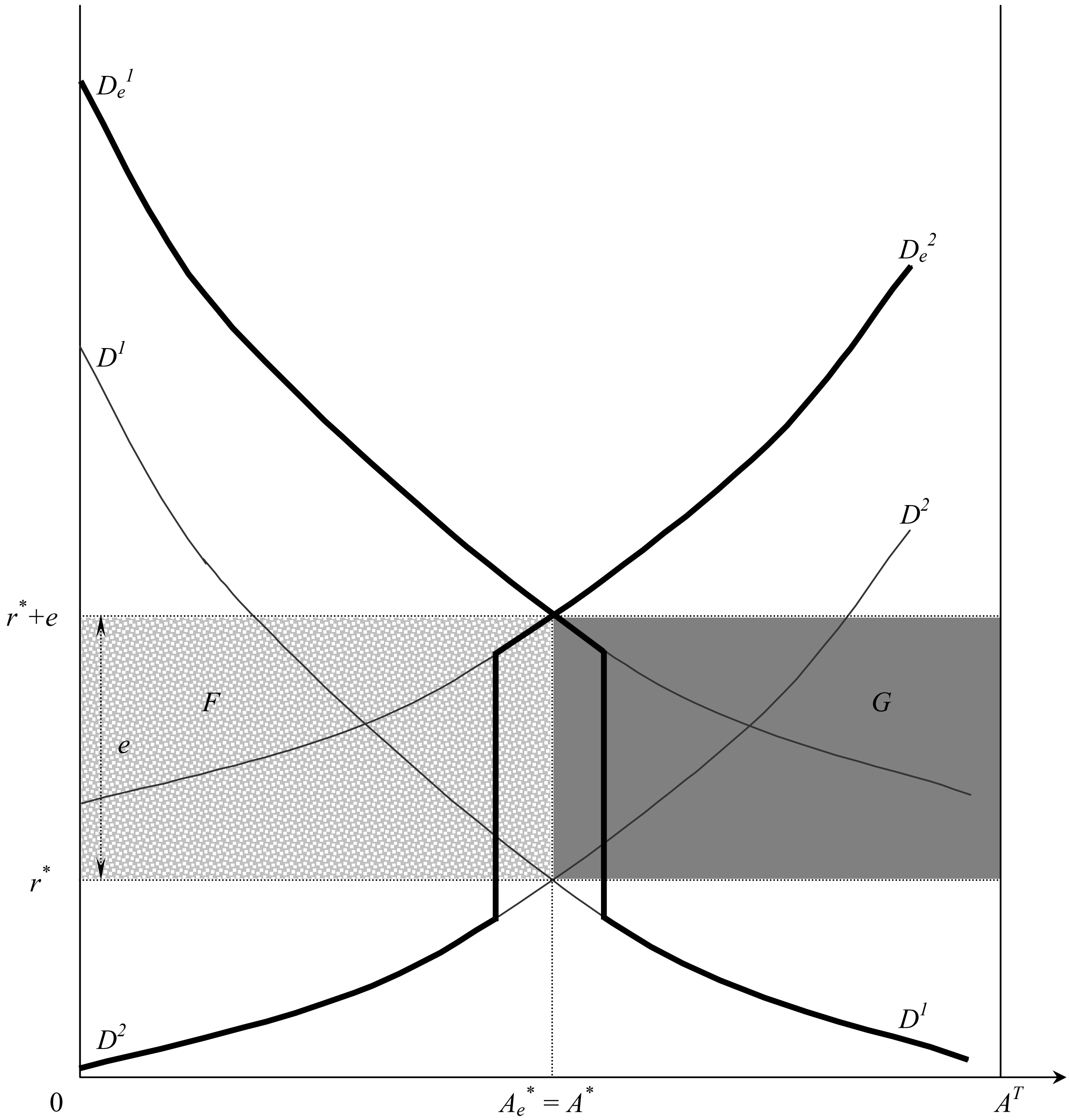


Figure 103. The effect of the historical SPS model and entrant eligibility for the SPS

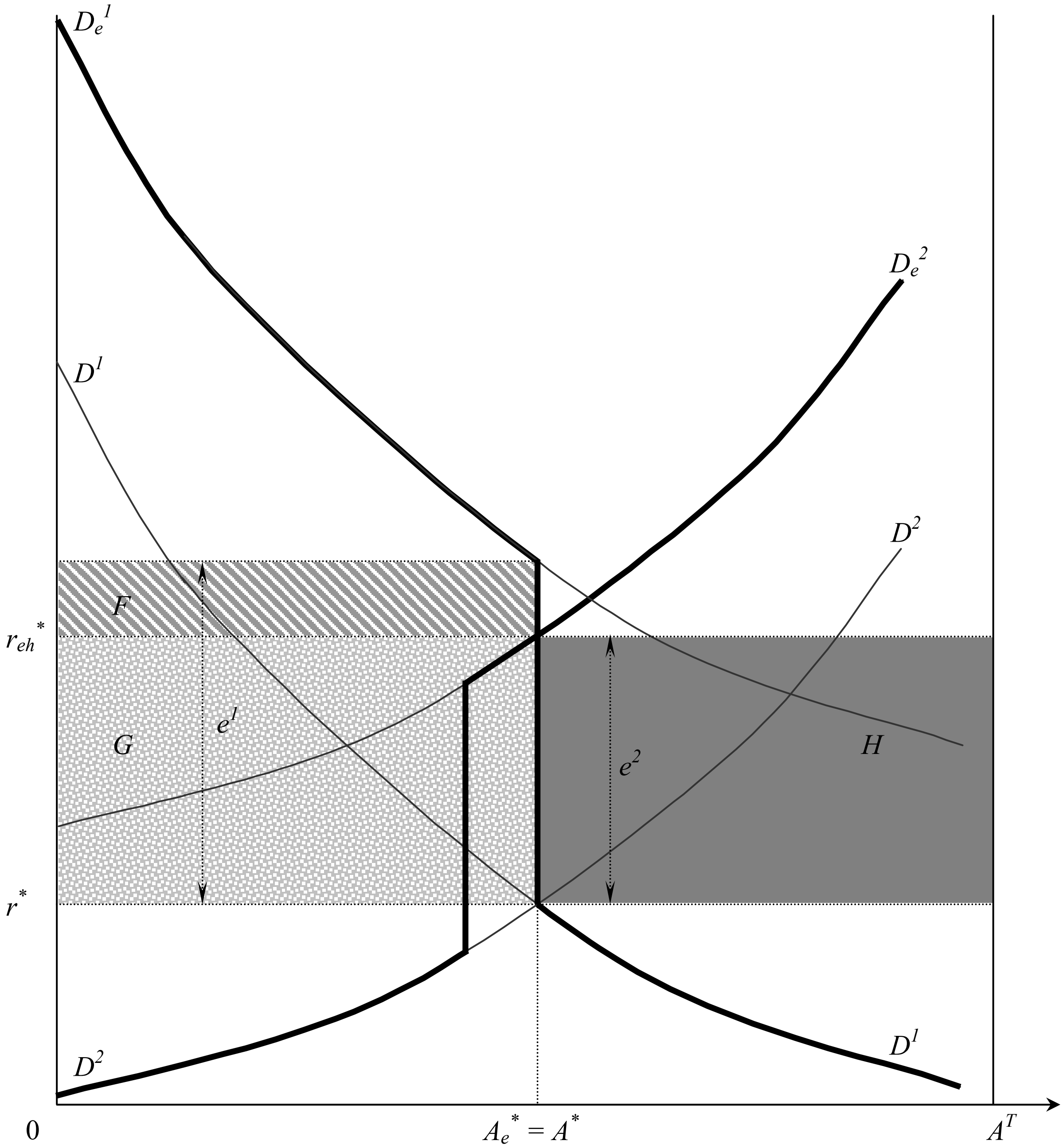


Figure 104. The effect of the historical SPS model and entrant eligibility for the SPS

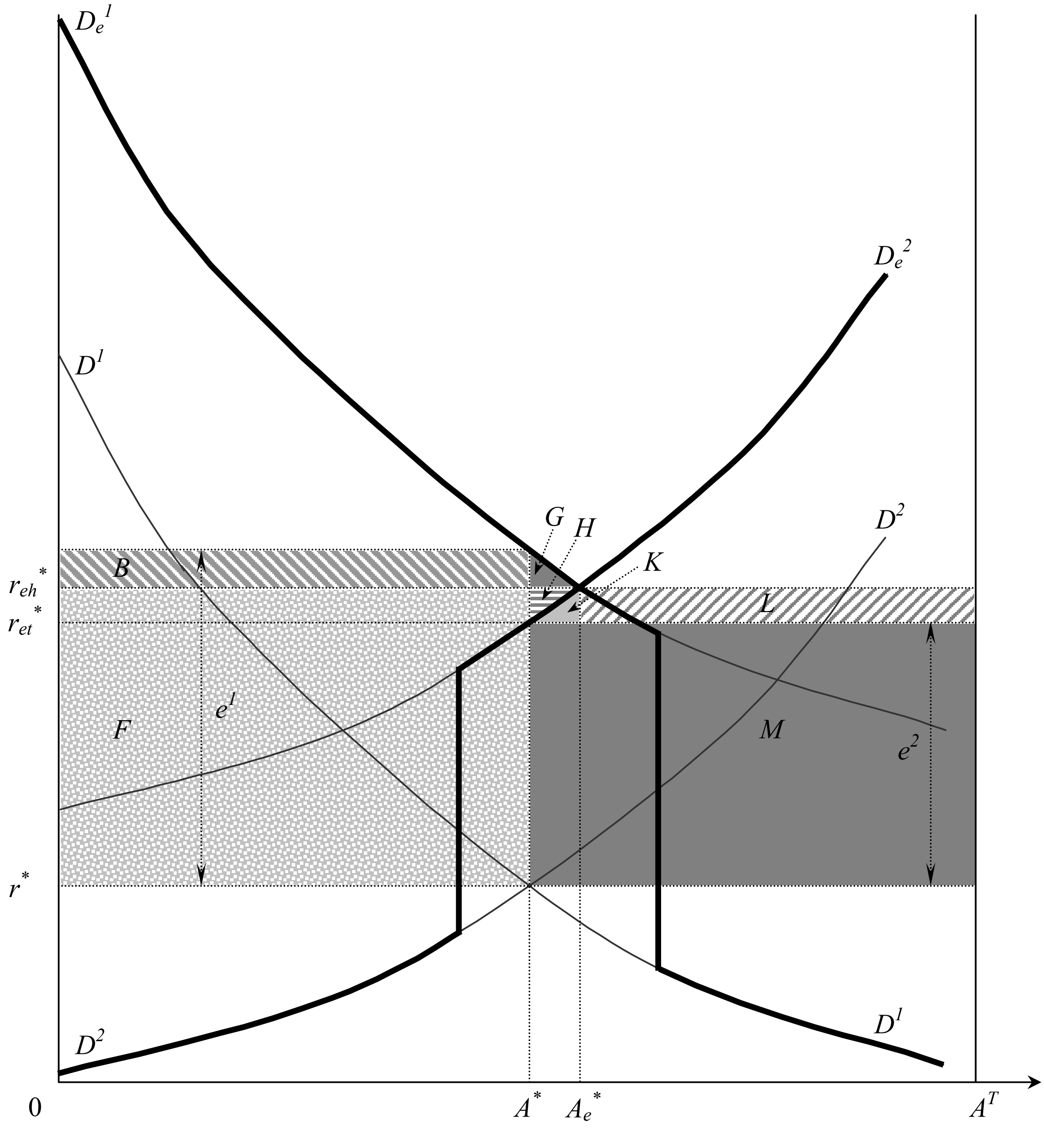


Figure 105. The effect of productivity changes on the land market

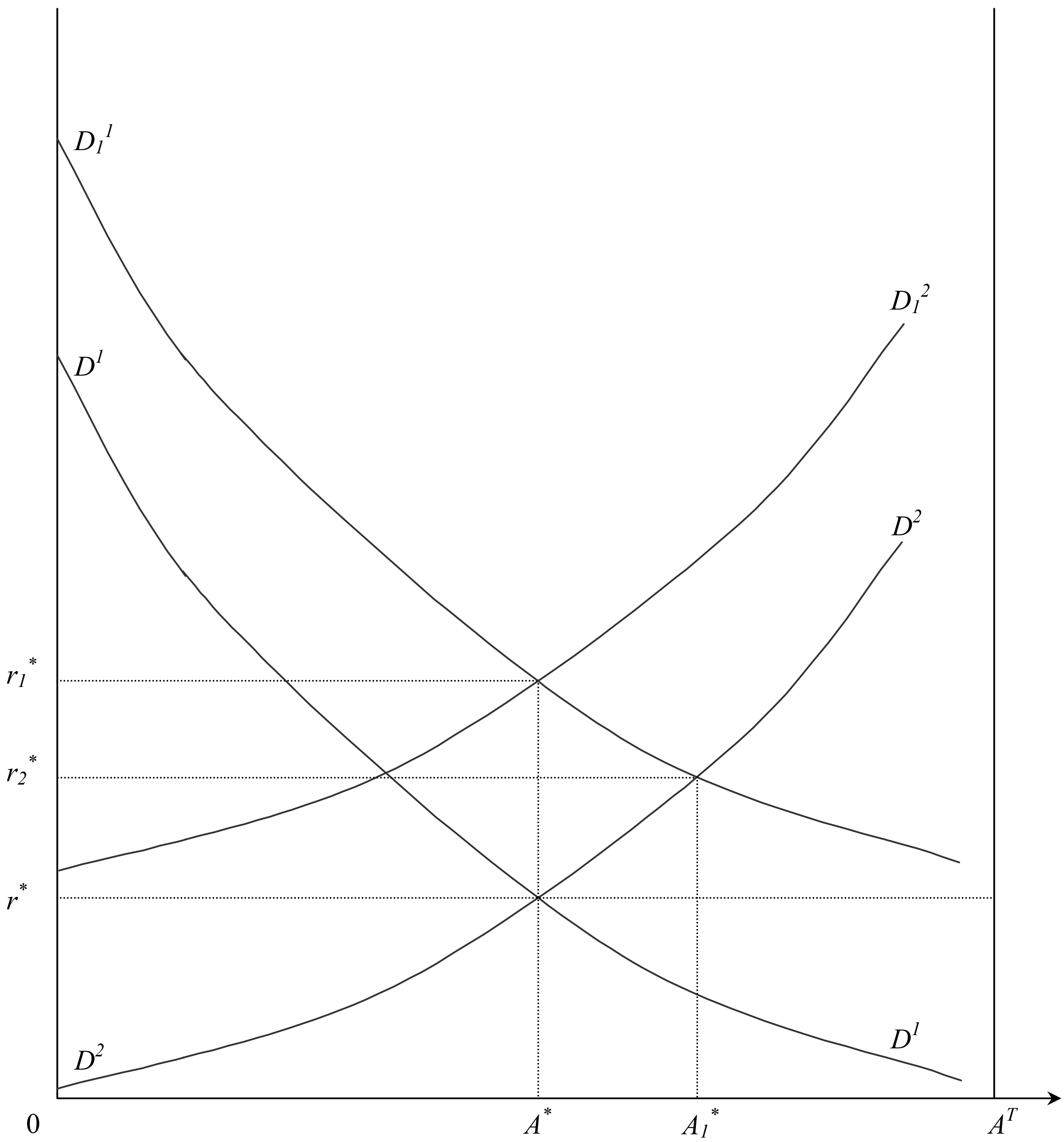


Figure 106. The effect of symmetric productivity change and regional SPS model on the land market

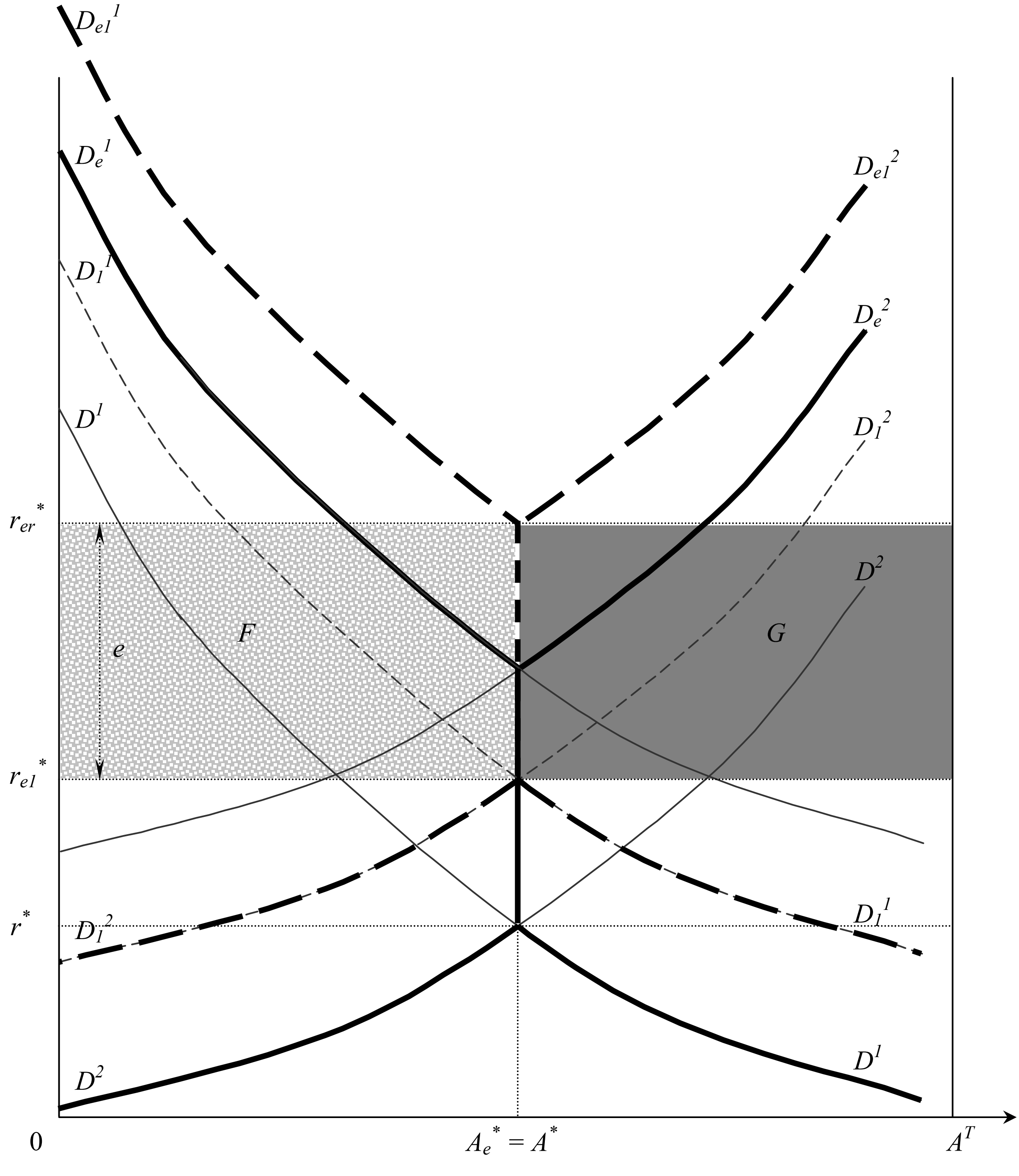
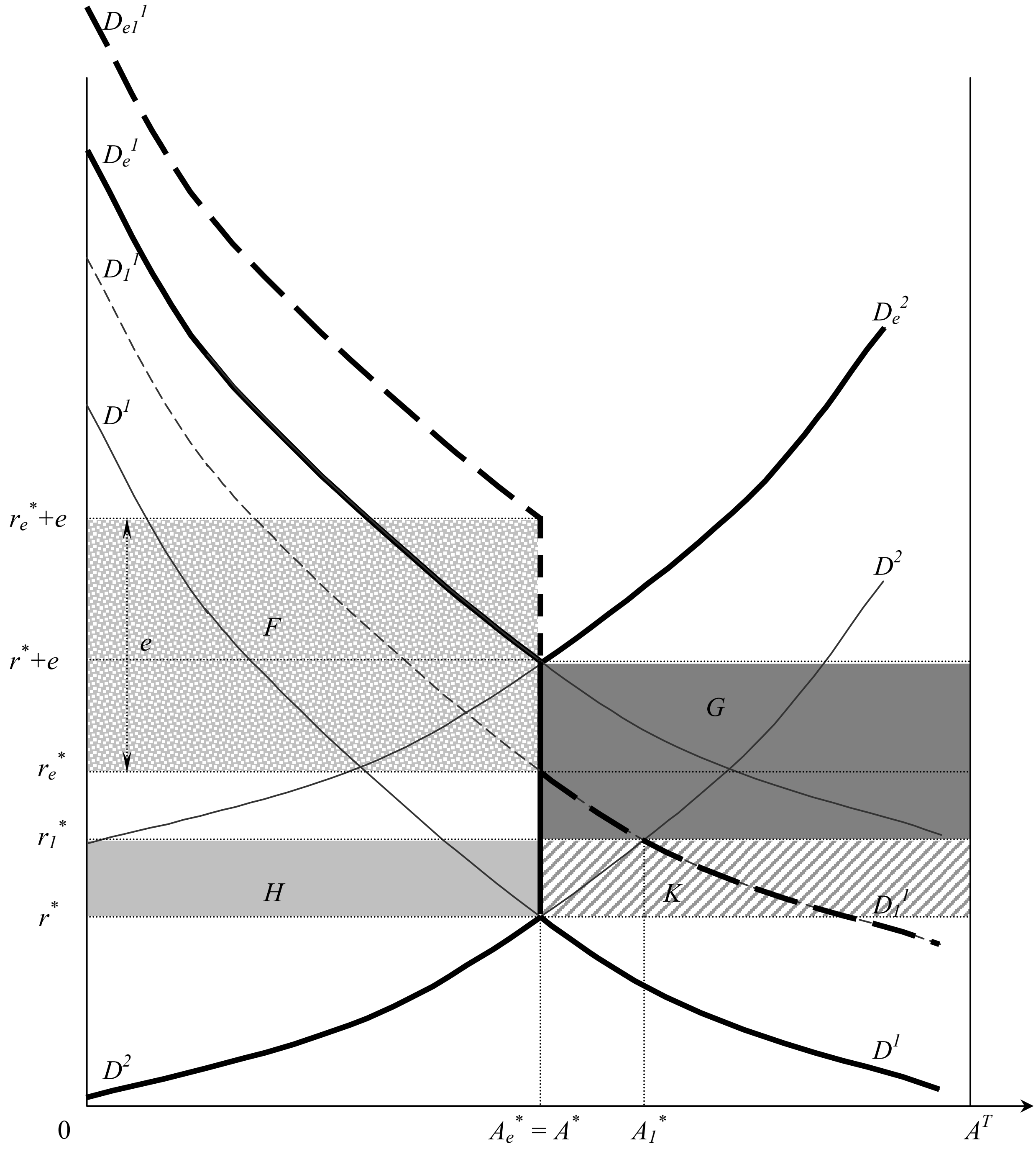


Figure 107. The effect of asymmetric productivity change and the regional SPS model on the land market



15. APPENDIX 4. THE EMPIRICAL APPROACH

The main objectives of this section are to:

- recognise data requirements which satisfy both objectives of the study and empirical methodologies;
- identify empirical methodologies which are needed to test the proposed hypotheses within the constraints of the project;
- identify potential econometric problems and suggest solutions for addressing the issues.

The section is organised in two main parts: estimating policy impact on land rents, and estimating policy impact on land prices.

15.1. Introduction

Findings from previous sections suggest a number of factors that may determine the price and rental rate of farmland. Drawing on these insights, this section derives an econometric model and outlines possible empirical strategies for estimating policy impact on farmland rental rate and farmland price. Thus, the main focus of this section is to identify problems associated with econometric estimation and suggest appropriate solutions.

The a prior acknowledging of estimation issues is extremely important because, if they are thoughtfully addressed, statistically significant and theory-consistent results can be obtained. Consistent and significant estimation results in turn can provide additional evidence about the relationship between subsidies and land rents/prices suggested by the theoretical models.

In order to estimate the policy impact on farmland rental rate and farmland price, two types of data can be used: farm-level and region-level. The empirical studies of land-market implications of decoupled subsidy payments involve either aggregate time-series data (where the unit of analysis is a region) or disaggregated cross-sectional data (where the unit of analysis is a farm). Both approaches involve serious statistical problems.

In aggregate time-series studies, the fundamental problem may be simply lack of data, which compounds a lack of confidence over whether the model structure is right or whether the empirical proxies for theoretical constructs are reasonable, and thus how to interpret the estimated model.

In cross-sectional studies, the primary econometric issues appear to be related to dealing with the roles of unobserved factors (such as farm-specific weather and soil fertility that determine the farm's history and thus its eligibility for subsidies as well as its current production mix and productivity) in jointly influencing land rents and land prices, and agricultural subsidies, (identification problems).

Given that time-series data is rarely available (although, farm-specific time series is the most preferred type of data, it is undoubtedly the least available data in Europe) and one period cross-sectional data is little appropriate for statistical inference of subsidy payments (see Alston 2007), in the following discussion we assume that at least a repeated cross section (two period panel data) is available:

- Panel data / repeated cross section with *n* regions and at least two periods, *t*=2;
- Panel data / repeated cross section with *n* farms and at least two periods, *t*=2.

15.2. Estimating the impact of subsidies on land rents

Theoretically, one could look for the effects of commodity policies on land rents/values cross-sectionally using data on land prices on different farms, where policies affecting those farms are different. The analysis would be like estimating the land price effects of irrigation by observing the values of irrigated and unirrigated land, which can be expressed as follows:

$$LR_{it} = b_0 + b_1GS_{it} + b_2X_{it} + e_{it} \tag{1}$$

where LR_{it} is land rental rate per hectare, GS_{it} is subsidy payments per hectare in year t, and X_{it} is a vector of observable covariates such as yield, selection and production of crops, occurrence of irrigation, farm size, revenue, and expenditures. Further important explanatory variables, which need to be considered when estimating equation (1) are land market institutions, details of policy implementation, duration of rental contracts etc. (see literature review). As usual, e_{it} is the residual capturing all other effects affecting farmland rental rate. Subsidy payments, GS_{it}, can be further split into specific agricultural policies, such as, market price support, output/input subsidies and decoupled single farm payments, the incidence of which can be estimated separately.

From the theoretical analysis it results that subsidies in interaction with market imperfection, structural changes and policy details affect land rents. Therefore, compared to estimating the land price effects of irrigation, the situation is more complicated for agricultural policies. There are several land market and policy-related issues, which considerably complicate the estimation of the impact of agricultural policies on land rents. The most important of them are: measurement error, endogeneity of explanatory variables, unobserved heterogeneity, unobservable explanatory variables, simultaneity bias, expectation error and omitted variable bias.

15.2.1. Measurement error

If the per hectare rental rate is calculated by dividing the total cash rent by total hectares rented, and part of the rent is paid in form of share corps, the calculated rental rate will be too small (as it does not include the share crop rent). The resulting measurement error is not classical measurement error. Given that the calculated rental rate is less than or equal to the true cash rental rate, the expected value of the measurement error must be greater than zero. As long as the non-classical measurement error is uncorrelated with the regressors, only the intercept will be confounded. However, if the measurement error is positively correlated with the magnitude of subsidy payments, the estimated effect of subsidy payments on rental rates will be biased downward.

This type of non-classical measurement error can be addressed with instrumental variables. Good instruments for subsidy payments in the pre CAP reform period[144] could be, for example, the farm-specific subsidy parameters: program yield and base hectares. These parameters are known in advance, they are highly correlated with actual subsidy payments, and they are uncorrelated with the idiosyncratic shocks to prices that ultimately determine subsidy payments. Thus, program yield and base hectares could serve as good instruments, because they are correlated with the realised subsidy payment and uncorrelated with shocks that contribute to the expectation error.

However, usually farm-level data on program yields and base hectares are unavailable. An alternative set of feasible instruments, which considers the data availability constraints, could be, for example, subsidy payments in the post CAP reform period. Because they are highly correlated with the pre CAP reform subsidies, but uncorrelated with they are uncorrelated with the idiosyncratic shocks to prices, they could be used as instruments for subsidy payments in the pre CAP reform period.

15.2.2. Endogeneity

Given that subsidies (at least coupled) are a function of yield and crop choice; they are endogenous variables reflecting the characteristics of the land and the producer's behaviour. Hence, subsidies are not assigned randomly, which implies that subsidy payments, GS_{it}, are correlated with the error term, e_{it}. As a result, the resulting OLS estimate of b_1 will be biased.

In order to control for endogeneity-caused problems, three issues need to be addressed: unobserved heterogeneity, simultaneity, and farmer's expectation error due to the time lag between rental contracts and subsidy payments. Given that they are caused by different factors, each of the three problems needs to be addressed differently. For example, using farm fixed effects, such as different land characteristics and entrepreneurial skill, the unobserved heterogeneity can be controlled for. Simultaneity can be controlled for through exogenous change in subsidy rate, which allows to divorce producer behaviour from subsidy payments. The expectation error can be overcome, for example, by using an IV strategy.

15.2.3. Unobserved heterogeneity

Usually, the empirical analyses performed at the regional level assume farm homogeneity within the geographic unit of observation. However, differences in farm size, structure, and productivity within a region serve to confound the conventional

[144] In this section we refer especially to the 2003 CAP reforms.

analysis. Many farm characteristics which are different across farms cannot be directly observed in the data, yet they affect both subsidies and farmland rental rates. Among these are farm-level soil properties and farmer human capital and entrepreneurial skill. Transient shocks, such as drought or pests, also may affect rental rates and subsidies.

The unobserved characteristics, such as farm productivity, that positively influence both subsidies and rental rates, is a usual source of bias in empirical analyses performed at the regional level and assuming farm homogeneity, because the positive correlation between payments and the unobserved factors that influence productivity will result in an upward bias to incidence estimates and confound b_1 as a measure of the effect of subsidies on rental rates. By controlling for permanent farm-level characteristics, one could avoid the estimate of b_1 to be inconsistent. In order to address the issue of unobserved heterogeneity, farm and time-varying region fixed effects need to be included in the estimable equation. Expanding equation (1) to include both yields:

$$LR_{it} = b_0 + b_1 GS_{it} + b_2 X_{it} + f_i + R_t + e_{it} \tag{2}$$

where f_i as the fixed effect for farm i, R_t is the time-varying regional effect which captures shocks, such as weather or pests, that affect all farms within the region.

15.2.4. Simultaneity bias (especially for coupled payments)

Prior to the SPS, output prices played a role in determining both subsidies and rental rates. Market price support was counter-cyclical; high prices meant low subsidies. This feature of agricultural subsidies induced a negative relationship between the subsidy and the rental rate. When expected prices were high, rental rates were high and expected subsidies were low. In the case of coupled payments, the explanatory variable contemporary payments per hectare of land is likely to be endogenous leading to specification error and bias. A region whose commodities faced weak market conditions (not captured in market income variables) will tend to have both lower farmland prices and higher commodity subsidy payments than a region selling into stronger markets. Therefore, the contemporary subsidy payment variable will tend to be biased downward.

A further source of endogeneity through simultaneity bias arises from adjustments in farmer behaviour due to subsidy payments. Given that all observations are of the same year, cross-sectional regressions hold national-level market conditions constant by construction. But support programs typically encourage more input use and production of supported commodities than would be the case in the absence of the programs. If the programs were removed, market prices of the supported commodities would rise. In the cross-sectional observations, prices received by farmers would rise more in the heavily supported regions than in those that relied less on the programs. Therefore, the cross-sectional regressions that hold commodity prices constant overstate the program effects.

In order to address this endogeneity issue, one can make use of two cross-sections of regional data for two different years. The underlying intuition is to explain the growth of farmland value between base year and end year as a function of support provided during that period. The problem is dealt with through the use of changes between the base year and end year. If programs reduced market prices, the relevant effects of that decline will appear as a corresponding reduction in the base year to end year increase in farmland value. The 2003 CAP reform divorced farm subsidies from commodity prices, eliminating the commodity prices as a source of bias in the post CAP reform period.[145] Hence, the CAP policy reform might provide an exogenous change in subsidy rates, and its structure eliminates the obstacle to identification caused by simultaneity bias.

15.2.5. Expectation error (especially for coupled payments)

Usually, rental rates are set according to expected receipts, including expected subsidy payments. Prior to the 2003 CAP reform, market price support was conditioned on the market price and thus was unknown until after the harvest, while rental rates were agreed upon before planting in the spring.[146] The difference between the actual subsidies and the expected subsidies is expectation error, which is part of the composite error term in the estimable equation. Assuming that the expected subsidy and the expectation error are uncorrelated, i.e. their covariance is equal to zero, implies that the realised payments, GS_{it}, are correlated with the error term. The effect on the coefficient of interest, b_1, is the same as classical errors in variables, namely attenuation bias.

The instrumental variables strategy can overcome the attenuation bias induced by the expectation error. An adequate instrument should be correlated with subsidies and uncorrelated with the composite error term. For example, the decoupled subsidy level in the post CAP reform period meets these requirements. Given that in 2003 the subsidy rates were exogenously predetermined for the next years according to one of the three SPS implementation models, there is no expectation error in the post CAP reform period subsidies.

On the one side, post CAP reform subsidies can be assumed as strictly exogenous. Due to the absence of expectation error in the post CAP reform subsidies, this variable is uncorrelated with the error term. This condition holds if the subsidy shock in the pre CAP reform period contained no information for the expected subsidy in the post CAP reform period which, according to Pokrivcak, Ciaian and Bartova (2004), is a reasonable assumption.

On the other side, depending on the SPS implementation model, the entitlements to decoupled payments in the post CAP reform period are based on past subsidy payments

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[145] SPS were implemented in the period 2005-2007 in the EU-15. The exact implementation date of SPS varies across the EU member states.

[146] Similarly, to a certain extent also coupled livestock and crop area payments were determined by the market price, because the total level of subsidy payments depend on the behaviour of all farms and the regional constraints of total subsidy payments.

from the pre CAP reform period, they are likely to be strongly correlated with the pre CAP reform period subsidies, and hence may serve as a good instrumental variable.[147]

If the panel data contains longer time series (t>2), an alternative way to address the expectation error can be used. In order to approach the expected market rent, Goodwin et al. (2005) propose to construct a four year average of the land rent realised during the current and past three years.

15.2.6. Unobservable explanatory variables

Equation (2) cannot be estimated in its current form, as not all farm fixed effects, f_i, are observable in the data. In order to absorb f_i, one can take the first differences of equation (2), which in a two-period panel results in:

$$\Delta LR_i = \Delta b_1 GS_i + \Delta b_2 X_i + \Delta e_i \tag{3}$$

where operator Δ denotes first differences. If the post CAP reform period level of the observable covariates, X_{it}, are influenced by the exogenous subsidy change, the first differencing of the control variables might not be recommended. Instead, the pre CAP reform period values of these variables, X_{it-1}, can be included in the estimable equation. In a panel with t=2, the estimated coefficients from first difference data will be identical to those obtained by including the individual fixed effects (Kirwan 2005).

15.2.7. Omitted variable bias

Given that agricultural areas across the EU differ substantially in the crops grown, one might be concerned that the obtained results mask variation in response across region. Given that each crop is subsidised separately, one might worry that the incidence differs according to crop and subsidy regime. This issue might be addressed by estimating the impact of subsidies on land rents separately for different regions.

Regions with lower commodity program benefits may have lower land values for reasons other than support programs or other variables included in the regressions. If support programs were to end, land prices in the regions that are now heavily supported would not fall to the levels of the less supported regions as the regressions would predict.

In order to address the heterogeneity issue, one can make use of two cross-sections of regional data for two years. The idea is to explain the growth of farmland value between base year and end year as a function of support provided during that period. By including the base value of each region's farmland as a right-hand side variable, the

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 The first stage equation of a two-stage least squares estimation strategy is then following: $\Delta GS_i = bGS_{it-1} + R + u_i$.

characteristics of a region's farmland that affect its value, but are not captured by the other variables in the regression, are held constant.

Farm size might also affect the size of the impact of subsidies on land rents. For example, large farms might be better able to negotiate for lower rental rates, which might drive the relatively low incidence. Alternatively, small farm operators might be better acquainted with the landlord and hence receive a more favourable rental rate. The farm size issue might be addressed by estimating the impact of subsidies on land rents separately for different farm sizes.

15.2.8. Correlation between explanatory variables

A further complication may arise if the errors applying to observed policy benefits are correlated, which is the case of different coupled subsidies, and coupled and decoupled policy instruments. According to Goodwin wt al. (2003), this correlation may assume two different forms- correlation of the errors across different programs and correlation of errors across different regions in a sample. Although, both circumstances are likely to coexist, in a pooled cross section of regions, most likely the latter will by more important.

If there are several coupled policies or coupled and decoupled policies, they may be correlated with each other. Consider a case of two programs – output subsidy and market loss assistance payments. The extent of support is likely to vary considerably from year to year according to market conditions. Low-price years realise larger payments for both programs. Thus, the errors associated with using realised benefits are likely to be highly correlated across the programs. The correlation could also be negative. Consider the case of yield disaster relief and price supports. In low-yield years, market prices are high and thus price support payments will be low, though disaster benefits will be higher to compensate for the production shortfalls.

15.3. Estimating the impact of subsidies on land value / (sales) prices

The effect of subsidies on the asset value of farmland provides another dimension for assessing the distributional impacts of agricultural subsidies. Unlike the rental rate incidence, which reflects the incidence of the contemporaneous marginal subsidy dollar, the land value incidence reflects both the incidence of the contemporaneous subsidy dollar and information about the future subsidy dollars. If the estimated incidence on the rental rate is a permanent feature of the farmland market, a reasonable discount rate should reconcile the rental rate incidence with the incidence on land values. Given that the relationship between the rental rate incidence and the farmland value incidence provides additional insight into the interaction between agricultural subsidies and the farmland market, in this section we outline key issues which need to be addressed when estimating the impact of subsidies on land prices.

In order to investigate the relationship between the subsidy impact on land values, the per-hectare land value need to be introduced as the dependent variable instead of the farmland rental rate. Using a traditional present value model (see literature review), one can calculate the implied discount rate from the estimated incidence on rental rates and on land values. More precisely, the land value, *LP*, equals the ratio of the rental rate, *LR*, divided by the discount rate, δ:

$$LP_{t-1} = E(LR_t) / \delta$$

where $$LR_{it} = b_0 + b_1 GS_{it} + b_2 X_{it} + f_i + R_t + e_{it} \quad (5)$$

Generally, the discount rate, δ, attached to each source of returns can vary reflecting differences in the uncertainty associated with different sources of future net returns. However, without loss of generality we can assume the same discount rate to all cash flows from the same source, and that each cash flow stream grows at a constant rate. As a result, the above formulation of the land price model simplifies to:

$$LP_{t-1} = b_0 + b_1 E(GS_{it}) + b_2 E(X_{it}) + f_i + R_t + e_{it} \quad (6)$$

where $E(GS_{it})$ represent the expected subsidies and $E(X_{it})$ captures the expected market returns. If the available subsidy data is detailed enough, then the variable GS_{it}, can be further split into specific agricultural policies, such as, market price support, output/input subsidies and decoupled single farm payments. As above, the individual farm fixed effect, f_i, continues to account for unobserved heterogeneity in land productivity.

The time-varying regional effect, R_t, however, is different from land rent estimations. Here it captures non-agricultural opportunity income, as several studies have shown that the influences of urbanisation and non-agricultural conversion pressure play a large role in the value of farmland, e.g. Plantinga, et al. (2002). Thus, the time-varying regional fixed effect now controls for urbanisation and other non-agricultural pressures experienced by all farms in a region.

In spite of the progression of the empirical literature (see Alston 2007 for the state of the art discussion), fundamental shortcomings remains for models that attempt to quantify the determinants of farm land values, implying that similar to the land rental models, the estimation of equation (6) is associated with several econometric issues, the most important of which we briefly discuss in the following.

15.3.1. Expectation error

According to the underlying framework (equation 5), land values are based upon expectations about the long-run stream of net returns to production and subsidies tied to the land. However, expected future cash flows are unobservable. We can only observe certain market and payment realisations for a sample of farms under a fixed set of policy instruments and market conditions. Both market and subsidies in any given year represent realisations drawn from distributions that are determined by random prices, yields, and policy shocks.

This raises a critical issue: to what extent do observations about payments in any given year reflect the long-term expected stream of cash flows, which determines land values? What one observes in any given year for a farm may not be a valid indicator of what is expected in the long run and thus what is actually driving land values implying a standard errors-in-variables problem.

There are several possibilities regarding the link between observed policy and market outcomes in any given year and the determination of farmland prices. For example, it is possible that farmer correctly assesses the true determinants of land values, but these determinants are unobservable. Relating the observable annual realisations of market and policy outcomes to land prices results in the classical errors in the explanatory variables problem. Errors-in-variables result in an attenuation bias that forces the estimated coefficients toward zero and thus yields inconsistent estimates. As outlined in the previous section, it is also possible that farmers do not correctly assess the true determinants of land values, implying another source of the expectation error.

15.3.2. Spatial correlation

Spatial correlation is likely to be relevant when a pooled sample of individual farms is considered. Since realised program benefits are dependent upon aggregate market conditions, the errors are likely to be highly correlated across observational units (farms) in a given year. In a sample consisting of only a few years of data, the correlation across farms increases the estimation error and may further exaggerate the bias; year-to-year shocks may not average out when only a few years are observed. Furthermore, if realisations are highly correlated across units within a year, parameter estimates may shift considerably from year to year. If only a few years are observed, the estimates from a pooled sample may be sensitive to events in the years observed and thus may vary substantially across years and be more variable in a pooled analysis.

The problem of spatial correlation can be addressed, for example, by using farm-specific time series. However, they are very rare for Europe yet.

15.3.3. Unobservable counterfactual

For policies that support market prices, such as commodity subsidies for example, all land that grows the supported commodity, which is likely to be all the comparable land in any particular region, will be affected in the same way, at least to a first approximation. So we do not have the necessary contrast between the policy and its absence. Of course we will always find some landowners not enrolled in a program, but if the market price is supported, that land will reap the benefits anyway. Moreover, even if a particular farm does not grow the supported commodity, but could if the owner chose to, the market value of the land will reflect that option and so be affected by the subsidies.

For policies that do not support market prices, such as production flexibility contract payments, market loss assistance payments, and loan deficiency payments in the US and SPS in the EU for example, land values in an area will be affected even for non-participating farms if they could chose to participate.

One econometric approach to these problems could be to attempt to hold the non-program factors that make land at two different locations differently valuable using a standard regression model, and see how much of the residual differences can be explained by variables pertaining to commodity programs. As usual, the difficulties may involve getting appropriate observations, data that measure both policies and the relevant non-policy variable s that influence land values, and estimating effects of policies on land values rather than effects of other variables (omitted variables correlated with land values) on policies.

15.4. Summary

The insights from this section suggest that coupled and decoupled policies require a different econometric approach, as they affect land rents and land values differently. Moreover, the appropriate empirical methodology depends also on whether land rent or land price data, and whether regional or farm-level data is available.

From the statistical perspective, the most valuable data would be farm-specific time series. However, recognising the poor quality of the available policy and land market data as well as the current project constraints, it was not possible to collect a full range of the required data within the present study.

Therefore, a more pragmatic approach, which allows us to combine both qualitative and quantitative information, is applied for the empirical analysis of the present study. For example, where the required statistical data is not available, the analysis draws on qualitative data.

16. APPENDIX 5. LAND VALUE DETERMINATION

At least three conceptually different theories have contributed to the theoretical discussion of land value determination: the Net Present Value model, the Asset Pricing model and the Hedonic Land Price model. Although, they provide different micro-foundations of the mechanism how land value and land rents are determined, as we will see, their predictions are rather similar.

The Net Present Value Model. Most research attempting to identify and quantify the determinants of farmland price relies on the Net Present Value (NPV) approach.[148] This approach assumes that the price of farmland equals the present value of all future expected cash flows attached to the use of land for productive purposes. In this context, an increasing farmland price should be explained by an increasing land rent. Indeed, in the US, agricultural economists observed that the evolutions of the real land value and agricultural income go in the same direction from 1910 to 1950. Those trends convinced agricultural economists to rely on the NPV approach.[149]

The Asset Pricing Model. The classical net present value approach became criticised because of the observed decreasing agricultural income and increasing land price in the 1950s. Several alternatives models were proposed to explain the evolution of farmland price. Feldstein (1980) points out that the increasing farmland price observed in the 1970s took place during a period characterised by a strong inflation. As an alternative to the NPV approach, Feldstein (1980) proposes a portfolio choice model with two assets: a classical financial asset and land.[150] He shows that anticipated inflation could lead to a decrease in the actualisation rate applied to land and explain an increase in farmland price. Other authors explain that as a real asset with fixed supply, land tends to hold its real value during inflationary periods. Consequently, there is an inflationary hedging

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[148] According to the NPV framework, land prices are thought to be determined by the current and expected future stream of benefits derived from its use. These benefits can be distinguished into two broad categories. The first are the stream of benefits from productive use, and include returns from the market place for production of agricultural output, next to the stream of benefits that are directly or indirectly a result of government support policies. The second relates to anticipation of future capital gains, for example, if prices increase because of urban pressure.

[149] Today the NPV is a standard method for the financial appraisal of long-term projects. Used for capital budgeting, and widely throughout economics, it measures the excess or shortfall of cash flows, in present value terms, once financing charges are met.

[150] The general model of asset pricing was introduced by Jack Treynor, William Sharpe, John Lintner and Jan Mossin (in 1990 Sharpe received the Nobel Memorial Prise in Economics for his contributions to the Capital Asset Pricing theory). The Asset Pricing model is used to determine a theoretically appropriate required rate of return (and thus the price if expected cash flows can be estimated) of an asset (e.g. agricultural land value), if that asset is to be added to an already well-diversified portfolio, given that asset's non-diversifiable risk. The Asset Pricing model takes into account the asset's sensitivity to non-diversifiable risk (also known as systematic risk or market risk), as well as the expected return of the market and the expected return of a theoretical risk-free asset.

motive to buy land during an inflationary period (Castle et al. 1982). The Asset Pricing model was first applied to agricultural land value in late eighties.[151]

[151] Featherstone and Baker (1987), Barry (1990), Clark, Fulton and Scott (1993), and Chavas and Thomas (1999) are good examples of applications using the capital asset pricing theory.