Effects of decoupling direct payments on agricultural production and land use in individual member states of the European Union

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1. Referent: Prof. Dr. Bernhard Brümmer

2. Referent: Dr. Harald Grethe

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Abbreviations

AG-MEMOD	AG-MEMOD model
AT	Austria
BE	Belgium/Luxembourg
BG	Bulgaria
bn.	billion
CAP	Common Agricultural Policy
CARA	Constant Absolute Risk Aversion
CEECs	Central and Eastern European Countries
CET	Constant Elasticity of Transformation
CGE	General Equilibrium model
CGF	Corn Gluten Feed
COP	Cereals, Oilseeds, and Protein crops
ct	cent
CZ	Czech Republic
DARA	Decreasing Absolute Risk Aversion
DK	Denmark
EE	Estonia
ERS	Economic Research Service
ES	Spain
ESIM	European Simulation Model
EU	European Union
FAO	Food and Agriculture Organisation
FCI	Feed Cost Index
FI	Finland
FR	France
GAMS	General Algebraic Modelling System
GATT	General Agreement on Tariffs and Trade
GE	Germany
GNI	Gross National Income
GR	Greece
ha	hectare
HU	Hungary
IE	Ireland
IT	Italy
kg	kilogramme
LDP	Loan Deficiency Payment
LT	Lithuania
LV	Latvia
MJ ME	Megajoule Metabolisable Energy

MLA	Market Lost Assistance
mill.	million
MTR	Mid-Term-Review
NL	Netherlands
NMS	New Member States
NUTS	Nomenclature of Territorial Units for Statistics
OECD	Organisation for Economic Cooperation and Development
PEM	Policy Evaluation Model
PFC	Production Flexibility Contract
PL	Poland
PMP	Positive Mathematical Programming
PSE	Producer Support Estimate
PSTM	Penn State Trade Model
PT	Portugal
RO	Romania
ROW	Rest Of the World
SAPS	Single Area Payment Scheme
SFP	Single Farm Payment
SI	Slovenia
SK	Slovakia
SW	Sweden
TRQ	Tariff Rate Quota
UK	United Kingdom
US	United States
URAA	Uruguay Round Agreement on Agriculture
WFM	World Food Model
WTO	World Trade Organisation

1 Introduction

Within the first decades after inception of the Common Agricultural Policy (CAP) high levels of agricultural support to farmers had been the norm. The core policies generating this support consisted of high administrative prices combined with import tariffs, export subsidies, and quantitative restrictions. The stated objectives of these measures were numerous, however, income stabilisation and thus the avoidance of shortages in the availability of foodstuffs was by far the most frequently used justification.

Due to a revolution in productivity in the 1960s the European Union (EU) turned from a large importer to a major exporter of agricultural products. High prices limited growth in demand and lead to encouraged investment, restructuring, and adoption of modern technologies. The inevitable result was the emergence of surpluses. In the 1980s, production surpluses caused immense budgetary costs, mainly due to high expenditures for export subsidies. In addition, the problem of surplus disposal arose (USDA, 1999). At the same time, the highly protectionist agricultural support measures of the EU were put under pressure by trading partners in the course of multi-lateral negotiations within the Uruguay Round.

In order to respond to budgetary pressures and in order to pave the way for a new General Agreement on Tariffs and Trade (GATT) the CAP was finally reformed in 1992 (MAAS AND SCHMITZ, 2006)[1]. This reform, widely known as the MacSharry reform, changed the architecture of price and income support significantly. Cereal prices were reduced by 29 % and butter intervention prices by 5 %. Beef prices were cut by 15 % and at the same time the special male subsidy was restricted to a limit of 90 animals per farm. In addition, farmers had to set-aside 15 % of their arable land. The main change in the design of the CAP system, however, embodied the introduction of direct payments to grandes cultures, i.e. cereals, oilseeds, protein crops, and set-aside area, as a compensation for the price reductions in the cereal sector (AGRA INFORMA, 1993).

Responding to the upcoming Eastern enlargement of the EU and to increasingly binding restrictions on export subsidies resulting from the Uruguay Round Agreement on Agriculture (URAA) another CAP reform, i.e. the Agenda 2000, was passed in 1999. This reform embarked on the way adopted by the MacSharry reform with a further cut in intervention

[1] COLEMAN AND TANGERMANN (1999), however, describe that some politicians have disputed a connection between the CAP reform and the negotiations within the GATT.

prices and an extension of direct payments towards milk. In case of direct payments agricultural support was slightly further decoupled in the sense that payment rates for cereals, oilseeds, and protein crops were stepwise brought in line. An innovation was the reinvigoration of the structural policy, placing the emphasis on rural development and the environment, i.e. creating the so-called second pillar of the CAP (AGRA INFORMA, 2000).

However, many politicians and economists claimed that the reform steps under the Agenda 2000 were not far reaching enough to cope with longer term defiances like upcoming negotiations within the framework of the World Trade Organisation (WTO) and the financing of direct payments after accession of the Central and Eastern European Countries (CEECs) (SWINBANK, 1999). As a compromise, it was agreed upon a mid-term review of the CAP, in order to check again were European agriculture is heading. In the aftermath, it turned out quickly that EU agriculture would not be able to reach its goals under the existing policy so that on June 26th 2003 the EU's council of agricultural ministers agreed upon a further and so far last reform (MTR reform) of the CAP.

The focus of the MTR reform is clearly on the further decoupling of direct payments from production. While direct payments under earlier CAP reforms were paid for grandes cultures only, arable fodder products and pasture land became also eligible for direct payments under the MTR reform. In addition, farmers were allowed to set-aside their land completely without loosing the eligibility for direct payments, as far as they keep their land in good conditions corresponding to the so-called cross compliance regulations. That is, uniform direct payments per hectare are paid for all kinds of area uses apart from fruits, vegetables, and table potatoes. At the same time, payments for ruminants have to be abolished or, as an option, at least reduced significantly (AGRA INFORMA, 2005). The new design of payments under the MTR reform constitutes most probably the biggest step from production support towards income support of producers, since this way has been adopted in the MacSharry reform. However, from an economic point of view it is not efficient yet.

Based on theoretical considerations, the payment scheme under the MTR reform is expected to have various effects on the composition of agricultural production and land use. Thereby, adjustment processes in the EU-15 can be expected to differ from those observed in the new member states (NMS), since the latter group of countries receives EU payments for the first time, while the production structure in EU-15 member states has partially even been based on these subsidies over time. The more general impacts of decoupling in EU-15 members crucially depend on two more or less contradicting effects. Decoupling of area payments can be expected to lead to an increase in roughage area, which results in lower fodder costs and, thus, in a support for ruminant producers. Decoupling of ruminant payments thwarts this effect, i.e. leading to lower ruminant supply and a reduced need of roughage areas. Thus, decoupling can be expected to have complex effects and the net effect on crop and fodder area is unclear. These effects could additionally be different among member countries, since governments can choose as to what extent payments will remain coupled to production. France, Spain, and Portugal, for example, opted to stay in line with the old coupled direct payment system as far as possible, while Germany, Ireland, and the United Kingdom, for example, decided to shift completely to the new payments. Different decisions on the design of subsidies also exist among the group of NMS, where Poland, for example, is the only country, which forgoes payments for ruminants completely.

Against this background, this analysis has the purpose to look at the effects of decoupled direct payments on land use and production in individual member countries of the enlarged EU. This is done by the partial equilibrium model ESIM (European Simulation Model), which has been extended in terms of country coverage and modified with regard to the modelling of the land market and, to some extent, to the depiction of direct payments.

The work is structured as follows: The second chapter highlights the most important economic and political aspects of decoupling and provides a basis for further discussions and analyses in subsequent chapters. This is done first by a more general discussion of the economic mechanisms of various more or less decoupled support policies and secondly by a detailed description of the decoupling regulations under the MTR reform and their potential effects from a theoretical point of view. Chapter 3 first provides a literature overview of the state of depicting decoupling effects in various economic simulation models of the agricultural sector. Thereby, the focus is on the mechanisms of land allocation, the link between the livestock and the fodder/crop sector, and the depiction of direct payments. These aspects are considered most crucial with respect to the modelling and the analysis of decoupling effects. In the second part, simulation results of decoupling scenarios from various simulation models are presented and compared. Chapter 4 includes the analysis of decoupling effects under various scenarios on agricultural production and land use conducted with ESIM. In order to ease the understanding of the simulation results, however, chapter four starts with a very detailed description of the assumptions and scenarios, which the analysis relies on. Chapter 5 describes and analyses the results of a sensitivity analysis, which is conducted for varying assumptions on the production effectiveness of payments under the MTR reform and varying elasticity levels, which have a-priori been considered crucial for simulating the effects of decoupling. Though the analysis of decoupling effects on production and land use is clearly in the focus of this work, chapter 4 and 5 also look at the developments of the EU's trade position and the role of land prices, which have explicitly been included in ESIM in course of the underlying research work. The work concludes with a summary, some interpretations, and an outlook on future research needs.

2 Economic and political aspects of decoupling

Since the late 1980s discussions and efforts in the field of agricultural policy focus on cutting the link between support and production both on national and international level. The need to reduce trade distortions that result from political support in the agricultural sector dominated the debate leading to the adoption of the URAA in 1994. Much effort has already been expended in improving the understanding of the meaning behind the concept of decoupling.

Against this background this chapter highlights the most important economic and political aspects of decoupling. First, in section 2.1 an overview and an evaluation of the most common definitions of decoupling are provided, before section 2.2 throws the light on the general economic mechanism of how agricultural policy measures affect production. Thereby, the scope of these considerations is broad, i.e. not always focusing on typical CAP direct payments only, in order to classify the economic meaning and importance of direct payments in the overall political context. In section 2.3 the view turns from the more general perspective to the specific issue of direct payments under the MTR reform. First, the regulations under the MTR reform, which relate to the new design of direct payments, are described. It follows an overview of the implementation of the MTR reform in individual member states and an illustration of the financing of direct payments under the current CAP. Thereafter, theoretical considerations on potential effects arising from the new CAP payments are made. Finally, section 2.4 summarises the main issues of this chapter.

2.1 Definition of decoupling

The term "decoupling" has been used widely among agricultural policy makers and scientists, though with different meanings[2]. Some see it as a support programme with less or no distortions on production. Others, mostly policy makers, define it in terms of the effects of a whole policy package. That is, a set of policy measures is considered decoupled, if it has no or almost no effect on production and trade. Under the URAA the term "decoupled" is applied to a specific category of agricultural policy measures only, namely "decoupled income support" (WTO, 2007). At times, decoupling denotes a transition mechanism towards a more market oriented agricultural business. In general, decoupling is not necessarily used with regard to a reform of an existing policy, but also in the context of introducing a completely new measure. This is, for example, the case for the extension of CAP direct payments towards the CEECs in the course of accession. The lack of consistency when using the term decoupling calls for some caution and a more specific definition of its economic meaning.

The general meaning of the concept of decoupling seems to be clear to everybody. The idea of coupling and, as a logical consequence, also the idea of decoupling is always related to the degree, by which policy measures affect production and trade. Thereby, decoupling is usually understood in the context of those policies, whose link to production is more relaxed (ANDERSSON, 2004). However, apart from this very general statement it is difficult to arrive at one common definition.

According to CAHILL (1997) it is rather the policy set than an individual measure that determines the coupledness of support in a given country. That is, while individual measures could have a significant impact on farmers' production decisions, the aggregated influence of all agricultural policy instruments could have no effect at all. This is, for example, the case when a coupled direct payment is combined with a restriction on quantities supplied. In addition, production effects of policy measures largely depend on the question whether these measures are applied to a single commodity only or to a bundle of commodities. In the latter case production effects could be much lower due to possible substitution effects in production (see below). The approach of looking at the whole policy package when evaluating the impacts of policies has further been discussed by GOHIN ET AL. (2000), OECD (2001a), MORO AND SCKOKAI (1999), and GOHIN AND GUYOMARD (2000). All studies confirm the result that

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[2] According to BAFFES (2004), decoupled support has already been discussed in the literature since 1945.

the identified impact of policies depends on a number of policy instruments rather than on single selected measures.

A major difference regarding the definition of decoupling is whether policies are defined as decoupled *ex ante* or *ex post*. *Ex ante* definitions are criteria based. They can be found, for example, in the legal text of the URAA and in BURFISHER AND HOPKINS (2003), who argue that subsidies are decoupled as long as they do not depend on prices, factor use or production. However, definitions of decoupling that are based on criteria do not exclude the possibility that support has an impact on production *ex post* (ANDERSSON, 2004). According to Article 6 of Annex 2 to the URAA policy instruments, which are claimed to be decoupled and to belong to the green box, have to meet the following criteria (WTO, 2007: 15-17):

a) "Eligibilty for such payments shall be determined by clearly defined criteria such as income, status as a producer or landowner, factor use or production level in a defined and fixed base period.

b) The amount of such payments in any given year shall not be related to, or based on, the type or volume of production (including livestock units) undertaken by the producer in any year after the base period.

c) The amount of such payments in any given year shall not be related to, or based on, the prices, domestic or international, applying to any production undertaken in any year after the base period.

d) The amount of such payments in any given year shall not be related to, or based on, the factors of production employed in any year after the base period.

e) No production shall be required in order to receive such payments."

In addition, two more basic criteria exist in Article 1 of Annex 2:

a) "The support in question shall be provided through a publicly-funded government programme (including government revenue foregone) not involving transfers from consumers.

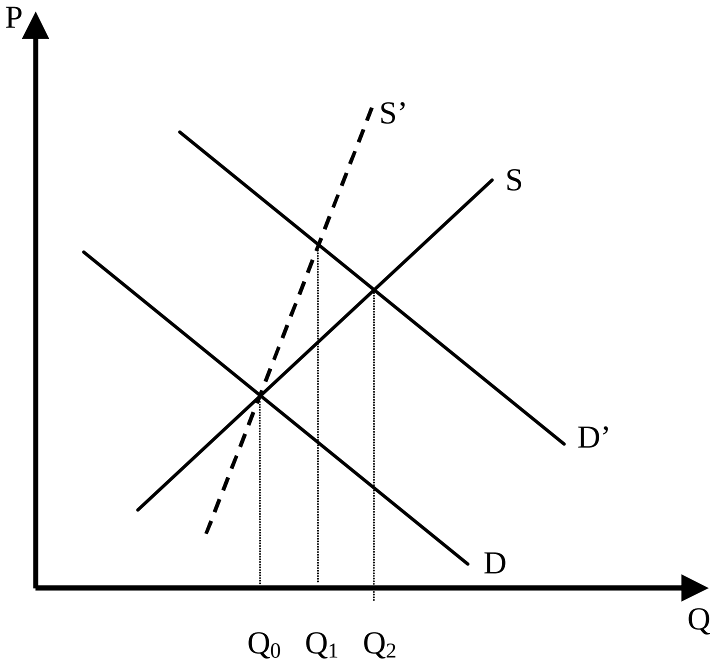
b) The support in question shall not have the effect of providing price support to producers."

The criteria as set out in the Annex to the URAA have been heavily criticised. USDA (1998) as well as TIELU AND ROBERTS (1998) criticise that they leave too much room for interpretation. Some programs that are evaluated as green box measures could meet the required criteria, though having a substantial impact on production.

CAHILL (1997) distinguishes policies according to their outcomes, i.e. *ex post*. He differentiates between two types of decoupled policies: In case of an introduction of a *fully decoupled* policy, supply and demand functions remain completely unchanged. Equilibrium prices as well as quantities are not changed and an external shock does neither influence supply nor demand. The definition of the second type of decoupled policies is less restrictive and is quite similar to the concept under the URAA. An *effectively fully decoupled* policy does not lead to a production that exceeds the level that would have existed without it. However, in contrast to a *fully decoupled* policy, *effectively fully decoupled* policies can cause a decrease in production. Additionally, a market response to an external shock can occur. An *effectively fully decoupled* policy does not necessarily correspond to the definition of a *fully decoupled policy*. That is, it is possible that the implementation of a policy does not affect prices and quantities. The same policy, however, could significantly influence the response to external shocks.

The situation described above is explained in Figure 1. In case of an assumed supply function S and a demand function D, Q_0 represents the equilibrium quantity. A policy package, according to which S turns to S', would have no impact on production at all. However, an assumed external shock to demand, which moves the demand curve from D to D' results in a new equilibrium quantity Q_1. This quantity, in turn, differs from quantity Q_2 that would have been produced, if the policy was not implemented. Thus, the policy turns out to reduce the degree of adjustment of production to the external shock.

Figure 1: Market adjustments under an effectively fully decoupled policy package



Source: Depicted from OECD (2001a).

According to CAHILL (1997) this policy would be *effectively fully decoupled*, since its introduction does not lead to any changes in the production level. However, it does not fulfil the more restrictive criteria of a *fully decoupled* policy, because any external shock would be transmitted to producers. The supply response depicted in Figure 1 could, for example, occur under an administered price that corresponds to the world market price level. Additionally, boarder measures exist in order to maintain this price (OECD, 2001a).

CAHILL's definition of an *effectively fully decoupled* policy is an asymmetric definition of the concept. A policy that leads to an increase in production would be referred to as coupled. A policy that causes a decreasing production, however, would be called decoupled, though it obviously has an impact on production. OECD (2001a), in contrast, recommends to evaluate all policies as coupled that lead to a change in production, i.e also those policies, which lead to a decrease in production. The reason is quite straightforward: Political support can amount to higher or lower monetary values and it might be the case that production response changes its direction with increasing or decreasing support levels (OECD, 2001a).

Two more definitions of decoupling exist that are often found in the literature: According to HENNESSY (1998) payments are decoupled when they are triggered by *ex post* market conditions, although the level of the payment is not based on the level of production. Desaster relief measures, for example, belong to this group of payments. GOODWIN AND MISHRA (2002) claim that only a payment, for which the level is fixed and guaranteed and which is thus not influenced by *ex post* market conditions, can be called fully decoupled. This payment comes close to a bond, which has been advocated by BEARD AND SWINBANK (2001), SWINBANK AND TANGERMANN (2001), and TANGERMANN (1991).

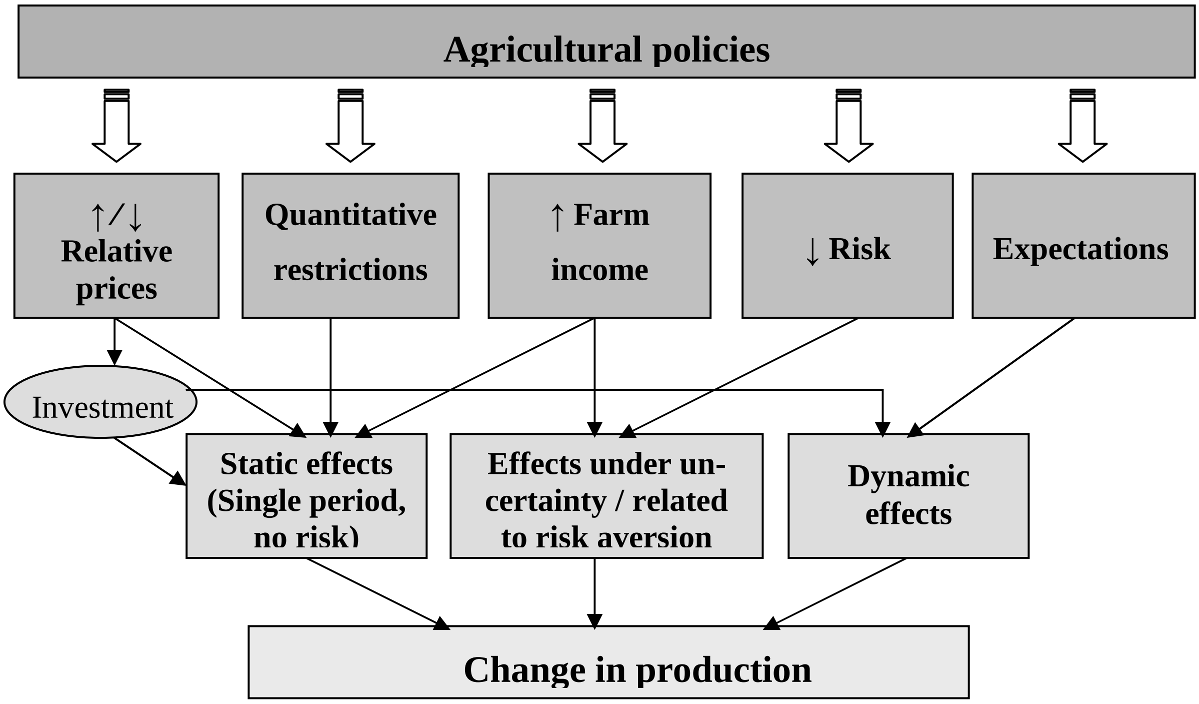
A shown above, a whole range of definitions on the issue of decoupling and decoupled policies exists. The differences in meanings among them are large and, thus, it seems to be difficult to arrive at a common definition. In the underlying work the term "decoupling" will be used in a more universal sense meaning that the link between agricultural support and production is relaxed to a more or less pronounced extent compared to a reference situation. The term "decoupled payment" as used in the chapters analysing the results of ESIM refers to the type of payments that are granted under the MTR reform, although their characteristics do not correspond to any of the definitions of decoupled payments listed above. It simply reflects the fact that payments are "more decoupled" under the MTR reform than under the Agenda 2000.

2.2 Economics of decoupling

This section analyses the economics behind the production response to decoupling by looking at the mechanisms, through which different types and designs of support measures affect production decisions of farmers. According to OECD (2001a) the effects of policy measures are categorised into three groups: *Static effects, effects under uncertainty (risk-related effects),* and *dynamic effects*. Static effects refer to changing relative incentive prices of agricultural inputs and outputs. Income effects under constraints on production decisions as well as the effects of quantitative constraints also belong to the category of static effects. Effects under uncertainty occur, if risk aversion of farmers occurs and policy measures reduce risk or increase income. Finally, dynamic effects arise due to investments that affect production in the future and due to farmers' expectations regarding future government behaviour that may influence their production decisions.

Of course, the above mentioned effects are cumulative and can arise simultaneously. The main mechanism of the impact of agricultural policies on production is also depicted in Figure 2.

Figure 2: Mechanism of the impact of agricultural policies on production



Source: OECD (2001a).

In the first part of this section, various forms of direct payments and the types of incentives they provide are classified. This is done i) in order to distinguish the forms of direct payments, which were subject to the MTR reform and which will be dealt with in the subsequent chapters of this work, from other forms of direct payments, and ii) in order to ease the proximate description of the production effects of various types of direct payments. At the same time static effects of classified payments on production are described and compared to the impact of a price support on production. It follows an explanation of the effects under uncertainty in the second part and an explanation of dynamic effects in the third part.

2.2.1 Classification of direct payments and static effects

ANTON (2005: 4) has classified the incentives that are created by direct payments according to four criteria:

a) "the nature of the "variable" that determines the amount of the payment received;

b) the mathematical relationship between variable a) and the amount of the payment;

c) the limits or conditions imposed that constrain the direct application of a) and b);

d) the commodities and activities that are covered by variable a)".

Table 1 provides an overview of possible options of how these criteria can be and have been implemented in the political environment. However, it does not claim to be exhaustive.

Table 1: Relevant criteria for the design of direct payments

Implementation criteria		Political options
a) Dependency of the amount of and the right for the payment		1) Output quantity 2) Output price 3) Area 4) Non-land inputs 5) Risk reducing activities (insurance, hedging)
b) Provision of the payments		1) proportional to a) 2) Positively related to a) but not proportional 3) Negatively related to a)
c) Limits or conditions attached to the payments		1) Quantitative limits on a) and/or b) 2) Conditions with respect to environment, animal or consumer protection
d) Commodity coverage of the payments		1) Single commodity 2) Several commodities with • same payment rate • different payment rates 3) Allowing idling 4) Maintaining land in agricultural use

Source: Anton (2005).

Payments that are granted proportionally to the output are normally considered as fully coupled. The most payments granted to ruminant producers under the Agenda 2000 and partially also under the MTR reform typically belong to this category. However, according to the economic theory an output subsidy is ceteris paribus still less distorting than market price support, since only the supply side is affected while the demand side is not. A subsidy, that provides producers the same revenue as price support, increases the net welfare of producers. While taxpayers bear the costs for subsidies, consumers are completely unaffected so that the total welfare loss occurs as a result of an increased supply only (ANDERSSON, 2004). Also simulations carried out in OECD (2001b, cited in OECD, 2005b) confirm that the difference between price support and output subsidies is small.

Payments that are based on non-land inputs, like pesticides and fertilisers, have also a clear impact on production. This type of subsidy may even lead to stronger changes in production than price support (OECD, 2001b, cited in OECD, 2005b). This may be explained by the fact that price support can be viewed as a subsidy to all types of input. A payment or subsidy to variable input use, in contrast, supports those production factors that are more elastic in supply than, for example, arable land (ANDERSSON, 2004, and ANTON, 2005). However, payments that are based on the use of non-land inputs have not been used frequently within the EU. Apart from the production quantity and variable inputs, payments can also be granted on the basis of market price support, which is expected to have similar effects on the production side as output payments, or on the basis of risk reducing strategies like insurance or price hedging (ANTON, 2005).

Apart from the payments for ruminant producers, direct payments that are based on area clearly represent the most relevant type of payments under earlier CAPs and under the actual MTR reform. In general, payments that are based on area use are expected to be less production and trade distorting than those based on output prices and quantities or on variable input use. Corresponding to the argumentation for the large production impact of payments for non-land inputs, the comparatively small production impact of payments that are based on area use can be explained by the quite inelastic supply of land, which, in turn, creates an incentive to use the land more extensively, which finally results in lower yield levels (KOESTER, 2005, and OECD, 2006). This can be explained in some more detail as follows:

Under the assumption of a Leontief production function it does not make any difference whether payments are granted for land or for other inputs. The production increases to the same degree anyway, since inputs have to be used for production in fixed proportions. Under the more realistic assumption that some substitutability exists among land and other production factors, the subsidised input tends to be used more than the input, whose use is not supported. That is, if an area payment is implemented, more land is taken into production at the expense of other inputs. In other words, the introduction of an area payment leads to a reduction in the yield level. Production decreases will be observed, if the reduction in yields overcompensates the area increase. This, in turn, is the case under an inelastic land supply and a comparatively more elastic supply of other inputs like fertilisers and pesticides. In general, the following statement applies: With increasing substitutabilities and increasing differences between the elasticity of supply and elasticities of other inputs the probability for a lower supply response to area payments also increases (ANTON, 2005).

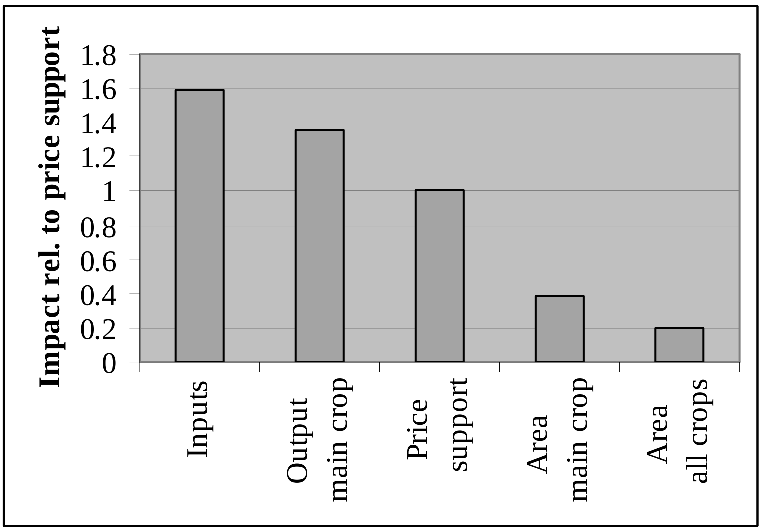
Also the product coverage of a support programme has an influence on the degree, to which support affects production. An area payment scheme, for example, that applies for a wide group of products has a smaller effect on resource allocation and thus production than an area payment scheme, under which only very few commodities are eligible. Area payments, which are equal across all kinds of land use under the constraint of fixed total land, would not affect production decisions of farmers at all as far as land is perfectly substitutable among land uses (OECD, 2001a).

Figure 3 illustrates the impact of the above mentioned support policies on production for an average of four crops (wheat, coarse grains, oilseeds, and rice) and six countries (EU, Canada, Japan, Mexico, Switzerland, and the United States (US)). These impacts are based on simulations conducted with the Policy Evaluation Model (PEM) of the Organisation for Economic Cooperation and Development (OECD). The PEM is a stylised version of existing and hypothetical policies in the six countries mentioned above. These countries are represented by individual modules, which are connected through the world market price and trade effects. The PEM is based on a partial equilibrium model and consists of two parts, i.e. the milk and the crop model, which share a common, endogenous land and feed market (OECD, 2003a).

Figure 3 confirms the theoretical considerations made above. Compared to market price support, payments based on inputs clearly have a stronger impact on production. Also payments that are based on output of the main crop are measured to have a somewhat stronger impact, though economic theory assumes a rather similar effect. However, this result might have occurred as a result of an additional distorting effect of granting the payment on the basis of the output of the main crop.

Following the economic theory area payments are measured to have a significantly smaller effect on production than market price support and payments based on input and output. Thereby, the influence of area payments decreases, the more crops become eligible for the payments.

Figure 3: Production impact of various types of payments relative to price support[3]



Source: OECD (2001b, cited in OECD, 2005b)

As described above, there are clearly differences in supply response between area payments and those related to input use and output. However, the absolute incentive on supply, which is induced by area payments highly depends on the degree of capitalisation of area payments into rental prices and values of agricultural land. First, assume a situation, under which land supply is fully inelastic. In this case, the price for land would fully reflect the payment. It is only the landowner, who benefits from this subsidy, while production does not change at all. However, it is more realistic to assume some positive response of land supply to the introduction of area payments. The additional amount of land that is used for production purposes can be expected to replace the use of inputs to some extend. This, in turn, results in decreasing yield levels. Under this second, more realistic situation, farmers, who

[3] Of course, the figures are no definitive estimates. This is also pointed out in the study, which provides these figures (OECD, 2005b). Estimates crucially depend on the design of the experiment, the data source, the country, and the underlying analytical/empirical framework. It shall also be stressed that these estimates represent an average on various crops in various countries all over the world. Furthermore, each category of payments as well as price support does not represent one homogenous agricultural support measure, but a bundle of relatively similar measures that are summarised in one category of the Producer Support Estimate (PSE) used by the OECD. As will be shown in chapter 3 and 6 the assumptions on the degree, to which various types of direct payment schemes affect production, vary significantly among model applications.

cultivate land on a rental basis, also benefit from area payments so that some effect on production can be expected (ANTON, 2005)[4].

In order to complete the overview provided in Table 1, there are at least two further criteria, which have an impact on the production incentive of a payment. This is, first, the mathematical relationship between the variable, which the payment is based on, and the amount of the payment. This relationship is mostly proportional. However, it could also be digressive, progressive or even negative (ANTON, 2005). All types of relationships create different production incentives for farmers. US counter-cyclical payments[5], for example, relate negatively to the development of prices (WESTCOTT ET AL., 2002). Many countries have some kind of emergency aid, which compensates farmers for high losses in production. Here, payments increase with a decreasing production level (ANTON, 2005). Secondly, there can be some sorts of constraints, which accompany the implementation of direct payments and which affect the incentives arised by direct payments. As stated in OECD (2001a), under a binding quantitative restriction on land that benefits from the payment, for example, a reduction in agricultural support could cause a decrease in production, while a higher support level does not have any effect at all. Also cross compliance conditions may have an effect on farmers' reaction to direct payments (ANTON, 2005).

The less trade distorting type of direct payments is for sure a lump sum payment, which is based on historical entitlements (OECD, 2001a). Static effects, i.e effects on relative prices, do not occur under this type of subsidy. First attempts to define policy instruments that support farmers' incomes without affecting the allocation of resources were made in the beginning of the 1990s. TANGERMANN (1991) first proposed a bond scheme for supporting farm incomes. In a publication on the efficient design of direct income payments OECD (1994) recommended general charactercitics of direct income payments and suggested that they should be directly financed by taxpayers. In the beginning of this decade SWINBANK AND TANGERMANN (2001) suggested a bond scheme for an approaching CAP reform. They proposed various steps, under which direct payments could be transformed into a bond

[4] The effects of direct payments under the MTR reform on land prices are discussed in some more detail in section 2.3.

[5] US counter-cyclical payments have been newly introduced under the 2002 Farm Act. They replace most of market loss assistance (MLA) payments that were granted to US producers between 1998 and 2001. Counter-cyclical payments are provided for certain commodities whenever their effective market price is below a fixed target price (WESTCOTT ET AL., 2002). MLA payments were authorised by the US emergency legislation in 1998 to 2001 as a result of decreasing farm incomes in the previous years (USDA, 2007, and WESTCOTT ET AL., 2002). They are principally based on historical entitlements. However, they also include a counter-cyclical dimension (OECD, 2006).

scheme. In addition to the features of direct payments under the current MTR reform a bond scheme after complete transformation is suggested to have the following features:

- *Entitlements to receive the payments are decoupled from farming at all and attached to individuals.* In contrast to the current MTR reform, the values of payments under a bond scheme would not be reflected by land prices so that values of land are not distorted anymore. This is an important prerequisite for structural change in agriculture, since it is easier for farmers, who want to expand, to finance the acquisition of additional areas. Additionally, farmers have more flexibility to decide on future professional activities compared to the situation under the current CAP.

- *The duration of payments is limited and their level is fixed.* This generates certainty over the future of direct payments. Decisions on investments can thus be made on a solid foundation.

- *The government guarantees the stream of payments by providing a document to each holder of payment rights, which can be sold on the capital market. Thereby, the stream of guaranteed annual payments is converted into a certain amount of money. The characteristics of the government document would correspond to a government bond with interest payments only.* Whenever a holder of a bond would sell the document the sum of money obtained could be used, for example, to make investments on farm or to create new earning opportunities outside agriculture[6].

As mentioned above, lump sum payments have no impact on relative prices. However, they still have risk-related as well as dynamic effects and, thus, can not be considered as having no impact on production decisions at all. In the following section, effects of agricultural policies and, more specifically, direct payments that are related to risk and dynamics are discussed.

[6] Impacts of a bond scheme on administration costs are not considered here.

2.2.2 Risk-related effects

Apart from static effects, which lead to changes in relative prices for agricultural inputs and output, agricultural policy measures can simultaneously induce production effects that are related to risk aversion and dynamics. This section describes the economics behind risk-related effects and summarises the results of recent studies, which have dealt with this issue. The next section deals with dynamic effects. Again, the focus is not only on more or less decoupled direct payments, but also on decoupling of agricultural policies in general.

It is statistically proved that the application of most agricultural policy measures reduces the variabilty of farmers' receipts, either implicitly or explicitly. This is most of all true for market price support measures, which is the most risk reducing type of support, but to a minor degree also for direct payments (OECD, 2005b).

Not only according to estimation results in OECD (2002a) and OECD (2005c), farmers are considered risk averse. As shown by SANDMO (1971) and CHAVAS AND HOLT (1990), this assumption has an influence on production decisions of farmers under uncertain conditions. Risk, which is faced by risk averse farmers, affects production in two ways: First, with an increase in the assumed level of risk farmers may reduce the use of production factors, which ceteris paribus results in lower production. According to ANDERSSON (2004) farmers reduce their use of inputs in order to face lower production costs, which implies a lower perceived level of risk of a low income in a period when market revenues are low. This behaviour may be based on the basic idea that "one Euro lost in a bad year is worth more than one Euro gained in a good year" (ANDERSSON, 2004: 18). Secondly, uncertain conditions affect the level of supply, since risk averse farmers can be expected to diversify production in order to reduce income variability (ANDERSSON, 2004).

Based on the assumption of risk averse farmers HENNESSY (1998) developed a neo-classical framework to derive the effects of agricultural support on production under uncertainty[7]. The following lines describe, how the effects are derived under the existence of income payments:

His model relies on a firm that maximises its expected utility of profits, which is determined by three variables: a variable representing the decision of the farmer, an

[7] Note that this framework does not apply for farmers that are not risk averse (OECD, 2001).

uncertainty variable, and an index representing the level of support by agricultural policy measures.

Following the simplification in OECD (2001a) it shall be assumed that these variables are represented by the produced quantity Q, the price $\tilde{P}$ and the overall budget available for the application of the policy measure B. Profits are defined as market revenue minus production costs C plus the government payment g.

Formula 2.1:

$$\underset{Q}{Max}\ E\left[U\left(\tilde{P} * Q - C(Q) + g(B)\right)\right].$$

The price $\tilde{P}$ is the only uncertain, i.e. stochastic, variable. More precisely, farmers can decide the level of production and they know, according to which criteria the payments g is granted. However, at the point of time, when they have to make their production decision, they do not know the price. As shown in formula 2.1 profits are defined as market revenue plus payment minus costs of production.

HENNESSY (1998) identified two kinds of effects on production that would occur under uncertain conditions only: First, there is a *wealth effect*. That is, under the common assumption of a Decreasing Absolute Risk Aversion (DARA) the increase in wealth that results from the receipt of payments makes farmers less risk averse (OECD, 2001a). As a result, they will decide to expand production, which would possibly have been judged too risky in a situation without political support (OECD, 2001a). The extent, to which the degree of risk aversion is affected by an increase in wealth, depends on the utility function. As already mentioned, normally, a DARA is assumed. Assumptions of a Constant Absolute Risk Aversion (CARA) a rare. Secondly, an *insurance effect* has been identified. In this case, agricultural support has an impact on the degree of risk faced by the farmer. This would be true, if the payment g depends on the source of uncertainty, i.e. on the price. According to the assumed mechanism of the *insurance effect* production increases, if a government scheme is in place that increases payments under low prices, while payments are lower when prices are high, so that income variability is reduced (OECD, 2001a).

Supported by the *wealth effect* and the *insurance effect* overall net effects of agricultural payment schemes g(B) on production will be positive under price uncertainty in the following cases (OECD, 2001a):

- *Lump sum payments:* Since payments neither depend on $\tilde{P}$ nor on Q, there may be a wealth effect but no insurance effect.

- *Output based payments:* In this case, the payment increases with Q, i.e. $\partial g/\partial Q > 0$. Here, a wealth effect and a relative price effect occur.

- *Payments (partially) offsetting price fluctuations (price stabilisation programmes):* In this case, payment g(B) decreases with $\tilde{P}$, i.e. $\partial g/\partial P < 0$. Here, both an insurance effect and a wealth effect occur.

It is striking that the wealth effect may also occur for policy measures that are generally regarded as not production affecting. The insurance effect, in contrast, occurs only, if the payment depends on the uncertain variable (OECD, 2001a).

The findings made by HENNESSY (1998) are partly challenged by the work by NEWBERY AND STIGLITZ (1981, cited in OECD, 2001a). Their work is based on a farm household model, which includes not only risk but also labour market imperfections that are depicted as a gap between on-farm and off-farm wages. According to the model results, which rely on the assumption that leisure is a normal good, lump sum payments as well as payments that are designed to (partly) offset price fluctuations lead to decreases in production. According to QUIGGIN (1991, cited in OECD, 2001a) this contradiction can be traced back to the assumption made for the labour market. Under the model used by NEWBERY AND STIGLITZ farmers are assumed to be not able to separate production from consumption and labour decisions so that income support will even have a negative impact on agricultural production. Which of the models discussed above are the most appropriate is an empirical question. However, it is undisputable that agricultural support has an effect on production under uncertain conditions (OECD, 2001a).

Empirical results with respect to risk-related effects

A lot of recent studies have tried to identify the magnitude of risk-related effects. The results and underlying methods of some of them will be shortly summarised in this section. OECD (2004a) conducted a statistical analysis in order compare the magnitude of risk-related effects relative to price effects that result from various policy programmes, i.e. output, input, and area payments, as well as payments based on historical entitlements and market price support. This is done on the basis of a risk including version of the PEM, whereby simulations of stochastic shocks in the world market are run for various policy regimes that reduce the variability of revenues. Results reveal that the insurance effect is large under all support programmes. The wealth effect is much smaller. The latter depends crucially on the transfer efficiency of support measures. Among all support measures observed market price support is the most risk reducing measure.

MULLEN ET AL. (2001, cited in OECD, 2004a) use a model on wheat production in Kansas to examine the risk reduction effects of Production Flexibility Contract (PFC) payments, MLA payments, and Loan Deficiency Payments (LDPs)[8]. It is assumed that producers face uncertain output prices and maximise the expected utility function under DARA. According to the results the wealth effect on production is relatively modest, accounting for just 9 % of the total production change, while the insurance effect is large. So far, results of OECD (2004a) are confirmed. However, in MULLEN ET AL. (2001, cited in OECD, 2004a), the insurance effect (65 %) even exceeds the price effect (26 %). Both studies OECD (2004a) and MULLEN ET AL. (2001, cited in OECD, 2004a) stress the importance of the assumed degree of risk aversion of farmers for the model results.

HENNESSY (1998) has applied his model, which has been discussed above in a somewhat simplified form, in a simulation analysing the effects of the US LDPs on a corn and soybean farm in Iowa. Again, the wealth effect is small compared to the insurance effect, which even dominates the price effect. OECD (2002a) investigates risk-related effects of the arable payments scheme under Agenda 2000 for crop farms in Italy. The analysis is performed as an econometric estimation on the basis of a sample of over 4,000 farms included in the Farm Accountancy Data Network database for the years 1993 to 1999. It is assumed that farmers are risk averse and face risk on output prices. A scenario is run, which includes a 5 % reduction in cereals intervention prices, of which 50 % is compensated by area payments. Again, results do not differ much from those described above. Intervention prices induce large insurance effects that can be compared in their magnitude to the standard price effects. Wealth effects are much smaller. Payments based on area planted have moderate effects in reducing relative variability of revenues and moderate wealth effects.

Table 2 summarises the results of the above mentioned studies regarding the risk-related shares of US LDPs. Additionally, the results of a study from OECD (2003b, cited in OECD, 2004a) measuring the effects of LDPs for corn are taken into account. It shall be noted that only effects on relative prices and risk-related effects are taken into account. Dynamic effects, for example, are not considered in these studies so that the shares depicted below add up to 100 %. It is only the OECD (2004a) study, where the price effect is dominant. In the remaining studies the insurance effect clearly dominates the overall effect.

According to explanations in OECD (2004a), the difference in the results can partly be explained by the assumptions on the coefficient, i.e the degree, of risk aversion, which is rather low in OECD (2004a) relative to the other studies. Also the selected ratio between farming receipts and farm household incomes is presumed to cause the differences between study results.

Table 2: Shares of price and risk-related effects of US loan deficiency payments measured in different studies

	Price effects	Insurance effects	Wealth effects
HENNESSY (1998)	21 %	66 %	14 %
MULLEN ET AL. (2001)	26 %	65 %	9 %
OECD (2003b) for corn	30 %	70 %	
OECD (2004a)	66 %	33 %	1 %

Source: Depicted from OECD (2004a).

An analysis conducted on the basis of the PEM confirms the hierarchy of policy measures with respect to their impact on production. At the same time, however, it highlights, how policy measures have to work in order to trigger risk-related effects. In other words, the analysis results reveal that policies including counter-cyclical elements tend to have a larger insurance effect than political measures that do not exhibit such elements. Of course, market price support has a counter-cyclical character and, thus, risk-related effects are significant. However, also MLA payments are measured to have a strong impact on production, if risk-related effects are included, since they also exhibit a counter-cyclical dimension. Under inclusion of risk-related effects their production impact is measured to be ten times higher than in a situation when risk is not considered (OECD, 2006).

In an analysis based on a computable general equilibrium model of the US, Canada, and Mexico, BURFISHER ET AL. (2000) obtained only a small production response to direct payments by risk-averse producers that relate to risk-related effects. A study on the impacts of

[8] PFC payments have been paid to farmers during 1996-2002. They were seen as being decoupled to a large extent providing almost total planting flexibility to farmers. LDPs are part of the 2002 Farm Act. They are granted to farmers of specific commodities in times when market prices are low.

crop insurance subsidies on production in Spain obtained the results that also insurance subsidies have a significant impact on production (OECD, 2002b). However, impacts on production are expected to be smaller than those of payments based on planted area. The study results are based on an econometric estimation, which uses a sample of more than 19,000 cereal farms from the ENESA (the Spanish state insurance agency) database in Spain for the period 1990 to 2000.

Most of the studies mentioned above conclude that among the risk-related effects, insurance effects tend to be much larger than the wealth effects, and in case of some studies they are even larger than price effects. However, RAMASWAMI (1993) expects a moral hazard effect that thwarts the insurance effect. He has shown that many farmers tend to reduce the use of variable inputs like fertilisers or pesticides when the crop is insured anyway. WU (1999), however, has shown that the contradicting effect of moral hazard is much lower than the insurance effect.

2.2.3 Dynamic effects

So far, it has been assumed that farmers do have to take the impact of current decisions on future production and profit into account. However, in the real world, this intertemporal link, of course, exists. Farmers can be expected to make inter-temporal choices, which relate to current and future income. Under this assumption the decision problem of farmers can be referred to as an intertemporal maximisation of the discounted sum of the stream of profits. Following formula 2.2 and further assuming a simplified case of two periods with “d” as the discount rate the underlying problem is written as follows (OECD, 2001a):

Formula 2.2:

$$\underset{Q}{Max} \sum_{t=1}^{2} \left(\frac{1}{1+d} \right)^{t-1} * \left[P_t * Q_t - C(Q_t) + g_t(B_t) \right].$$

A policy measure that has an impact on current and future income clearly affects current decisions on farm. In addition, also expectations on political developments in the future that are based on information on past developments are generally considered having an impact on current production decisions. Thus, dynamic effects can generally be regarded as having an influence on current investment (OECD, 2005b).

Investment decisions

The use of capital on farm can be distributed among current and future production. That is, in the optimisation problem illustrated in formula 2.2, the current amount of available capital depends on past investment decisions. When the farmer decides on current investment he has to keep in mind that any additional capital has an impact on both current and future production.

Under perfect capital markets investment decisions do not relate to consumption decisions. The relationship between investment and consumption will adjust over time, while capital is lend or borrowed freely. Under these circumstances coupled direct payments clearly lead to an increase in investment, while payments that are not attached to any input, output or price are really decoupled in the dynamic sense. That is, they do not affect investment at all. Under imperfect capital markets the situation is different. Here, farmers are limited in their ability to secure money from traditional lenders. This can be due to two reasons: First, market failures resulting in imperfect capital markets can lead to borrowing rates that exceed the level of lending rates. Secondly, due to the absence of perfect information on farmers' creditworthiness lenders may restrict the supply of loans to them (OECD, 2004b). Under these circumstances, i.e. whenever farmers face a constraint to borrow capital they need for investment on farm, they can not separate production decisions from household consumption. Agricultural income support relaxes this constraint to some extent. As a result, support measures or, more specifically, direct payments will be invested in agriculture and, thus, affect the level of production. This is also true for payments that are regarded as fully decoupled from production under a static situation (OECD, 2001a). In recent studies on capital constraints, BARRY ET AL. (2000), BIERLEN AND FEATHERSTONE (1998), as well as OECD (2005) have provided evidence that investment is affected by cash flow. This is the more so when farms face debt constraints. Based on a household production and consumption model PHIMISTER (1995) shows that potentially decoupled payments under perfect capital market conditions clearly have an impact on production when capital markets work imperfectly and farmers face limitations in their ability to borrow money. ANDERSSON (2004), however, notes that there is also an effect, which contradicts the investment pushing impact of direct payments under imperfect capital markets. He argues that lower income variability leads to an increase in consumption at the expense of reduced savings and investments.

Expectations on future policies

Agricultural policy measures are changed every few years as a result of growing external pressure or simply in the course of a given cycle. Farmers are experienced in observing and evaluating these policies and have clear expectations on the criteria chosen by governments (OECD, 2001a). Throughout the literature farmers' expectations about the conditions attached to the receipt of direct payments in the future are considered to influence current production decisions (OECD, 2005a, OECD, 2004b, OECD, 2001a, and Andersson, 2004). Farmers may perceive that the receipt of direct payments in the future depends on current production decisions. This idea is somewhat supported by historical developments, since farm programmes, which farmers have always benefited from, were mostly based on past production or land use (OECD, 2001a).

If farmers expect that future payments won't be attached to all kinds of products, they can not be expected to strongly reallocate their resources towards production of commodities that won't be eligible for subsidies in their opinion, though market prices of products they currently produce are decreasing. Due to planting decisions that result from expectations a link to production is created even for those payments that would otherwise have been decoupled (BAFFES, 2004, BAFFES AND DE GORTER, 2004, and BURFISHER AND HOPKINS, 2003). In BURFISHER AND HOPKINS (2003) farmers expectations are distinguished between those on the level of future payments and those, which relate to the eligibility of payments. Thereby, expectations on the level are assumed to affect farmer's wealth, since land prices reflect the expected changes in the level of payments. In a more direct way production decisions are affected by the expectations on terms of the payments eligibility. Based on survey results GOODWIN AND MISHRA (2002) could confirm that a large share of farmers produce certain crops due to their expectations on the design of future policy measures.

As stated by YOUNG AND WESTCOTT (2000) even expectations regarding disaster relief payments, which are granted ex post, can have an influence on the level of production. This is due to a moral hazard effect. Since farmers can count on government assistance in bad times, they may tend to use highly unproductive land, which they would not have used otherwise. As a result, support by disaster relief measures is triggered easier than under other circumstances.

2.3 Decoupling under the MTR reform

The previous sections of this chapter dealt with the more general features of agricultural policies and the impact of more or less decoupled support measures on production. In this section, the view turns to the specific issue of direct payments under the current MTR reform. In the following parts of this section the most relevant regulations of the MTR reform and their implementation in EU member states, the financing of direct payments, as well as the underlying theoretical considerations with respect to the new CAP payments will be addressed.

2.3.1 Decoupling regulations under the MTR reform

Within the last years decoupled payments have replaced most of the direct payments paid to European farmers so far. The receipt of the new payment does not depend on the production of certain commodities anymore but is granted for almost all types of agricultural area use. However, the eligibility to receive the subsidies is still attached to the use of land and not, as under a bond scheme, attached to persons only. According to the cross compliance regulations the receipt of payments is additionally bound to environmental and animal welfare obligations. Though the scheme of decoupled payments came into force on January 1st 2005 EU member states were allowed to delay its implementation by up to two years, i.e. until January 1st 2007 (AGRA INFORMA, 2005). The following sections describe those provisions of the MTR reform, which are most relevant for the simulation of decoupling effects with ESIM.

Partial decoupling

Decoupling is the general principle from 2005 onwards. However, individual member states may opt to retain a part of the pre-existing product-related CAP aid scheme based on crop area or animal numbers. This approach is known as “partial decoupling”. The following options are open to member states:

- *Arable crops:*

  Member states can retain 25 % of the COP (cereals, oilseeds, and protein crops) component of the decoupled premium or up to 40 % of the supplementary durum wheat aid and continue granting the existing coupled payments up to the above mentioned percentage levels.

- *Sheep and goats:*

  Coupled payments for sheep and goats can be maintained at up to 50 %.

- *Beef:*

  In the bovine sector members are allowed to maintain the current suckler cow premium at up to 100 % and the beef slaughter premium at up to 40 %. Alternatively, they could keep 100 % of the current beef slaughter premium or, instead, up to 75 % of the special male premium coupled (EUROPEAN COMMISSION, 2003).

Additional payments – national envelopes (Article 69)

Member states are also allowed to grant additional payments to their producers "for the purposes of encouraging specific types of farming which are important for protection or enhancement of the environment and of improving the quality and marketing of agricultural products." These payments, however, must not exceed 10 % of each country's overall national aid entitlement. (AGRA INFORMA, 2006).

Payments based on historical entitlements versus regionalised flat-rate

According to the Luxembourg agreement the single farm payment (SFP) in principle is based on actual receipts by each farmer in the reference period 2000 to 2002. In this case the number of premium entitlements per farm corresponds to the number of hectares, which has justified the receipt of payments in the reference period. Alternatively, member states may opt to create the SFP at a flat-rate regional level. That is, for all eligible hectares within one region the same flat-rate aid is paid. In this case the number of premium entitlements depends on the area endowment in the year of implementation of the decoupling regulations. Thereby, premium entitlements are allocated to all types of land use apart from permanent crops.

Under both decoupling models all land, which is used for any agricultural activities except for the production of potatoes (other than starch potatoes), fruit and vegetables, or any other permanent crop is eligible for the receipt of direct payments (ISERMEYER, 2003).

The dairy premium

Direct payments to dairy producers have been introduced in 2004 and are paid per tonne of quota held on March 31st 2004. Thereby, the premium increases from 1.18 ct/kg in 2004 to 2.37 ct/kg in 2005 and 3.55 ct/kg in 2006. Member states are obliged to incorporate the dairy premium into the SFP not later than 2007. Should member states decouple the dairy premium at an earlier point of time the value of SFP has to be increased according to the scheduled increase in the milk premium in the years 2005 and 2006 (AGRA INFORMA, 2006).

Modulation

From 2005 to 2012 the MTR reform foresees an obligatory modulation, i.e. a proportion of the SFP and all other coupled direct payments have to be deducted from farmers and channelled into a new fund to create additional resources for rural development measures. In 2005 direct payments are reduced by 3 % and in 2006 by 4 %. Between 2007 and 2012 5 % of direct payments are withheld. In addition, member states are allowed to increase these rates as a way of procuring additional funding for national rural development and agri-environmental schemes (AGRA INFORMA, 2006). The first 5,000 Euro per year in direct payments per farmer are exempted from the modulation requirement. As a result, a large number of farmers across the EU-15 is not affected by the modulation regulation at all. The NMS are generally exempted from modulation regulations.

Decoupling regulations for the new member states

As an alternative to the SFP system applied in the old EU-15 member states the NMS can opt for a simplified Single Area Payment Scheme (SAPS) until the end of 2010. In case of an application of the SAPS farmers receive a uniform regionalised premium per hectare. This regulation is similar to the provisions of the regionalised premium under the SFP. However, in contrast to the SFP, payments under the SAPS are also granted for fruits and vegetables, potatoes etc. No later than 2011 NMS, which have opted for SAPS, have to change their system and are obliged to adopt the regionalised version under the SFP. Just as the members of the EU-15 the NMS are allowed to couple a part of their payments to production from 2011 onwards.

The level of direct payments in the NMS is phased-in stepwise over a period of ten years to the level prevailing in the old member sates. Table 3 shows that the level of payments financed by the EU budget amounted to 25 % of the EU-15 level in 2004. In 2013 these payments will have reached the EU-15 level. However, it was also agreed that the NMS can grant their farmers an additional, nationally (co-)financed „top-up“ payment equivalent to 30 % of the full EU rate.

Table 3: Direct payments and top-ups in the new member states (in % of EU-15-payments)

Year	EU financed payments	National (co-) financed top-ups	Maximum payment level
2004	25	30	55
2005	30	30	60
2006	35	30	65
2007	40	30	70
2008	50	30	80
2009	60	30	90
2010	70	30	100
2011	80	20	100
2012	90	10	100
2013	100	0	100

Source: AGRA INFORMA (2006).

This means that farmers in the NMS may in fact receive up to 55 % of the full EU rate in the first year and the full EU rate already in 2010. However, it is not allowed that the sum of EU payments and national top-ups exceeds the level of direct payments existing in EU-15 member states. (AGRA INFORMA, 2006).

2.3.2 Implementation of decoupling provisions in the member states of the EU

EU-15

In some countries the SFP has already been applied in the beginning of 2005. Other countries have opted for a start of the new system in 2006. The following section provides a short overview of how the decoupling regulations concluded on the Luxembourg summit have been implemented in the old member states of the EU.

As shown in Table 4 most countries of the EU-15 have started to decouple their payments (partly) from production already in the beginning of 2005. Only Finland, France, Greece, the Netherlands, and Spain have introduced the new payment scheme in 2006. No member state has opted for an immediate implementation of the regionalised premium. Most countries (Austria, Belgium, France, Greece, Ireland, Italy, Netherlands, Portugal, Scotland, Spain, and Wales) have chosen payments that are based on historical entitlements. All other countries realise the decoupling provisions by a combination of a uniform regionalised premium and a premium that is based on historical entitlements. In Luxembourg, Sweden and Northern Ireland this mix of both payment systems will persist over the next years ("static hybrid” version) [9]. Denmark, Germany, Finland, and England have opted for combinations of both payment systems, which include a stepwise phasing-out of the historical element to leave a pure regional-based system at the end of the process (“dynamic hybrid” version).

Government decisions with respect to the degree of decoupling of direct payments have also differed significantly among member states. The payments are fully decoupled from production in Germany, England, Ireland, Luxembourg, Northern Ireland, and Wales and almost fully decoupled in Scotland, Italy, and Greece. In the latter three countries payments are only coupled by applying the Article 69 so that coupling rates do not exceed 10 %. France and Spain, in contrast, have chosen to keep the payments coupled to production as much as possible in all agricultural sectors. Spain has decided to additionally apply Article 69 in case of beef and milk. Thus, even a part of the milk premium remains coupled to production beyond 2007.

Portugal has opted to couple its payments for all ruminant producers, i.e. beef and sheep meat producers, to the highest possible degree, though not applying Article 69. To a somewhat minor degree coupled payments for ruminants also exist in Austria, Belgium, Denmark, Finland, the Netherlands, and Sweden, and by applying Article 69 also in Greece, Italy, and Scotland.

Payments for arable crops are coupled to the highest degree possible in France and Spain and by the application of Article 69 also in Finland, Greece, and Italy. In Denmark, Germany, England, Ireland, Northern Ireland, Scotland, and Wales the milk premium has been included in the SFP in 2005 already. In Belgium, Italy, and Spain this step is foreseen at 2006. All remaining countries plan to include the milk premium into the new payment scheme in 2007 (AGRA INFORMA, 2006).

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[9] For the purpose of a more comprehensive and detailed overview, decoupling decisions for Luxembourg, Wales, Northern Ireland, and Scotland are also listed, though these countries are included in the aggregates of Belgium/Luxembourg as well as the United Kingdom with respect to the analysis of decoupling effects in chapters 5 and 6, respectively.

Table 4: Implementation of decoupling regulations in EU-15 member states[10,11]

Country	Implementation of SFP/ Decoupling of milk premium	SFP system	Coupling rates
Austria	2005, Milk 2007	historical	100 % suckler cows 40 % adult cattle slaughter 100 % calf slaughter
Belgium	2005, Milk 2006	historical	100 % suckler cow 100 % calf slaughter
Denmark	2005, Milk 2005	dynamic hybrid	75 % special male beef 50 % sheep
England	2005, Milk 2005	dynamic hybrid	Full decoupling
Finland	2006, Milk 2006	dynamic hybrid	75 % special male beef 50 % sheep Article 69: - 2.1 % for COP[1] - 10 % for beef
France	2006, Milk 2006	historical	25 % arable crops 100 % suckler cows 40 % adult cattle slaughter 100 % calf slaughter 50 % sheep
Germany	2005, Milk 2005	dynamic hybrid	Full decoupling
Greece	2006, Milk 2007	historical	Article 69: - 10 % for COP - 10 % for beef - 5 % for sheep
Ireland	2005, Milk 2005	historical	Full decoupling
Italy	2005, Milk 2006	historical	Article 69: - 7 % for COP - 8 % for beef - 5 % for sheep
Luxembourg	2005, Milk 2006	static hybrid	Full decoupling
Netherlands	2006, Milk 2007	historical	100 % adult cattle slaughter 100 % calf slaughter
Northern Ireland	2005, Milk 2005	static hybrid	Full decoupling
Portugal	2005, Milk 2007	historical	100 % suckler cows 40 % adult cattle slaughter 100 % calf slaughter 50 % sheep
Scotland	2005, Milk 2005	historical	Article 69: 10 % for beef
Sweden	2005, Milk 2005	static hybrid	75 % special male beef
Spain	2006, Milk 2006	historical	25 % arable crops 100 % suckler cows 40 % adult cattle slaughter 100 % calf slaughter 50 % sheep Article 69: - 7 % for beef - 10 % for milk
Wales	2005, Milk 2005	historical	Full decoupling

[1] COP = Cereals, oilseeds, and protein crops.
Source: AGRA INFORMA (2006).

[10]The figures in this table refer to the latest information from the member states. However, for some members it is not sure whether these figures are the final ones.

[11]In chapter 5 results are not displayed for each member of the United Kingdom, but for the United Kingdom as an aggregate. However, since each member could chose its own way of implementing the MTR reform each member is depicted individually in Table 2.

The new member states

Apart from Malta and Slovenia all NMS have chosen to operate the SAPS, under which direct payments have to be fully decoupled from production. With regard to the design of the nationally (co-)financed top-ups, however, NMS had some freedom of choice. As mentioned above, countries can decide upon the level as well as on the degree of coupledness to production of these top-ups. According to the reports on the negotiations of the NMS with the European Commission regarding the design of top-ups in the year 2005 the options chosen by member states can be summarised as follows (EUROPEAN COMMISSION, 2006):

- Decoupled top-ups do not exist in any member state.
- All members grant top-ups to their COP producers.
- Poland and Latvia opted for (low) top-ups for arable fodder.
- All member states apart from Poland decided to implement top-ups for ruminants, whereby top-ups for beef in Slovenia, Estonia, and the Czech Republic are higher than in the other countries.
- Top-ups for other products than for the ones mentioned do not exist at all.

Within the first years after direct payments under the MTR reform have been implemented some countries faced severe problems with respect to the payments of top-ups to their producers. Some governments could neither manage to grant the top-ups in time nor to pay the level of subsidies they had negotiated with the European Commission before. Additionally, the NMS are allowed to change the design and level of top-ups on a yearly basis. For example, Slovakia negotiated a top-up for arable land amounting to 99 Euro/ha for the year 2005. Only one year later, the actual top-up payment amounted to just 37 Euro/ha (VUEPP, 2006). An overview of the medium-term future of top-ups in the NMS would therefore be highly hypothetical. Consequently, assumptions on the design of top-ups and direct payments under the SFP, which are essential for modelling the effects of various decoupling options, are based partly on the reports on the negotiations of the NMS with the European Commission and partly on plausibility considerations[12].

[12] The underlying assumptions for the simulation scenarios formulated in this thesis are described in much detail in chapter 5.

2.3.3 Financing of direct payments under the MTR reform

The financing of direct payments to agricultural producers is subject to a strict financial framework. In the course of establishing a new financial perspective for the years 2007 to 2013 direct payments to farmers in the EU have already been subject to strong criticism. The reason therefore was not at least the critical financial situation in many member states and the immense part of the EU budget, which is allocated to the agricultural sector[13]. EU-accessions including the extension of direct payments to the NMS have further contributed to increasing budgetary shortages. As a result, governments of EU member states agreed on the so-called financial discipline, which forces the member states of the EU-15 to reduce payments, if the financing of direct payments is expected to exceed the available budget for payments (AGRA INFORMA, 2006). As in case of modulation, the financial discipline agreement does not apply for the NMS. The following paragraphs provide an overview of the distribution of the EU budget for the agricultural sector among policy areas and member states with a special focus on direct payments.

Expenditures for EU policy measures are subject to annual ceilings, which governments agree upon within negotiations on the long-term financial perspectives. The current set, reaching from 2007 to 2013, was finalised after long negotiations by the heads of EU governments in December 2005. As shown in Table 5 total EU budget will increase from 120.6 bn. Euro in 2007 to 126.6 bn. Euro in 2013, measured in 2004 prices. These means are financed by a mixture of sources, the most significant being a levy based on a proportion of each member state's gross national income (GNI). For the period of the next financial perspective, it has been agreed that this levy decreases from 1.1 % in 2007 to 1.0 % in 2013 corresponding to an average 1.045 %.

[13] Further reasons, why direct payments to EU farmers are more and more subject to criticism in the current political discussions can be found in BALKHAUSEN AND BANSE (2006).

Table 5: EU-27 spending figures for 2007 - 2013[14]

Million Euro, 2004 prices	2007	2008	2009	2010	2011	2012	2013	Total 2007 - 2013
Total budget (commitment appropriations)	120601	121307	122362	122752	123641	125055	126646	862363
% of GNI	1.10%	1.08%	1.06%	1.04%	1.03%	1.02%	1.00%	1.045%
Preservation and management of natural resources	54972	54308	53652	53021	52386	51761	51145	371244
of which CAP pillar 1	43120	42697	42279	41864	41453	41047	40645	293105
of which CAP pillar 2	9964	9928	10205	9927	9973	10001	10057	69250

The budget for the agricultural sector ("Preservation and management of natural resources") is divided into two areas. The traditional agricultural market support and direct payments (also including the SFP) are commonly referred to as "pillar 1" of the CAP. Rural development, agri-environmental and other accompanying measures are included in "pillar 2". Each pillar has its own sub-ceilings of the financial perspective that must not be exceeded. The share of the budget allocated to the agricultural sector is still considerably high, though decreasing over time from 45.6 % to 40.4 %. The major part of the agricultural budget is allocated to first pillar measures.

The CAP budget established for each year is further broken down by product sector, member state or type of policy instrument. Due to its relevance for the underlying work the national ceilings for payment of the SFP between 2005 and 2013 are presented in Table 6[15].

[14] All information on budgets and CAP regulations in this section are based on AGRA INFORMA (2006).

[15] In those members, where (partially) coupled payments exist, the budget for the SFP is reduced correspondingly to ensure that farmers receive the same amount of aid overall as if they had received the basic decoupled aid.

Table 6: National ceilings for payment of Single Farm Payment (in mill. Euro)

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Belgium	411.1	530.6	530.1	530.1	530.1	530.1	530.1	530.1	530.1
Denmark	943.4	996.2	996.0	996.0	996.0	996.0	996.0	996.0	996.0
Germany	5148.0	5492.2	5492.0	5492.0	5492.0	5496.0	5496.0	5496.0	5496.0
Greece	838.3	1701.3	1723.3	1723.3	1723.3	1761.3	1761.3	1761.3	1761.3
Spain	3266.1	4065.1	4263.1	4263.1	4263.1	4275.1	4275.1	4275.1	4275.1
France	7199.0	7231.0	8091.0	8091.0	8091.0	8099.0	8099.0	8099.0	8099.0
Ireland	1260.1	1322.3	1322.1	1322.1	1322.1	1322.1	1322.1	1322.1	1322.1
Italy	2539.0	3464.5	3464.0	3464.0	3464.0	3497.0	3497.0	3497.0	3497.0
Luxembourg	33.4	36.6	37.1	37.1	37.1	37.1	37.1	37.1	37.1
Netherlands	386.6	386.6	779.6	779.6	779.6	779.6	779.6	779.6	779.6
Austria	613.0	614.0	712.0	712.0	712.0	712.0	712.0	712.0	712.0
Portugal	452.0	493.0	559.0	559.0	559.0	561.0	561.0	561.0	561.0
Finland	467.0	467.0	552.0	552.0	552.0	552.0	552.0	552.0	552.0
Sweden	637.4	650.1	729.0	729.0	729.0	729.0	729.0	729.0	729.0
UK	3697.5	3870.4	3870.5	3870.5	3870.5	3870.5	3870.5	3870.5	3870.5
Czech Rep.	228.8	266.7	343.6	429.2	514.9	600.5	686.2	771.8	857.5
Hungary	350.8	420.2	508.3	634.9	761.6	888.2	1014.9	1141.5	1268.2
Poland	724.6	881.7	1140.8	1425.9	1711.0	1996.1	2281.1	2566.2	2851.3
Slovakia	97.7	115.4	146.6	183.2	219.7	256.2	292.8	329.3	365.9
Slovenia	35.8	41.9	56.1	70.1	84.1	98.1	112.1	126.1	142.2
Estonia	23.4	27.3	40.4	50.5	60.5	70.6	80.7	90.8	100.9
Latvia	33.9	39.6	55.6	69.5	83.4	97.3	111.2	125.1	139.0
Lithuania	92.0	107.3	146.9	183.6	220.3	257.0	293.7	330.4	367.1
Cyprus	8.9	12.5	16.3	20.4	24.5	28.6	32.7	36.8	40.9
Malta	0.7	0.8	1.6	2.1	2.5	2.9	3.3	3.7	4.1
EU-25	29488.4	33234.3	35576.8	36189.9	36803.1	37513.1	38126.3	38739.3	39354.7

Ceilings for the members of the EU-15 increase until 2006 taking into account the increase in the premium for milk. From then on ceilings remain more or less the same until 2013. In the NMS, ceilings increase between 2005 and 2013 reflecting the approach of phasing-in of direct payments. In the course of modulation these country-specific budgets are reduced according to the modulation rate assumed adjusted by the individual share of small producers in each country.

2.3.4 Theoretical effects of decoupling under the MTR reform

Compared to the Agenda 2000, the list of commodities, which are eligible to receive direct payments, has been extended under the MTR reform towards roughages. Apart from special payments, the payment rate is the same among all kinds of area uses unless countries have opted for partially coupled COP payments. However, even in these countries payment rates have converged compared to Agenda 2000 conditions. Output-based payments for ruminants are allowed to a certain extend only, whereby not all countries across the EU make use of this. Altogether, it can be argued that the CAP payment scheme is more decoupled under the MTR reform than ever before. The expected theoretical effects resulting from this more decoupled system can be summarised as follows:

Area allocation and production

If the receipt of direct payments is linked to the production of some specific products only, a distortion of the production and allocation of inputs takes place, since farmers employ their production factors in the subsidised sectors in order to extend the production of commodities that are eligible for the receipt of premiums (KOESTER AND TANGERMANN, 1976). Relative incentive prices, i.e. farm gate (producer) price plus payment, and, thus, the relative advantage among various production alternatives changes in favour of subsidised products (BURFISHER AND HOPKINS, 2003). In case of coupled payments it can even be efficient from the individual farmer's view to maintain the production of commodities that are eligible for payments, if producer prices do not cover the variable costs of production anymore (KOESTER, 2000). However, the increase in production, which results from the existence of coupled payments, normally leads to a decrease in producer prices, which partially thwarts the production increasing effect of the payments received (BURFISHER AND HOPKINS, 2003).

If the same payment rate is paid for (almost) all kinds of area uses, as under the MTR reform, farmers are expected not to act according to the receipt of payments when they decide on what to produce. In the first instance, the developments on product markets are considered as crucial. A distortion of agricultural supply and of the allocation of resources within the agricultural sector as well as a resulting influence on market and producer prices does is significantly reduced[16]. However, if the agricultural sector on the whole is relatively more subsidised than other sectors, the agricultural sector attracts production factors that would otherwise be used in other sectors (ANTON, 2005). Thus, there is still a distortion in the

[16] In face of the explanations of production effects of various policy measures in section 2.2 it must be stated that this statement is somewhat simplified. Since also the new payments under the MTR reform definitely can be expected to have some kind of production effect, there will still be an influence on prices. However, the distortion of the resource allocation and the production within the agricultural sector is extremely low and results mainly from the fact that under the MTR reform still some types of area uses are not eligible for direct payments.

allocation of resources between the agricultural sector and other sectors of the economy under the new CAP payment scheme.

It has been argued that a payment scheme does not have any effect on production, if the activity of setting land aside on a voluntary basis, either with or without the requirement to maintain land in good agricultural conditions, is also eligible for the receipt of direct payments. However, apart from possibly arising static income effects, effects under uncertainty or dynamic effects, this is erroneous as long as there are still activities that are not eligible for direct payments (OECD, 2005a). As mentioned above, under the MTR reform direct payments are not paid for potatoes (other than starch potatoes), fruit and vegetables, and any other permanent crops.

The central point of the underlying work is the analysis of the effects of direct payments under the MTR reform on production and area allocation. Thereby, the analysis, which is carried out with the partial equilibrium model ESIM, is based on the following theoretical consideration: On the one hand, decoupling of area payments will raise the relative gross margins of crops, which were not subject to direct payments prior to the MTR reform (mainly roughages), compared to those crops, which were already eligible for direct payments under Agenda 2000 policies (grandes cultures including set-aside). This reform may shift fodder supply functions to the right, which could lead to lower fodder prices and potentially to higher supply of ruminant products. On the other hand, decoupling of ruminant payments is expected to reduce gross margins of ruminant production, which could lead to lower ruminant supply and less feed demand for fodder. This would lead to lower fodder prices and, thus, shift the supply functions for grandes cultures to the right. Moreover, it has also been argued that payments under the new CAP scheme would lead to a higher amount of voluntarily set-aside area (BALKHAUSEN ET AL., 2005).

A special feature of the MTR reform is that countries can decide upon the degree, to which they decouple direct payments. As a result, the political environment with respect to the design of direct payments is different from country to country. According to economic theory, the evaluation of policy decisions is straightforward and results more or less from the explanations made above. The more decoupled direct payments, the less distorted is the production and the allocation of inputs. On EU level, the eligibility to decide upon the degree of decoupling on a national basis leads to distortions in competitiveness among member states. As a result, one of the most important principles within the Single Market of the EU is violated (ISERMEYER, 2003).

Within the beef sector, different production activities can be subject to different levels of support. Theoretical considerations on possible effects of varying degrees of coupledness among payments for different beef production activities are difficult, because husbandry of suckler cows and cattle mast are closely connected via prices for calves[17]. If trade between EU members was factored out, the following implications could exist:

- If a member state opts for a partially coupled bull premium, demand for calves increases. This, in turn, leads to an indirect support of the husbandry of suckler cows.
- Vice versa: If the premium for suckler cows is kept coupled, while the bull premium is largely decoupled, prices for calves could fall in favour of steer fattening.

Due to these implications, coupled subsidies do not only affect the activity, which directly receives the payment, but due to the connection via the market for calves also the activity, which is not directly supported. However, these effects can be expected to be sweeped off through the trade with calves, since decoupling regimes differ significantly across EU member states (ISERMEYER, 2003)[18].

Land prices

For land tenants the effects of direct payments on income and production highly depend on the level of land rental prices and on the degree, to which direct payments are shifted to land owners. The following paragraphs describe, how land prices and the transfer efficiency of direct payments will develop over time and as compared to the Agenda 2000. Thereby it shall be mentioned that the simulation of land prices is not in the focus of the underlying work, since an agricultural sector model like ESIM is not well suited for very detailed analyses of land prices given the great variety of influencing factors that also include purely farm- and agent-based factors. However, the direction of changes in land prices as well as their approximate magnitude may well be simulated by ESIM. For this reason the following theoretical considerations turn out to be rather brief[19]. According to ISERMEYER (2003) the

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[17] Note that the cattle sector sector in ESIM is represented by one aggregated activity only. That is, results of the simulation of decoupling effects, which will be presented and discussed in chapter 5 and 6 will relate to this aggregated activity and not to various specific beef production activities. Nonetheless some short considerations on the effects of various degrees of coupledness among payments for different beef production activities seem to be appropriate.

[18] Effects of varying decoupling decisions on some purely farm economic related issues as well as on aspects related to administration and rural areas exist (ISERMEYER, 2003) but go well beyond the scope of the underlying work.

[19] For a very detailed analysis of the development of land markets under the MTR reform see BERTELSMEIER (2003), KLARE AND DOLL (2004), and ISERMEYER (2003).

development of land prices depends on the amount of area, which is eligible for direct payments but is not activated by an entitlement.

Three scenarios are imaginable with respect to the relationship between eligible area and premium entitlements:

a) Eligible area > number of premium entitlements

In this case, land prices are expected to fall. In the long-run they will reflect the ground rent obtained from market revenues (BRÜMMER, 2003).

b) Eligible area ≈ number of premium entitlements

According to BRÜMMER (2003) landowners do not benefit from direct payments even when the amount of eligible area and the number of premium entitlements is more or less equal. The regional market for land plays a major role under this scenario.

c) Eligible area < number of premium entitlements

Under this scenario land is more valuable, since premium entitlements compete for the scarce area. The major part of the payment is passed trough to the landowner so that the tenant benefits only slightly (ISERMEYER, 2003).

Situation b) can be expected to occur right after the assignment of premium entitlements in those countries, which opted for a decoupling model that includes a regionalised element (ISERMEYER, 2003). Here, the amount of area equals more or less the number of premium entitlements. Scenario a) occurs under an implementation of a decoupling system that is based on farmers' historical receipts only.

The conditions change when looking at the long-term developments of land prices. Due to the extension of urban areas total agricultural area decreases in most countries of the enlarged EU, while the number of premium entitlements is expected to remain relatively constant[20]. Of course, the decrease in eligible area has an effect on land prices under both decoupling models. However, the eligible area under the regionalised version of the SFP is

[20] ISERMEYER (2003) mentions that additional premium entitlements from the national reserve could enter the market. However, likewise it is also imaginable that entitlements are withdrawn from the market and put into the national reserve, which compensates the first effect to some extent. For a more detailed discussion of the role of the national reserve see ISERMEYER (2003).

relatively scarcer than under the historical version. As a result, in case of a decoupling model, which includes a regionalised dimension, the continuous reduction of agricultural area affects land prices right after the introduction of decoupled payments, while it will take some time until it will affect land prices under the historical version. According to ISERMEYER (2003) land prices will remain at a high level under the regionalised version as compared to the Agenda 2000. In case of the historical version they are expected to decrease to a lower level in the first years after the MTR reform has been implemented. BERTELSMEIER (2003, cited in KLARE AND DOLL, 2004) also argues that the scarcity of premium entitlements under the historical version of the SFP leads to lower land prices than under coupled direct payments existing under Agenda 2000. In case of the regionalised version, he expects even increasing land prices as compared to the Agenda 2000. Following his argumentation the overall transfer of financial means from the ruminant production sector to the plant production sector under a regionalised version of the SFP leads to a higher overall demand for agricultural land and thus higher land prices.

2.4 Summary and conclusions

Since the beginning of the last decade the concept of decoupling is in the focus of discussions in the field of agricultural policy. However, a common definition of this concept does not exist. Section 2.1 tried to bring some light into the dark by comparing several, more or less restrictive definitions that have been found in the literature. Thereby, those definitions, which evaluate the impact of political support on production from an *ex post* perspective, turn out to be more meaningful from an economic point of view. Politically, i.e. from a WTO point of view, it may well be discussed whether the existence of criteria, which define *ex ante* whether a policy is decoupled or not, is reasonable. However, according to economic theory and some empirical results with respect to risk-related and dynamic effects, which have been described in section 2.2, a policy without any link to production is unimaginable anyway. As a result, the only correct definition of really decoupled policies has been proposed by SPRIGGS AND SIGURDSON (1988, cited in BAFFES, 2004: 1), who simply stated: “In fact, a program to eliminate subsidies would be the ultimate decoupling. It is the only truly decoupled program that there is.” For the purpose of this work a very pragmatic approach has been chosen. The terms “decoupling” and “decoupled payments” are used in a more universal sense aiming at the new design of direct payments under the MTR reform.

Output payments for ruminant producers and area payments clearly represent the most relevant type of payments under the Agenda 2000 and under the actual MTR reform. While economic theory suggests that output payments have a similar effect on production as market price support, the impact of area payments is expected to be lower, which is the more so, the more types of land uses are eligible for payments[21]. In general, however, the magnitude of production effects highly depends on the extent, to which payments are passed through to land owners. If payments are fully capitalised into land values, the scope for direct payments to influence by whatsoever effect production decisions of farmers is narrow (ANTON, 2005, and OECD, 2004).

Under the MTR reform, direct payments and national top-ups have been kept partly coupled to production in most member states of the EU, though to significantly varying degrees. Only Germany and Ireland eliminated coupled direct payments in all agricultural sectors. Particularly in the beef sector, member states were allowed to maintain the old regime of coupled payments to a large extent. Following the theoretical considerations made above government decisions as to what extent payments are kept partly coupled to production can be expected to have a significant influence on national and EU-wide markets.

In addition to the degree of coupledness, countries could also decide on the decoupling approach. All countries have opted for payments that are either based on historical entitlements or on a combination of a historical and a regionalised payment element. In some countries the combined approach includes a dynamic dimension, i.e. the payment becomes a purely regionalised payment over time. However, irrespective for which type of the SFP a member state has opted, in the simulations conducted with ESIM decoupled payments are generally modelled as a uniform regionalised payment per hectare[22]. The SFP, which is based on actual receipts by each farmer in the reference period 2000 to 2002, can not be modelled in ESIM[23]. However, from a sectoral point of view, it can be expected that the effects on production and area allocation ceteris paribus do not differ significantly between both decoupling models. This is also confirmed by BERTELSMEIER (2004), who analysed the effects of both decoupling models on land rental prices on the basis of a linear programming model.

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[21] Similar to model applications in other studies the treatment of area payments in the underlying work diverges from theoretical suggestions to some extent. A detailed description of the assumptions in the underlying analysis follows in the chapters 5 and 6.

[22] The approach of modelling coupled and decoupled payments in ESIM will be described in more detail in chapter 4.

[23] For simulations including decoupled payments that are based on receipts of individual farmers linear programming and agent-based models are better suited.

The more general impacts of decoupling crucially depend on two more or less contradicting effects. Decoupling of area payments can be expected to lead to an increase in roughage area, which results in lower fodder costs and, thus, in a support for ruminant producers. Decoupling of ruminant payments thwarts this effect, i.e. leading to lower ruminant supply and a reduced need of roughage areas. In order to capture these effects in model applications, various links between the crop and fodder sector and the livestock sector have to be incorporated in the model structure. The next chapter provides an overview of how this challenge and other modelling aspects with regard to the depiction of decoupling effects are dealt with in various simulation models.

3 Modelling decoupled payments in selected simulation models[24]

As described in chapter 2 the introduction of decoupled payments under the MTR reform is expected to have various effects. In the last years economists have tried to capture these effects in economic simulation models. This chapter has a double purpose: First, it reviews the model mechanics of depicting the effects of decoupling on area allocation and production in various simulation models. Second, it looks at what the effects of decoupling on area allocation and production may be. It does so by a detailed literature review of selected model applications and tries to trace the results back to the respective model mechanics and assumptions on parameters. It shall be noted that a very recent version of ESIM, further referred to as ESIM-2005, is also included in this literature review. Based on previous model versions it has been developed and documented by BANSE ET AL. (2005). It also provides the basis for the extension and modification of ESIM in the underlying research work. In the first part of this chapter an overview of the state of depicting decoupling effects in various economic simulation models of the agricultural sector is presented. Thereby, the focus is on mechanisms of land allocation and the link between the livestock and the fodder/crop sector. In the second part, simulation results of decoupling scenarios from various simulation models are presented and compared. Finally, findings are summarised and some preliminary conclusions with respect to the suitability of ESIM to simulate the decoupling effects within the underlying work are drawn.

[24] This chapter is strongly based on BALKHAUSEN ET AL. (2005), though it includes additional findings from further research activities.

3.1 Structural features of economic simulation models

The models covered in this section are listed in Table 7 in alphabetical order. The general criteria for the inclusion of models in this review have been a good coverage of EU agriculture[25], a multi-commodity nature, and the availability of model documentation.

All but two of the models presented in Table 7 are partial equilibrium models, only GTAP and GOAL being general equilibrium (CGE) models. In all the partial equilibrium models, the core of the supply as well as the demand side is a system of behavioural equations, except in CAPRI, which for the EU is composed of two iteratively coupled supply and world trade modules.

Table 7: Economic simulation models covered

Model	Institution of development
AGLINK	OECD, Paris
AG-MEMOD MODEL (AG-MEMOD)	AG-MEMOD partnership
CAPRI	University of Bonn
CAPSIM	University of Bonn
ESIM-2005	ERS26/USDA, Universities of Stanford, Göttingen and Berlin (Humboldt)
FAO WORLD FOOD MODEL (WFM)	Food and Agriculture Organisation (FAO), Rome
FAPRI-GOLD	Iowa State University
GOAL	INRA, Rennes
GTAP	Purdue University
PENN STATE TRADE MODEL (PSTM)	Pennsylvania State University
WATSIM	University of Bonn

Sources: Standard documentation for AGLINK is OECD (year unknown); for AG-MEMOD, CHANTREUIL ET AL. (2005); for CAPRI, BRITZ (2004a); for CAPSIM, WITZKE AND ZINTL (2005); for ESIM, BANSE ET AL. (2005); for WFM, FAO (2001); for FAPRI-GOLD, WESTHOFF (2004); for GOAL, GOHIN (2006); for GTAP, HERTEL (1997); for PSTM, STOUT AND ABLER (2003), and for WATSIM, KUHN (2003). All model information presented in this chapter is based on these sources, if not indicated otherwise.

[25] For example, many programming models such as FARMIS (BERTELSMEIER, 2004) depict only single member states and are therefore not included in this review. From FAPRI, only the FAPRI-GOLD model is included since it depicts the agricultural sector of the EU in most detail of all FAPRI models.(YOUNG AND WESTHOFF, no year).

[26] ERS means Economic Research Service and USDA is the abbreviation for the United States Department of Agriculture.

The supply module consists of PMP (Positive Mathematical Programming)-calibrated programming models at the NUTS II[27] regional level, fed with exogenous prices for each model iteration. These prices stem from the world trade module, in which supply quantities from member-state models are confronted with demand functions at EU level and solved for new member state-specific market prices, which drive the next iteration in the supply models.

3.1.1 Area allocation

In all of the partial equilibrium models, supply of crops in the EU is modelled as yield multiplied by area. The area component of the supply function is determined endogenously in each model. However, there are significant differences in the process of area allocation. In ESIM-2005, area is allocated as a function of current own and cross prices, direct payments, as well as cost indices for labour, capital, and intermediate inputs. Area allocation in WATSIM is similar, but in contrast to ESIM-2005, lagged prices and subsidies as well as area are also explaining variables. Also in the WFM the supply response is time-lagged. For cereals, area allocation only depends on lagged own and cross prices, on lagged area, and on a trend factor. For oilseeds, area is a function of lagged prices of the related oil and oilcake (YANAGISHIMA, 2004). Area in PSTM depends on own and cross producer prices and direct payments. In addition, area functions have a lagged price response with the pre-period area as an explanatory variable. The area allocation functions in CAPSIM are derived from a restricted normalised quadratic profit function. Dual values of the physical area and feed requirement restrictions are subtracted from revenues (per production activity) and input prices. The resulting net revenues of outputs and net prices of inputs are the explanatory variables of area allocation and herd size. In AGLINK, area allocation depends on own and cross commodity gross market returns as well as on direct payments (VON LAMPE, 2004).

In AG-MEMOD, land allocation occurs in two steps. First, total area is allocated among three major groups of crops, i.e. grains, oilseeds, and root crops. Second, land allocation within each of the major crop categories takes place. The total area equations for grains, oilseeds, and root crops are dependent on lagged prices, lagged area, and on a vector of exogenous variables like the set-aside rate and direct payments. The share of crops within groups is determined by lagged prices and the share of the respective crop in the previous year.

[27] NUTS means Nomenclature of Territorial Units for Statistics. It refers to local administration units within the EU. The NUTS II level, refers to an administration unit of 0.8 to 3.0 mill. inhabitants. (WIKIPEDIA, 2007).

Also in FAPRI-GOLD land is allocated at two stages. Total area allocated to cereals and total area allocated to oilseeds are modelled separately, and no other crops are covered. Total cereal area is a function of weighted average expected real gross returns, mandatory set-aside rate, and area used for oilseeds. The weights reflect average historical shares of various cereals in total cereal area. For each commodity, expected gross return is a function of trend yields, a weighted average of market prices from the past three years, and expected direct payments multiplied by a factor between 0 and 1 which reflects the degree of "coupledness" of the payment. Area for oilseeds is determined similarly, except that expected cereal returns are an argument in the total oilseed area equation, instead of the oilseed area term used in the total cereal area equation.

In GTAP and GOAL, land is allocated according to a Constant Elasticity of Transformation (CET) function expressing the constrained mobility of the factor land. GOAL and some extensions of the GTAP standard version include a nested structure of land allocation, i.e. land allocation takes place at different stages. The parameter of the CET function determines the mobility of land between uses at each stage, having the same value at each allocation stage and higher values the more that land becomes similar in the allocation framework (see, for example, HUANG ET AL. (2004) for GTAP).

In the regional programming supply models of CAPRI, area is distributed according to the contribution of the respective product to the objective function (market revenue and direct payments), the explicitly modelled constraints as well as the cost terms resulting from the PMP-calibration process.

3.1.2 Size of total agricultural area

The process of product-specific area allocation often results in total area exceeding or undershooting the total area in the model base period. This raises the question of technical feasibility. Can additional area move into production of products covered by the model from products not covered by the model? Are there uncropped land reserves? And, in case of area moving out of modelled products: what will happen to this area, and is this legally possible? The lower the area coverage of the respective model the easier it is to argue that aggregate area changes of model products are buffered by "other products". This, however, is problematic, as in many models the category of products not covered mainly consists of fodder and pasture area, for which variation should somehow be consistent with feed demand of ruminants. All models depict area allocation to cereals and oilseeds. Table 8 indicates whether roughage products and voluntary set-aside are included.

Table 8: Inclusion of roughage products and voluntary set-aside in simulation models

Product	AGLINK	AG-MEMOD[a]	CAPRI	CAPSIM	ESIM -2005	WFM	FAPRI-GOLD	GTAP	GOAL	PSTM	WATSIM
Pasture		?	X		X				X		
Silage maize		?	X	X	X				A		
Other fodder		?	X	X	X				X		
Vol. set-aside		?	X		X						

X = included as a separate product category; A = included in a product aggregate; ? = differs per country module.

[a] AG-MEMOD consists of country modules, which differ in product coverage, especially for roughages and voluntary set-aside. In addition, central parts of the model such as the land market as well as the link between the fodder, crop, and livestock sectors are not treated consistently among country modules. Due to these differences and since detailed documentation is not available for all country modules, AG-MEMOD is only included in the comparison of simulation results in section 3.2 of this chapter.

Source: BALKHAUSEN ET AL. (2005) and own composition.

Table 8 shows that product coverage of roughages is very limited. Only CAPRI and ESIM-2005 treat all of the four area uses as endogenous variables. Area allocation elasticities in ESIM-2005 are very low for pasture and voluntary set-aside area compared to other crops, because substitution is considered limited due to different soil qualities and geographical/climatic conditions. Voluntary set-aside is modelled as being limited by a quota, with the quota being at the level of voluntary set-aside area in the base period and a shadow premium at 90 % of the real premium. This is in order to address the restriction of voluntary set-aside area to a maximum level per farm (see section 2.3).

In CAPSIM, only silage maize and other fodder are endogenous to the model. Pasture is treated as exogenous according to recent trends. Voluntary set-aside is not modelled explicitly, but is included in the function determining the overall set-aside area. More precisely, the overall set-aside area function includes a set-aside elasticity which ought to capture the opposite change in voluntary set-aside usually accompanying an increase in the mandatory rate. GOAL contains fodder from arable land and fodder from pasture land as endogenous variables. The former product also includes silage maize, but not as a separate product. In GTAP, none of these products is modelled explicitly. But land is an input to ruminant production, which reflects the substitution relationship between ruminant and crop production. The other models capture neither roughages nor voluntary set-aside.

In order to ensure that all crop area (except mandatory set-aside) is used for agricultural production, ESIM-2005, WATSIM, and AGLINK use a scaling process, by which the area allocated as described above is scaled evenly up or down according to total crop area available (for AGLINK, see VON LAMPE, 2004). This implies that the area used in any product is not determined by behavioural functions alone. Other models allow for variation of total area covered by the respective model. These are FAPRI-GOLD, PSTM, and WFM (for the WFM, see YANAGISHIMA, 2004). In addition to the individual crops, PSTM contains one residual land use category, which represents all other land that could potentially move into production of modelled crops, or absorb land moving out of modelled crops. For each region an assignment for additional land is made, ranging from about 5 % to 20 % of total arable land. If the exogenously determined area limit for the EU is exceeded during the allocation process, the allocated area is scaled down until the limit is met. If the sum of allocated area is less than the limit, there is no scaling process (ABLER, 2004). Although land can move into and out of production without further restrictions in FAPRI-GOLD, the elasticity of total agricultural area with respect to weighted net returns is generally 0.1 or less.

In CAPSIM, GTAP, and GOAL, allocated area is not scaled. Since the land market is endogenous to the model, the rental price for land adjusts such that fixed total available area is not exceeded nor undershot. A land market is not included in the regional supply models of CAPRI, but two land balances, which define total area, one for arable land and one for pasture must both be met. In case of arable land, idle land not eligible for set-aside premiums is an explicit activity which closes the balance. For permanent pasture, two types with different yields are distinguished. Thus, extensification of pasture land can be depicted as a lower production intensity resulting from a change in the mix between the two intensities.

3.1.3 Linkage between the livestock and the fodder/crop sectors

To depict the effects of decoupling, various links between the crop and fodder sectors on the one hand and the livestock sectors on the other hand have to be incorporated in the model structure. The most crucial questions in this context are first, if and how feed prices affect livestock production and secondly, how feed requirements are modelled. With respect to the first question, FAPRI-GOLD uses a ratio of output prices and weighted direct payments (with lower weights on less coupled payments) to input prices to determine livestock production. Prices of major feed products are weighted by their shares in the base ration for the animal in question. In PSTM, livestock production depends on own and cross livestock prices, direct payments, and a feed cost index (FCI) for the considered animal product. This index is a weighted average of feed prices, using the base-period feed component mix as constant weights. In AGLINK (VON LAMPE, 2004) and ESIM-2005, supply of animal products is a function of own and cross prices and direct payments as well as a feed cost index, and, in ESIM-2005, prices for other inputs. However, weights of individual feedstuffs in the feed cost index are not fixed, but vary with the feed component mix[28]. In the WFM, livestock production depends on own and cross livestock prices as well as on a feed cost index, but this feed cost index is not animal-specific. In WATSIM, livestock production does not depend on a FCI, but on single own and cross feed prices in addition to own and cross prices of animal products.

In CAPSIM, livestock production depends on individual market prices for feed corrected by shadow prices for energy and protein (WITZKE, 2005). In GTAP and GOAL, feed products included in the model are inputs to animal production. Thus, feed prices determine livestock production, and the response of animal production to feed prices depends on the value share of the feed product in question in total inputs.

With regard to the second question, feed demand in AGLINK, ESIM-2005, PSTM, FAPRI-GOLD, and WFM is determined by own and cross feed prices and by the level of livestock production. This implies a possibility of substitution among feed components. However, different types of feedstuffs can not be substituted completely freely. In fact, own and cross price elasticities reflect certain requirements on protein and energy content, which affect the degree of substitutability among different feeds and thus the response of livestock supply to changes in feed prices.

In CAPSIM, feed demand depends on market prices for individual feeds corrected by the shadow prices for energy and protein. More precisely, if the price of a certain feed product increases and the quantity demanded accordingly decreases, nutrient balances ensure that neither a deficit in energy nor in protein can materialise. The increase in shadow prices moderates the increase in the net price of the feedstuff in question, which is the market price minus the nutrient shadow prices. As a consequence, demand decreases less than without such

[28] For ESIM, this mechanism will be described in more detail in chapter 4.

a restriction and nutrient balances are maintained (WITZKE, 2005). A similar approach is applied in WATSIM which includes no protein balance but only an energy balance (KUHN, 2004).

In GTAP, the link between livestock and fodder or crops is modelled simpler than in GOAL and in partial equilibrium models due to a high level of aggregation, for example, "meat products" and "cereals". However, given the structure of both CGE models, an expansion effect is depicted, i.e. the demand quantity for a feed product responds to changes in the production of livestock products. Also a substitution effect is depicted in GOAL and can be depicted in GTAP, if the feed product requirement of livestock production is modelled as a CES (Constant Elasticity of Substitution) structure, instead of the standard Leontief specification.

In the regional programming supply models of CAPRI, the profit-maximising animal herds are determined simultaneously with cost-minimising feed composition. Non-tradable fodder products such as grass and silage maize are treated as individual feeding activities whereas tradable feeding activities such as wheat or soybean cake are aggregated into different categories (cereals, rich energy, rich protein, etc.). Substitution among feeding activities is possible but restricted by very detailed nutritional requirements regarding animal needs for energy, protein, lysine, dry matter, etc. Substitution of feed components belonging to different feed categories is not possible.

3.2 Results from selected simulation models

In recent studies, some of the models presented above have been used to simulate decoupling effects on agricultural production and area allocation. This section looks at these studies by describing the underlying scenarios, assumptions, and results. Simulation studies were based on CAPSIM (EUROPEAN COMMISSION, 2003), ESIM-2005 (BALKHAUSEN ET AL., 2005), CAPRI (BRITZ, 2004b), FAPRI-GOLD (BINFIELD ET AL., 2004), AGLINK (OECD, 2004c), AG-MEMOD (CHANTREUIL ET AL., 2005), GTAP (FRANDSEN ET AL., 2003), and GOAL (GOHIN, 2006). The other three models, which were described in section 3.1 of this chapter (WFM, PSTM, WATSIM) have not yet been used to simulate decoupling of direct payments in the EU[29].

3.2.1 Scenarios

[29] PSTM is updated and now named PEATSim (ABLER, 2006).

The studies are different with respect to the level of policy disaggregation and reference scenario. The AGLINK, AG-MEMOD, CAPRI, CAPSIM, FAPRI-GOLD, and GOAL studies only show the aggregate effect of implementing all MTR reform measures together (including decoupling and some price cuts) compared to a reference scenario of continued Agenda 2000 policies. The studies using ESIM-2005 and the GTAP model illustrate the isolated impact of decoupling. In case of the GTAP study, however, the effects of decoupling the Agenda 2000 and not the MTR reform direct payments are analysed. In the ESIM-2005 study a reference scenario of implementing all MTR reform measures except decoupling is compared with a decoupling scenario of implementing all MTR reform measures including decoupling. Although measuring the isolated impact of decoupling has, of course, the highest explanatory power for the purpose of this chapter, the simulated effects of studies which introduce all MTR reform measures together are also included in this overview. Such a scenario still allows to draw some, though slightly weaker, conclusions regarding the effects of decoupling since decoupling is the dominant element of the MTR reform.

Furthermore, the studies differ as to whether they take into account the options for EU member states not to fully decouple direct payments. In the ESIM-2005 study, decoupling of direct payments is simulated as partial according to average EU-15 decoupling rates in 2011, which are based on estimates from the European Commission. Also in the CAPRI and GOAL studies the degree of decoupling reflects country-specific implementations of the SFP. In the CAPSIM and AG-MEMOD studies the full decoupling of direct payments is simulated. Projections with FAPRI-GOLD and AGLINK are each specified for a maximum and a minimum decoupling scenario. That is, according to member states' possibility of determining the degree of coupling, one scenario treats payments as decoupled from production as possible, while payments remain coupled to the maximum extent possible in the other.

3.2.2 Treatment of Decoupled Payments

In the sections 2.2 and 2.3 the possible production effects of more or less decoupled payments have been discussed in detail from an economic point of view. In the model applications discussed in this section the production effectiveness of both Agenda 2000 and MTR reform payments relies more or less on ad hoc assumptions and differs significantly among studies. Thereby, assumptions are not always fully in line with what economic theory suggests.

The standard approach to express the production effectiveness of direct payments is to use a coupling coefficient between 0 and 1 and to multiply it with the value of direct payments. Thereby, a factor 1 reflects an equally significant effect as price support; a factor 0 would reflect no effect on area allocation and production.

For area allocation, FAPRI-GOLD relies on the assumption that the new payments have an impact, which is 15 % of the effect of price support, compared to 50 % for the direct payments under the Agenda 2000. In the AGLINK study, the new direct payments are assumed to have an impact on area allocation amounting to 6 % of the corresponding impact of price support compared to 14 % for the former direct payments for arable crops under the Agenda 2000. The AG-MEMOD study treats the new payments as having 30 % of the area allocation effect of the arable crop payments under the Agenda 2000. In the ESIM-2005, CAPSIM, CAPRI, and GTAP studies, Agenda 2000 payments for crops and ruminants are treated as fully coupled to area allocation. Decoupled payments are modelled as uniform non-crop-specific area payments differentiated at national or regional level, which are fully coupled to area allocation. Two Agenda 2000 baseline scenarios are formulated in the GOAL study. First, a standard baseline assumes full capitalization of arable crop direct payments in land prices. Second, an alternative baseline assumes 50 % capitalization of direct payments. Decoupled payments under the MTR reform are assumed to have no effect on area allocation.

In all studies except for the FAPRI and GOAL study direct payments for ruminant production are assumed to be fully coupled to production under the Agenda 2000. All of these studies, however, take into account that payments are subject to ceilings: payments actually granted are scaled down such that budgetary expenditures for beef payments in the base period are met. This way of taking into account ceilings for beef and suckler cow premiums suggests producers cross-subsidising their beef production, which exceeds farm individual ceilings. In the FAPRI-GOLD study, ruminant payments under Agenda 2000 are coupled to production by less than 100 % but more than those for crops, which are assumed to be coupled by 50%. In the standard baseline of the GOAL study, premiums for ruminant production under the Agenda 2000 are treated as fully coupled. In the alternative baseline, ceilings are taken into account by explicitly allowing for non-subsidised, above ceiling suckler cow and beef production. For all studies, decoupled payments after the MTR reform are modelled as having no direct effect on beef production.

3.2.3 Comparison of simulation results

The comparability of study results is restricted for two reasons. First, simulations do not relate to the same projection period. While results obtained in the studies using CAPRI and CAPSIM relate to the year 2009, results in the AG-MEMOD, ESIM-2005, GOAL, and GTAP study refer to the years 2008, 2010, 2011, and 2013, respectively. The results in FAPRI-GOLD and AGLINK relate to averages of the years 2007 to 2012 and 2004 to 2008, respectively. Second, the scenario chosen in CAPSIM relates to the Commission's proposals for the MTR reform. Policy assumptions in AGLINK, AG-MEMOD, CAPRI, ESIM-2005, FAPRI-GOLD, and GOAL are based on the final MTR reform. The scenario in the GTAP study refers to none of both, but is an artificial design of fully decoupled Agenda 2000 payments. In particular, the decoupling as well as modulation rates differ among studies. Decoupling rates in the AG-MEMOD, CAPSIM, and GTAP studies and under the maximum decoupling scenarios in the AGLINK and FAPRI studies are 100 % for cereals and oilseeds, beef, and sheep meat. For CAPRI, ESIM-2005, GOAL, and the minimum decoupling scenarios in the AGLINK and FAPRI studies they are lower. Modulation rates are up to 12 % for the study, which simulates the Commission proposal, and down to 5 % for those that simulate the final decision, or even 0 % in the AG-MEMOD, GTAP, and GOAL studies.

However, despite these differences, a comparison of results still seems to make sense. At least the rough direction of effects should not depend too much on the differences in projection year and in the policy changes corresponding to the proposals on the one hand and the final MTR reform on the other. Therefore, Table 9 presents projected changes in area and production due to the implementation of the MTR reform compared to the continuation of Agenda 2000 policies in alphabetical order of the models used.

As a first observation, Table 9 shows that crop areas and quantity changes simulated with FAPRI-GOLD and AGLINK are far below those generated with other models with very few exceptions. This seems logical, because the difference in "production effectiveness" of the

Agenda 2000 and the MTR reform payments is considered to be only 8 percentage points compared to price support in AGLINK and 35 percentage points in FAPRI-GOLD. Results based on all other models/scenarios are more pronounced, which is in accordance with the much higher assumed difference between the coupledness of direct payments under Agenda 2000 conditions and the coupledness of payments under the MTR reform.

In the following paragraphs, results are discussed for individual product groups. All simulations show a reduction of total cereal area in case of decoupling. In the FAPRI and AGLINK simulations, this decline is only about 1 %. In other simulations the decrease varies between 2 % in AG-MEMOD and 9 % under the standard scenario of GOAL. According to the CAPSIM results the reduction of cereal area is partly offset by an increase in oilseed area. However, in the other studies, oilseed area is expected to decline by 0.1 % (AGLINK) to 9.2 % (ESIM-2005). Since under Agenda 2000 direct payments for cereals and oilseeds are at an identical level and the shares of direct payments in total revenue for cereals and oilseeds are quite similar, a decline of the oilseed area seems plausible. The increase in oilseed area in CAPSIM can be attributed to the strong increase in sunflower seed area (rapeseed area is declining). This corresponds with the strong decline of durum wheat area (-24 %), for which sunflower seed is a good substitute.

Table 9: Change in area and production in the EU-15 due to implementation of the MTR reform compared to the baseline (continuation of Agenda 2000) in %

Product	AGLINK[a]		AG-MEMOD	CAPRI	CAPSIM	ESIM-2005[b]	FAPRI-GOLD		GOAL		GTAP[b]
	Max. dec.	Min. dec.					Max. dec.	Min. dec.	Standard	Alternative	
	Average 2004 - 2008		2010	2009	2009	2011	Average 2007 – 2012		2008		2013
Area											
Cereals	-0.7	- 0.7	-2.0	-7.5	-4.0	-6.9	-1.3	-1.1	-9.0[c]	-7.4	-6.9[d]
Oilseeds	0.0	-0.1	-6.2	-4.8	+1.5	-9.2	-0.6	-0.2	-	-	-9.0[d]
Pasture	-	-	-	-1.0	-	+5.0	-	-	-7.5	-0.5	-
S-Maize	-	-	-	-5.2	-5.3	-10.8	-	-	-	-	-
Fodder	-	-	-	+15.0	+9.2	+11.0	-	-	+5.2	+1.0	-
V. set-aside	-	-	-	-7.9	-	-4.9	-	-	-	-	-
Production											
Beef	-0.6	-0.1	-4.6	-6.4	-9.3	-5.0	-2.6	-0.2	-3.6	-1.2	-10.8
Sheep	-	-	-4.4	-6.2[e]	-3.1	-8.6	-5.5	-1.7	-	-	-

[a] Figures for beef refer to the year 2008. [b] Figures only refer to the isolated impact of decoupling. [c] Figures refer to soft wheat. [d] Figures for cereals and oilseeds refer to supply, not to area. [e] Including goat meat.

Sources: BALKHAUSEN ET AL. (2005), EUROPEAN COMMISSION (2003), CHANTREUIL ET AL. (2005), BRITZ, (2004b), BINFIELD ET AL. (2004), OECD (2004c), FRANDSEN ET AL. (2003), GOHIN (2006).

Across all eight studies, beef and sheep meat production is projected to decline by 0.1 % to 10.8 % and 1.7 % to 8.6 %, respectively. Again, for beef, AGLINK and FAPRI-GOLD project the lowest effects, whereas results of all other models vary between a decline of 1.2 % and 10.8 %. In contrast to the arable crop sector, the decrease in beef production under the "maximum decoupling scenario" is much stronger than under the "minimum decoupling scenario". This can be traced back to the higher optional coupling rates for ruminant production than for the arable crop sector. In the GOAL study, the decrease in beef production is lower under the "alternative baseline" than under the "standard baseline", since payments to beef producers under the alternative baseline have a lesser effect on production due to the consideration of ceilings.

The area of silage maize is projected to decline between 5.2 % and 10.8 % under the MTR reform compared to the continuation of Agenda 2000 policies. This is consistent with the lower production level of ruminants as well as a potential substitution effect due to lower direct payment levels for silage maize compared to other feedstuffs such as "other fodder" and "pasture", which become eligible for direct payments under the MTR reform. In consistency with a priori expectations and the decrease in grandes cultures area (including silage maize), arable fodder area is projected to increase between 1% under the "alternative baseline" in GOAL and 15 % in CAPRI. Surprisingly, although pasture becomes eligible for direct payments under the MTR reform, only ESIM-2005 projects a noteworthy increase of pasture area. This probably results from rather limited substitution possibilities in land allocation and/or feed composition in other models combined with decreasing beef production. For example in the GOAL study, fodder from non-arable land is even projected to decline under the MTR reform with both baseline specifications.

Voluntary set-aside area is simulated to decrease by 4.9 % in ESIM-2005 and by 7.9 % in CAPRI. On the one hand this seems reasonable given the relative decline of the direct payments for set-aside under decoupling compared to other products. On the other hand this contradicts the expectations of most politicians and farmers. In reality there are indeed plausible reasons for an increase in voluntarily set-aside area in the course of decoupling. For example, the abolition of the restriction of a maximum set-aside area per farm leads to a relatively higher attractiveness of setting land aside.

3.3 Summary and conclusions

All studies covered by the literature review in this chapter uniformly project a decline of the cereal and silage maize area as well as ruminant production in the EU-15 in the course of decoupling of direct payments. In contrast, model results are heterogeneous with respect to the direction of the decoupling effect on oilseed, pasture, and voluntary set-aside area. A systematic effect of model type (behavioural partial or general equilibrium, or programming) on model results was not found on the first view. It seem to be the widely differing assumptions about the effectiveness of direct payments on production (under Agenda 2000 as well as under the MTR reform), which drive model results to a large extent.

In modelling the effects of decoupling, activities which have not been eligible for direct payments in the past become more important, because relative incentive prices between these products and the products, which were eligible for direct payments already under the Agenda 2000 policies change considerably. In addition, expected significant changes in feed rations for ruminants cannot be depicted without including pasture land and fodder from arable land in simulation models. Most of the current simulation models, however, cover these product categories incompletely. It is only CAPRI and ESIM-2005, which include silage maize, fodder from arable land, and pasture area as single product category on an EU-15 level. In addition, it is only these models, which include voluntary set-aside as an endogenous agricultural activity. As illustrated in section 3.1 the link between the livestock sector on the one hand and the fodder/crop sector on the other hand is modelled very detailed in ESIM-2005 compared to other partial equilibrium models. For these reasons it can be concluded that ESIM is a well suited tool to analyse the effects of decoupling.

4 Structure of the European Simulation Model

The analysis of the decoupling effects, which follows in chapters 4 and 5, is based on the partial equilibrium model ESIM. This model was developed by the ERS of the USDA in cooperation with Josling and Tangermann. It was first used in TANGERMANN AND JOSLING (1994). Thereafter, the model has been further developed by TANGERMANN AND MÜNCH (1995) as well as MÜNCH (1995). Country coverage of ESIM has been expanded first by MÜNCH (1997) and then by MÜNCH (2002). In 2004, the model was updated and extended in terms of base period, product and country coverage, as well as policy formulation. In addition, it was rewritten from SuperCalc into GAMS[30] software (BANSE ET AL., 2005).

Since 2001 ESIM is used by the European Commission. Since 2006 it is used and continuously extended at LEI (the Netherlands) by including bio-fuels and establishing links with CGEs and linear programming models. The focus of these analyses is mainly on the effects of Eastern enlargement and analyses of CAP and WTO reform impacts on agricultural markets and budgetary expenditures. Based on the model version developed by BANSE ET AL. (2005), i.e. ESIM-2005, ESIM has been extended again in terms of country and policy coverage as well as in terms of some modelling aspects for the purpose of the underlying work.

This technical model documentation of ESIM describes the basic model structure as well as the base data and parameters used in this new version of ESIM (ESIM-2007)[31]. However, since most structural features of the model have not been changed radically compared to ESIM-2005, the model documentation provided by BANSE ET AL. (2005) serves as a basis for the documentation of ESIM-2007. The documentation of ESIM-2007 describes those aspects in great detail, which have either been developed completely newly in the underlying research work or are at least considered highly relevant for modelling the effects of decoupling. Thereby, the focus is first on the general structure and equation system of ESIM-2007. It follows a detailed overview of the land market module, which has been newly developed, and an extended description of how direct payments and national top-ups as well as the feed market module are depicted. Finally, the view turns to the generation of exogenous model parameters and the description of base data. Further information on those features of ESIM,

[30] GAMS is the abbreviation for General Algebraic Modelling System.
[31] Note that, if not indicated otherwise, model features in ESIM-2007 also apply to ESIM-2005.

that have not been newly developed in the underlying research work, can be obtained from BANSE ET AL. (2005). The model documentation does not include a description of the GAMS software, which can be found elsewhere (BROOK ET AL., 1998).

4.1 Description of the core model

4.1.1 General overview

ESIM-2007 is a recursive dynamic partial equilibrium multi-country model. It is price and policy driven and includes agricultural production, consumption of agricultural products, and some first-stage processing activities. ESIM-2007 is a partial model, i.e. macroeconomic variables like income or exchange rates are exogenous. As a world model it includes all countries, though in greatly varying degrees of disaggregation. Typically, some countries are explicitly modelled, while others are included in the aggregate “rest of the world” (ROW). So far each of the NMS as well as Turkey and the US were modelled as a single region. The EU-15, however, was covered as one aggregated single region. In order to simulate the effects of the different options of implementing the decoupling regulations and in order to meet the differences in land use, technical progress, and various macro-economic indicators this highly aggregated single region has been divided into individual EU-15 member countries. As a result, ESIM-2007 covers 29 regions with Belgium and Luxembourg representing one region. As ESIM-2007 is mainly designed to simulate the development of agricultural markets in the EU and the NMS as well as in the accession candidate countries policies are only modelled for these countries. I.e. for the US and the ROW production and consumption takes place at world market prices. Trade is modelled as net trade for all countries.

ESIM-2007 is a recursive dynamic model, since it has lagged price responses modelled at the supply side. In addition, shifters at the supply as well as at the demand side (e.g. productivity or income growth) are taken into consideration. Meanwhile, ESIM covers 36 products plus voluntary set-aside area. The list of products covered by ESIM-2007 is shown in Table 10.

Table 10: Product coverage and activities in ESIM-2007

Product	Farm supply	Processing supply	Human demand	Seed demand	Feed demand	Processing demand
Crops						
Common wheat	x		x	x	x	
Durum wheat	x		x	x		
Barley	x		x	x	x	
Corn	x		x	x	x	
Rye	x		x	x	x	
Other grains	x		x	x	x	
Rice	x		x	x		
Sugar	x		x			
Potatoes	x		x	x	x	
Sunflower seed	x		x	x	x	x
Soybeans	x		x	x	x	x
Rapeseed	x			x		x
Manioc	x		x		x	
Arable fodder	x				x	
Silage maize	x				x	
Grass	x				x	
Animal products						
Raw milk	x				x	x
Sheep meat	x		x			
Beef	x		x			
Pork	x		x			
Poultry	x		x			
Eggs	x		x			
Processed products						
Sunflower oil		x	x			
Sunflower cake		x			x	
Soy oil		x	x			
Soy cake		x			x	
Rape oil		x	x			
Rape cake		x			x	
Cheese		x	x			
Skim. milk powder		x	x		x	
Butter		x	x			
Oth. dairy products		x	x			
Consumption milk		x	x			
Other products						
Voluntary set-aside	x					
Other energy					x	
Other protein					x	
Corn gluten feed					x	

Source: Depicted from Banse et al. (2005: 7).

For all crops and animal products as well as for voluntary set-aside supply is defined at the farm level. Sugar is treated as a crop product, though it is normally a processed product. That is, the area allocated to the production of sugar is defined as well as the yield per ha as in case of all other crops. The processing activity is accounted for by the high margin between the farmgate price and the wholesale price.[32]

All farm products except rapeseed, arable fodder, grass, and raw milk are subject to human demand. Some farm products are only demanded by the processing industry and others, like arable fodder and grass, only by livestock producers for feeding purposes. Seed demand is defined for those products, for which seed accounts for a significant share in production.

Processing demand is defined for raw milk and oilseeds only. While rapeseed is demanded by the processing industry only, soybean and sunflower seed is subject to human and feed demand. Raw milk is used by the dairy industry and for feeding purposes on farm. Various farm products, cake from oilseeds, as well as skimmed milk powder, Corn gluten feed (CGF), and the product aggregates "other protein" and "other energy" are used as feeding stuffs (BANSE ET AL., 2005).

Apart from a detailed coverage of most agricultural sectors, ESIM-2007 also includes a high variety of policy instruments like specific and ad valorem tariffs, tariff rate quotas, intervention and threshold prices, export subsidies, product subsidies, direct payments, production quotas, and voluntary as well as obligatory set-aside. Table 11 illustrates the policy coverage distinguished by product and type of policy measure.

[32] According to BANSE ET AL. (2005) "this approach is chosen because, in contrast to the oilseed industry, processing inputs (beet, cane) usually are not traded, and the quantity of the raw product produced is therefore identical with the quantity processed. In addition, the processing activity transforms a single product (beet) into a single output (sugar)"(BANSE ET AL., 2005: 8).

Table 11: CAP policy instruments in ESIM-2007

	Price policies	Trade policies	Supply management	Income policies
Cereals	minimum price	export subsidies/1 import tariffs TRQs/2	obligatory set-aside	direct payments
Oilseeds			obligatory set-aside	direct payments
Pasture /Fodder				direct payments
Sugar	minimum price	Import tariffs, TRQs	quota	direct payments
Milk			quota	direct payments
Dairy Products	minimum price	export subsidies/1 import tariffs, TRQs		
Beef	minimum price	export subsidies/1, import tariffs, TRQs		direct payments
Other meats		export subsidies/1 import tariffs		
Voluntary set-aside			quota	
Other products		Import tariffs		

/1 maximum expenditure and maximum quantities for export subsidies.
/2 Tariff rate quotas
Source: Depicted from Balkhausen and Banse (2005).

Where the explanations in Table 11 may not be self-explanatory, it shall be mentioned that import tariffs for cereals include the entry price system, according to which the threshold price for cereals is set at 155 % of the intervention price. The quota for voluntary set-aside accounts for the existing limit of voluntarily set-aside area per farm under Agenda 2000 conditions. Direct payments, of course, are covered for both CAP systems the Agenda 2000 and the MTR reform.

4.1.2 Equations

Table 12 provides an overview of major definitional equations in ESIM-2007. They are mostly identical to the ones used in ESIM-2005 as documented in BANSE ET AL. (2005). The behavioural equations are iso-elastic. In the table, they are written in their general form. The specification of the functional form of the most important equations, however, will be addressed later.

Table 12: Overview of equations in ESIM-2007

Supply			
(1) Supply of crops in European countries	$SUPPLY_{one,cr}$	=	$AREA_{one,cr} \cdot YIELD_{one,cr}$
(2) Supply of crops in other countries	$SUPPLY_{rest,cr}$	=	$f\ (PP_{rest,cr}, tp_{rest,cr})$
(3) Supply of animal products	$SUPPLY_{cc,livest}$	=	$f\ (PI_{cc,livest}, FCI_{cc,livest}, wag_{cc}, capc_{cc}, med_{cc}, tp_{one,livest}, submi_{cc}, FDMI_{cc,\text{"milk"}})$
Demand			
(4) Human demand	$HDEM_{cc,comm}$	=	$f\ (PC_{cc,comm}, popgr_{cc}, incgr_{cc}, submi_{cc})$
(5) Seed demand in European countries	$SDEM_{one,cr}$	=	$seed\_c_{one,cr} \cdot AREA_{one,cr}$
(6) Processing demand for oilseeds	$PDEM_{cc,oilseed}$	=	$f\ (PD_{cc,oilseed}, PD_{cc,ospro})$
(7) Feed demand (except milk)	$FDEM_{cc,feed}$	=	$fdex_{cc,feed} + \sum_{livest} FRATE_{cc,feed,livest} \cdot SUPPLY_{cc,livest}$
(8) Feed rate	$FRATE_{cc,feed,livest}$	=	$f\ (PD_{cc,feed}, tp\_fr_{cc,livest})$
(9) Total use	$TUSE_{cc,comm.}$	=	$HDEM_{cc,comm} + SDEM_{cc,comm} + PDEM_{cc,comm.} + FDEM_{cc,comm.} + FDMI_{cc,comm.}$
Area and Yield			
(10) Yield	$YIELD_{cc,cr}$	=	$f\ (PP_{cc,cr}, int\_ind_{cc}, lab\_ind_{cc}, tp\_gr_{cc,cr})$
(11) Product-specific area	$AREA_{one,cr}$	=	$f\ (PI_{one,cr}, PL_{one}, lab\_ind_{one}, int\_ind_{one}, cap\_ind_{one})$
Prices			
(12) Lower price bound for EU products with interv. Price	$P\_LO_{one,it}$	=	$MAX(PW_{it}/exrate_{one}, intpr_{one,it})$
(13) Upper price bound for EU products with thresh. price	$P\_UP_{one,thresh}$	=	$MAX(PW_{thresh}/exrate_{one}, thrpr_{one,thresh})$
(14) PW transmission for EU markets without export subsidies	$PD_{one,it}$	=	Logit function
(15) Shadow price voluntary set-aside	$PSH_{one,\text{"setaside"}}$	=	$f\ (quota_{one,\text{"setaside"}}, PI_{one,\text{"setaside"}}, lab\_ind_{one}, cap\_ind_{one}, int\_ind_{one}, tp\_gr_{one,cr})$
Wholesale/producer price transmission			
(16) Producer price if margin	$PP_{cc,nq}$	=	$PD_{cc,nq}/mm0_{one,nq}$
(17) Producer price for quota products	$PP_{one,qu}$	=	$MIN(PD_{one,qu}/mm0_{one,qu}, PSH_{one,qu})$
Determination of producer incentive price			
(18) For non-quota products	$PI_{cc,nq}$	=	$PP_{cc,nq} + DP_{cc,nq}$
Feed cost index			
(19) Feed cost index	$FCI_{cc,livest}$	=	$\sum_{feed} FRATE_{cc,feed,livest} \cdot PF_{cc,feed}/ FC\_0_{cc,livest}$
Other equations and closure rules			
(20) Net exports	$NEXP_{cc,it}$	=	$SUPPLY_{cc,it} – TUSE_{cc,it}$
Determination of export shares			
(21) Share of net exports in domestic market volume (individual countries)	$TSHR_{one,it}$	=	$NEXP_{one,it}/MAX(SUPPLY_{one,it}, TUSE_{one,it})$
(22) Share of net exports in domestic market volume (EU)	$TSHR_{eu,it}$	=	$\sum_{member} NEXP_{member,it}/\sum_{member} TUSE_{member,it}$
Market clearing			
(23) World market clearing condition	$NEXP_{row,it}$	=	$\sum_{one} NEXP_{one,it}$
(24) Domestic market clearing condition for non-tradables	$SUPPLY_{cc,nt}$	=	$TUSE_{cc,nt}$

Table 12: Overview of equations in ESIM-2007, continued

Sets	List of variables		List of parameters	
countries: cc	Supply	Supply	capc	capital cost index
products: i,j	Hdem	Human demand	submi	Subsistence milk
commodities: comm ∈ i	Sdem	Seed demand	seed_	Seed coefficient
crops: cr ∈ i	Pdem	Processing demand	wag	labour cost index
oilseeds: oilseed ∈ i	Fdem	Feed demand	intpr	Intervention price
oils. Products: ospro ∈ i	Frate	Feed rate	exrate	Exchange rate against the US-Dollar
feed: feed ∈ i	Tuse	Total use	FC_0	Feed cost index in the base period
livestock: livest ∈ i	Yield	Yield	tp_fr	Technical progress in feeding
processed goods: proc ∈ i	Area	Area	incgr	income growth rate
tradable: it ∈ i	PSH	Shadow price	popgr	population growth rate
Non-tradable: nt ∈ i	PP	Producer price	mm0	marketing margin in the base period
threshold prod.: thres ∈ i	PI	Incentive price	quota	quota
quota product: qu ∈ i	FCI	Feed cost index	thrpr	Threshold price
Non-quota product: nq ∈ i	NEXP	Net exports	fdex	Exogenous feed demand
Europ. countries: one ∈ cc	TSHR	Trade share	tp	Technical progress
US + RoW: rest ∈ cc	DP	Direct payments		
EU-member: member ∈	PW	World market price		
	PL	Price for land		
	PC	Consumer price		
	FDMI			

Source: BANSE ET AL. (2005) and own compilation.

Supply

In previous ESIM versions, the EU-15 has been included as one highly aggregated region. In ESIM-2007 this region has been disaggregated so that both supply and demand is now depicted for each EU-15 member state individually with Belgium and Luxembourg representing one region.

Supply includes farm supply of crops and animal products, processing supply of oilseed products, supply of processed dairy products, and supply of residual feed components. In European countries, supply of crops (see Table 12, equation 1) is modelled as a two-stage function, consisting of an area element (12-11), which is multiplied with a yield element (12-10). In other countries, supply (12-2) is a direct function of own and cross producer prices and technical progress. Supply of animal products (12-3) is a function of own and cross incentive prices, a productivity shifter, a FCI (12-19), and costs for labour, capital, and intermediate inputs[33]. The FCI, in turn, depends on the composition of the feed ration of ruminants and on component prices. The role of the FCI has already been described briefly in chapter 3 and will

[33] In the case of milk, supply is additionally dependent on two additive elements, i.e. "subsistence milk" and "feed milk".

again be addressed in more detail below. Producer incentive prices (12-18) are an aggregation of producer prices (12-16, 12-17) and direct payments per ton. The modelling of both coupled and decoupled direct payments will be described very detailed in section 4.2. Therefore, they are not addressed here.

All behavioural functions in ESIM-2007 are of the iso-elastic type. The livestock supply function is defined as:

Model equation 4.1:

$$Supply_{cc,livest} = \left(\sup\mathrm{int}_{cc,livest} * \prod_{j} PI_{j,cc}^{\varepsilon_{cc,livest,j}} * capc_{cc}^{\lambda_{cc,livest}} * wag_{cc}^{\mu_{cc,livest}} * med_{cc}^{\varsigma_{c,livest}} \right) * tp_{cc,livest}$$

where

$supint_{\mathrm{cc,livest}}$	is the intercept in animal supply,
$\varepsilon_{\mathrm{cc,livest}}$	is the elasticity of livestock supply with respect to incentive prices,
$\lambda_{\mathrm{cc,livest}}$	is the elasticity of livestock supply with respect to capital costs,
$\mu_{\mathrm{cc,livest}}$	is the elasticity of livestock supply with respect to wages,
$\varsigma_{\mathrm{cc,livest}}$	is the elasticity of livestock supply with respect to costs of intermediates.

However, for reasons of calculation efficiency behavioural functions are log linear so that the livestock supply function as it enters the model is written as:

Model equation 4.2:

$$Supply_{cc,livest} = \exp\begin{pmatrix} \ln \sup\mathrm{int}_{cc,livest} + \sum_{j} \left(\varepsilon_{cc,livest,j} * \ln PI_{cc,j} \right) + \lambda_{cc,livest} * \ln capc_{cc} \\ + \mu_{cc,livest} * \ln wag_{cc} + \varsigma_{cc,livest} * \ln med_{c}c \end{pmatrix} * tp_{cc,livest} \, .$$

Demand

Demand includes human demand (12-4), seed demand (12-5), processing demand (12-6), and feed demand (12-7) and is summarised in the total use equation (12-9). As in case of supply all types of demand are also depicted for each member state of the EU-15. As shown in equation (12-4) human demand depends on consumer prices, income, and population. Thereby, consumer prices mostly correspond to wholesale prices (12-14). In case of butter, however, a consumer subsidy ensures that consumer prices are lower than wholesale prices. The functional form for human demand entering the model code can be written as follows:

Model equation 4.3:

$$Hdem_{cc,comm} = \exp\left(\ln hd\,\text{int}_{cc,comm} + \sum_{j}\left(\varepsilon_{cc,comm,j} * \ln PC_{cc,j}\right) + \eta_{cc,comm} * \ln incgr_{cc} + \ln\ popgr_{cc}\right)$$

where

$hdint_{\text{cc,comm}}$.	is the human demand intercept,
$\varepsilon_{\text{cc,comm.,j}}$	is the elasticitiy of human demand with respect to prices,
$\eta_{\text{cc,comm}}$	is the elasticity of human demand with respect to income.

Feed demand has also a crucial meaning for the modelling of decoupling effects. The feed module in ESIM-2007 as well as the generation of feed demand elasticities will be addressed later in great detail. According to equation (12-7) feed demand is a function of feed prices, which are, in turn, mostly identical to the wholesale prices. In case of skimmed milk powder, however, a consumption subsidy leads to lower feed prices. The overall feed demand per feed component is calculated as the sum over animals of feed demand per animal unit, which is the feed rate (12-8), multiplied by animal production plus feed demand of those animals, that are not included in ESIM-2007. The pure fodder products, i.e. silage maize, grass, and arable fodder, are modelled as non-tradables with a country-specific price. Thus, market clearing takes place in each single region. In order to keep the consistency between animal production and feed demand the structure of feed demand in ESIM-2007 requires feed rates, autonomous feed components and own as well as cross price elasticities of feed demand for each country.

Area and yield

As mentioned above, supply of crops is composed of a yield and an area component. Thereby, yield (12-10) is a function of the own price, the costs for labour and intermediate inputs, and a productivity shifter. The area allocation process has been changed in course of research for the underlying work. In previous ESIM versions as well as in some other partial equilibrium models (see chapter 3) area allocation took place in two steps. First, area was allocated dependent on various factors. In a second step, the area allocated to all crops covered by the model was summed-up and the resulting total area was scaled down or up according to a total fixed available crop area in order to ensure, that all crop area was used for agricultural production (except obligatory set-aside area). In ESIM-2007, the equilibrium on the land market is not ensured by a scaling process anymore, but by the mechanisms of a newly introduced land market module, under which prices for agricultural land adjust in order to equal land supply and demand. A detailed description of this module follows in section 4.3.

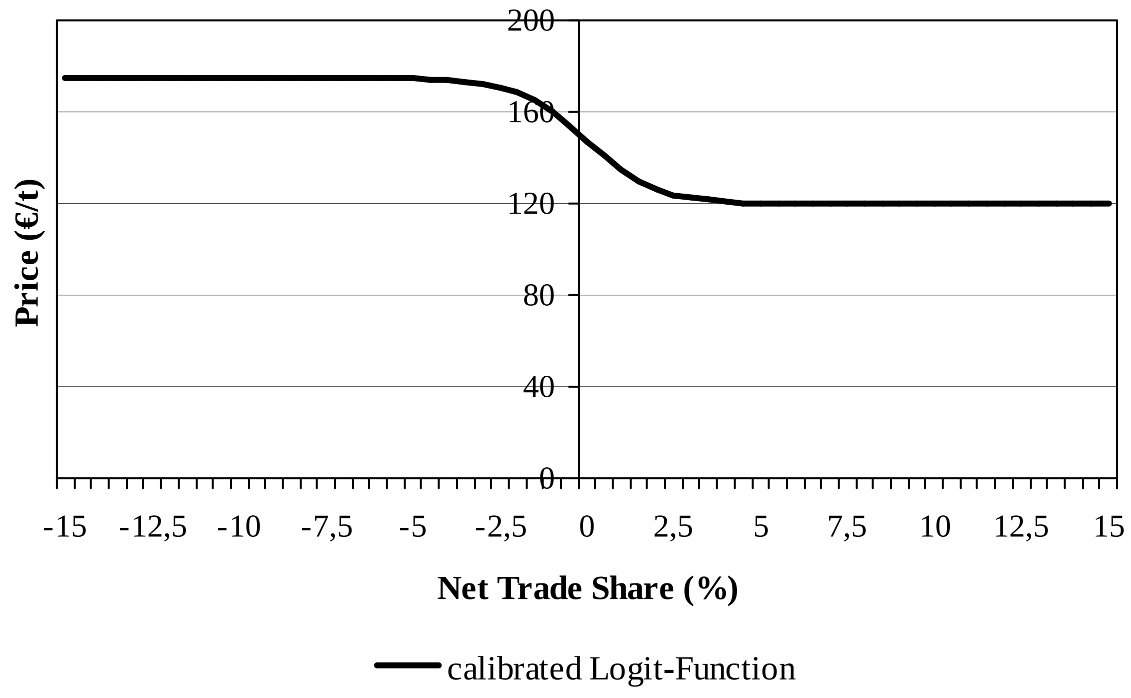
Prices

BANSE ET AL. (2005) developed a new mechanism of price transmission for ESIM. According to this approach, price transmission between the domestic and the world market price is determined by a logistic functional form, "which allows for a smooth course between a higher import based price and a lower export based price"(BANSE ET AL., 2005: 23).

The domestic price level, which is determined by the logistic function (12-14), depends on the share of net exports in the domestic market volume (12-21), and, if the EU is affected, in total use (12-22), respectively. Thereby, net exports (12-20) are simply defined as total supply minus total use. For some products specific quantity trade policies like export subsidy limits and TRQs apply. Since these quantities can not be allocated unambiguously to individual member states of the EU, the trade share for all tradable products is modelled for the EU layer and not for individual members of the EU. As a result, the price formation mechanism for the disaggregated EU-15 is the same as for the aggregated EU-15 under ESIM-2005 with a logistic function leading to the same wholesale price for tradable commodities across all countries of the EU.

Figure 4 depicts an example of a price transmission function for wheat in the EU-15. Thereby, the horizontal axis depicts the net trade share in percent, while the vertical axis depicts the wheat price in Euro/ton. If the trade share, i.e. the share of net exports in total domestic use, is larger than 5 %, the EU-15 is obviously in a clear net export situation. For this reason the domestic price is at the lower bound (12-12) of the logistic function. In that case, the domestic price equals the maximum out of the intervention price and the world market price. In contrast, if the trade share is negative and even smaller than -5 %, the EU-15 is in a clear net import situation and the domestic price equals the upper bound (12-13). For wheat, this is the maximum out of the EU threshold price for cereals, which amounts to 155 % of the intervention price, and the world market price.

Figure 4: Price transmission function for wheat in the European Union (EU-15)



Source: Depicted from BANSE ET AL. (2005), p. 24.

Whenever the EU-15 is not in a clear trade position, i.e. the trade share lies between -5 % and 5 %, the domestic price is in between the upper and the lower bound (BANSE ET AL., 2005). That is, “the closer the net trade situation comes to zero, the less the domestic price is determined by the respective import or export price alone, and the more it is subject to domestic price formation, but also to the effects of import and export prices at the same time, as considerable intra-industry trade may be hidden behind a net export situation of zero” (BANSE ET AL., 2005: 24). Of course, the logistic function does not only determine price transmission for the EU-15, but also for the NMS prior to accession and for the enlarged EU after accession. A more detailed description of the logistic function and its precise course, which becomes more complex when TRQs and export subsidies are additionally taken into account, can be found in BANSE ET AL. (2005).

With reference back to Table 12 and the general overview of equations in ESIM-2007, shadow prices are not only calculated for the quota products sugar and milk but also for voluntary set-aside. As mentioned in chapter 3, this activity is modelled like a quota product in order to address the quantitative limit to farmers, who are not allowed to set more than 33 % of their farm area aside (12-15). Shadow prices are the explaining variable for production decisions as far as they are lower than the market prices. If their level exceeds the market price level, market prices are the explaining variables (BANSE ET AL., 2005). The producer price (12-16, 12-17) is linked to the wholesale price by an exogenous marketing margin. However, according to the recursive dynamic character of ESIM-2007 producers' responses to changing producer prices are lagged. According to plausibility considerations the time lag for crop products is assumed to be one year for crops, pork, poultry, eggs, and sheep, and two years for beef and milk.

ESIM-2007 is a net trade model. Tradable commodities are required to clear on world markets (12-23) and non-tradables on the respective domestic markets (12-24). Following Walras' law the model solves for the vector of equilibrium world market prices and the matrix of prices for non-tradables. Corresponding to the clearing mechanism world market prices are a function of net exports. All countries therefore are large countries and influence terms of trade corresponding to their weight on world markets.

4.2 Direct payments

Direct payments are in the focus of the underlying work. Therefore, the approach of modelling these subsidies is described in detail below. Direct payments enter the area allocation functions in the same way as prices; that is, market price and direct payment per product unit make up an "incentive price" (*PI*) according to the following equation as already shown in Table 12:

Model equation 4.4:

$$PI_{cc,ag} = PP_{cc,ag} + DP_{cc,ag}$$

where

ag is products produced on farm.

The level of *DP* is simply the aggregate of the coupled and the decoupled payment per ton. Thereby, the degree, by which the decoupled element influences production decisions, is determined by a coupling coefficient so that *DP* is mathematically specified as:

Model equation 4.5:

$$DP_{one,comm} = CDP_{one,comm} + DDP_{one,comm} * coupcoeff$$

where

$CDP_{one,comm}$	is the coupled part of the payment per ton,
$DDP_{one,comm}$	is the decoupled part of the payment per ton,
coupcoeff	is the coupling coefficient.

It shall be noted that *coupcoeff* is not country-specific so that the same value applies to all countries. The larger *coupcoeff*, which amounts to values between 0 and 1, the higher is the production effectiveness of decoupled payments. A coefficient determining the production effectiveness of coupled direct payments does not exist so that these payments are treated as having the same influence on production as prices.

The calculation of the level of direct payments depends on the country and product in question and on the policy applied. First, the calculation of coupled direct payments in case of the EU-15 members is described. It follows the specification of coupled direct payments and top-ups in the NMS, before the modelling of decoupled direct payments is addressed.

4.2.1 Coupled direct payments in the EU-15

Coupled direct payments per ton for crops are calculated by:

Model equation 4.6:

$$CDP_{cc,cr} = premium_{cc,cr} * baseyield_{cc} / Yield_{cc,cr}$$

where

$premium_{cc,cr}$	is the politically set premium per ton,
$baseyield_{cc}$	is the political reference yield for each country applied in the base period.

That is, the coupled direct payment per ton is adjusted by the actual yield for each crop and simulation period. Thus, an increase in yield leads to a decrease in the direct payment per ton and vice versa.

Coupled direct payments for ruminants simply correspond to the premium per ton, i.e. the following equation applies:

Model equation 4.7:

$$CDP_{cc,livest} = premium_{cc,livest}.$$

The level of the premium under the MTR reform generally depends on the decoupling option chosen by governments. That is, the higher the degree, to which payments are politically coupled to production, the higher the premium and vice versa. The following equation illustrates the calculation of the premium value:

Model equation 4.8:

$$premium_{cc,comm} = premiumb_{EU,comm} * (1 - ratemo_t) * \deg coup_{cc,comm}$$

where

$premiumb_{\mathrm{EU,comm}}$	is the politically fixed premium in the EU,
$ratemo_{\mathrm{t}}$	is the obligatory modulation rate,
$degcoup_{\mathrm{cc,comm}}$	is the degree, to which direct payments are kept coupled to production according to government decisions under the MTR reform, further referred to as degree of coupledness.

The more direct payments are kept coupled to production, the higher is the degree of coupledness and the higher is the premium. The degree of coupledness can have values between 0 and 1. In addition, the value of the premium is also adjusted by the obligatory rate of modulation. In order to avoid misunderstandings, it shall be mentioned that the degree of coupledness is different from the coupling coefficient. The former reflects the political decoupling decisions of individual member states under the MTR reform. The latter addresses the assumed influence of the payments under the MTR reform on area allocation and production, which takes place according to risk-related and dynamic effects and some minor static price effects.

4.2.2 Coupled subsidies in the new member states

As mentioned in section 2.3 two types of direct subsidies are distinguished in the NMS. This is, first, the direct payments, and, secondly, the nationally (co-)financed top-ups. In the underlying work the term “direct subsidies” describes the aggregate out of both types of subsidies. It shall be noted that in the equation 4.5 the term *CDP* also includes the aggregate of coupled direct subsidies in the NMS.

Coupled direct subsidies (*CDS*) per ton for crops are specified as follows:

Model equation 4.9:

$$
\begin{aligned}
CDS_{cc,cr} = {} & \left(phasein_{cc} * premium_{cc,cr} * exrate_{EU} \,/\, exrate_{cc} * baseyield_{cc} \,/\, Yield_{cc,cr}\right) \\
& + \left(phaseout_{cc} * topup_{cc,cr} * exrate_{EU} \,/\, exrate_{cc} * baseyield_{cc} \,/\, Yield_{cc,cr}\right)
\end{aligned}
$$

where

$phasein_{cc}$ is the coefficient, which determines the stepwise introduction of direct payments,

$phasout_{cc}$ is the coefficient, which determines the stepwise elimination of national top-ups from 2011 on,

$exrate_{EU}$ is the exchange rate of the Euro against the US-Dollar,

$exrate_{cc}$ is the exchange rate of individual NMS currencies against the US-Dollar.

That is, the calculation corresponds almost to the one applied for EU-15 members. *Phasein* and *phaseout* guarantee that payments in the NMS reach the level existing in the EU-15 only stepwise. However, it shall be noted that coupled direct payments in the NMS only exist, if the regionalised version of the SFP is applied. Under the SAPS coupled direct payments do not exist at all. Here, governments are allowed to pay coupled top-ups only. The calculation of top-ups corresponds largely to the approach chosen for premiums. The value of top-ups is also derived from the politically fixed premium and adjusted according to the degree, to which top-ups are kept coupled to production. This, in turn, depends on government decisions. However, since top-ups are granted in the NMS only, they are not subject to the modulation requirement.

Model equation 4.10:

$$topup_{cc,comm} \quad = \quad premiumb_{cc,comm} * \deg couptop_{cc,comm}$$

where

degcouptop$_{\text{cc,comm}}$ is the degree, to which top-ups are kept coupled to production, for simplicity reasons further also referred to as degree of coupledness.

Coupled direct subsidies for ruminant payments are modelled according to the following equation:

Model equation 4.11:

$$CDS_{cc,livest} \quad = \quad \left(phasein_{cc} * premium_{cc,livest} * exrate_{EU} \ / \ exrate_{cc}\right) + \left(phaseout_{cc} * topup_{cc,livest} * exrate_{EU} \ / \ exrate_{cc}\right)$$

4.2.3 Decoupled direct payments and subsidies

Decoupled direct payments and subsidies per ton in member states of the EU-15 and in the NMS are calculated by:

Model equation 4.12:

$$DDS_{cc,cr} \quad = \quad \left(Payha_{cc} + topupha_{cc}\right) * exrate_{EU} \ / \ exrate_{cc} \ / \ Yield_{cc,cr}$$

where

payha$_{\text{cc}}$ is the decoupled uniform payment per hectare,

topupha$_{\text{cc}}$ is the decoupled uniform top-up per hectare.

Payha is calculated by dividing the available budget for decoupled payments by the total eligible area. Thereby, the budget for decoupled payments is the residual of the overall budget for direct payments minus the budget used to finance coupled direct payments. The distribution of financial means among the two “sub-budgets” for coupled payments on the one hand and decoupled payments on the other hand, of course, depends on the decoupling option chosen by member states under the MTR reform. That is, the higher the degree, to which direct payments are kept coupled to production, the lower is the budget for decoupled direct payments.

The budgetary situation in case of top-ups is somewhat more complex. Here, governments of the NMS can not only decide upon the degree, to which top-ups are linked to production. In addition, they can also determine the level of top-ups. As a consequence, production-related top-ups partially do not reach the limit allowed. In addition, decoupled top-ups, i.e. *topupha* do not exist in any of the NMS.

4.3 The land market model

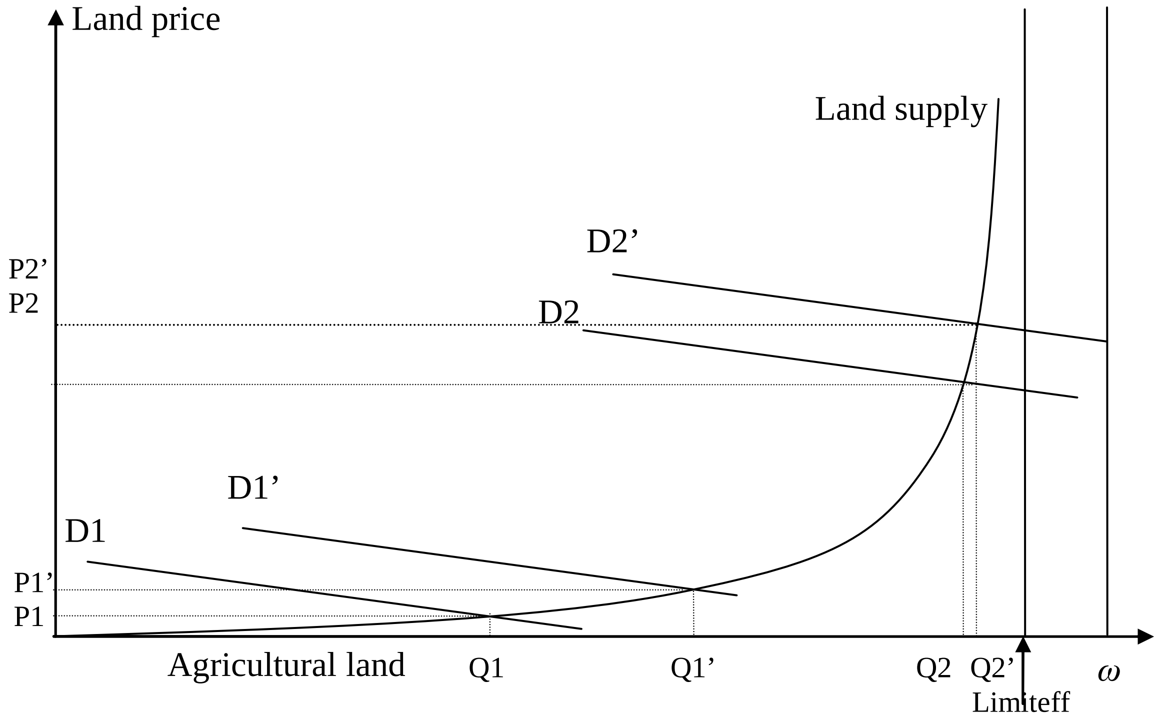
As described in chapter 3, most partial equilibrium models use a very pragmatical approach in order to ensure that restrictions of total land endowments in a country are met. Some models use some kind of scaling process in order to ensure that total available area is neither exceeded nor undershooted. This implies that the area used for any product is not determined by behavioural functions alone. Other models allow total area to vary completely freely. In the real world, however, supply of and demand for land is regulated by the land market or, more precisely, by prices for agricultural land. Changes in market and political conditions result in adjustments of incentive prices for farmers and finally in adjustments of prices for land. These adjustments ensure that supply of land equals demand for land.

However, while land markets are usually endogenous to CGEs, they are not included in most partial equilibrium models. So far, this has also been true for ESIM. However, in the course of research for the underlying work a land market module has been included. It is largely based on an approach used by VAN MEIJL ET AL. (2006), who modelled land supply in an extended GTAP version. Though this approach has been applicated to a CGE model it also fits in the general framework of ESIM when amended by technical and theoretical model specifications. The underlying approach and its implementation in ESIM will be described below.

The basic idea of the land market module in ESIM relies on a land supply curve, which specifies the relation between land supply and the price for land in each region. Thereby, a distinction between rental and purchase prices is not relevant. Land supply to the agricultural sector can be influenced by urbanisation, which is a very common situation in EU member states, and by conversion of non-agricultural land into land that can be used for agricultural purposes (VAN MEJIL ET AL., 2006). The latter case occurs in some of the NMS only (see below). In addition, also political measures, e.g. obligatory set-aside restrictions, have a direct influence on land supply. Figure 5 illustrates the land supply curve.

The design of the land supply curve is based on the idea that the most productive land is first taken into production. Additionally, the physical limit of taking additional land into agricultural production is considered.

Figure 5: Land supply curve determining land conversion and land prices



Source: Own composition, following VAN MEIJL ET AL. (2006).

If the difference between land, which is used for agricultural land, and the overall endowment of land resources, which could potentially be used by farming activities, is large, an increasing demand for agricultural land would lead to a conversion of non-agricultural land into agricultural land (VAN MEIJL ET AL., 2006). Such a situation is depicted at the flat part of the land supply curve in Figure 5. Here, an increase in demand for land by farmers, which could, for example, result from an increase in the overall price level for agricultural products, shifts the land demand function from D_1 to the D_1'. Though a significant amount of land is additionally taken into production, which is represented by the shift from Q_1 to Q_1', land prices increase only moderately from P_1 to P_1'. Thereby, the increase in land prices reflects the costs of bringing additional land into production. In contrast, if overall land endowments are scarce and there is not much room left to bring additional land into production, an increase in demand for agricultural land leads to significant increases in land prices, while agricultural area is extended only slightly. Such a situation is depicted on the steeper part of the land supply curve. While land prices increase considerably from P_2 to P_2’, agricultural land is extended from Q_2 to Q_2’ only.

The mathematical specification of the land supply function as well as the interactions between land supply and land demand are not identical to the specifications made by VAN MEIJL ET AL. (2006). This can be traced back to fact that the model structure of the CGE model, which is the basis of the approach chosen by VAN MEIJL ET AL. (2006), is different from the structure of a partial equilibrium model like ESIM. Accordingly, mathematical specifications regarding the inclusion of the land market in ESIM rely partly on own considerations, while the basic idea regarding the features of the land market function are taken from VAN MEIJL ET AL. (2006).

In ESIM, the shape of the land supply (LS) curve is modelled according to the following equation:

Model equation 4.13:

$$LS_{cc} = Limiteff_{cc} - \alpha_{cc} / \left(\beta_{cc} + LP_{cc}\right)$$

where

$Limiteff_{cc}$	is the effective total amount of land, which can potentially be used for agricultural production,
α_{cc}	is a parameter determining the bend of the land supply curve,
β_{cc}	is a parameter determining the dilation of the land supply curve,
LP_{cc}	is the land price.

Limiteff is endogenous to the model and is determined as follows:

Model equation 4.14:

$$Limiteff_{cc} = \omega_{cc} * \theta_{cc} - Oblset_{cc}$$

where

ω_{cc}	is the total amount of land, which can potentially be used for agricultural production, plus obligatory set-aside area,

θ_{cc} is the rate, by which ω changes each year over the whole simulation period due to urbanisation or conversion of land into potentially usable agricultural area,

$Oblset_{cc}$ is the obligatory set-aside area, which depends on the grandes cultures area and the set-aside rate set out each year.

The following paragraph describes, which mathematical specifications, mechanisms, and equations ensure the equilibrium on the land market by the adjustment of land prices.

Assume again an increase in the overall price level for agricultural products. As mentioned above, this leads to an increase in overall demand for agricultural area given the area allocation function as specified in previous ESIM versions (BANSE ET AL., 2005):

Model equation 4.14:

$$Area_{cc,cr} = \exp\begin{pmatrix} \ln area\operatorname{int}_{cc,cr,j} + \sum_j \left(\varepsilon_{cc,cr,j} * \ln PI_{cc,j}\right) + \lambda_{cc,cr} * \ln capc_{cc} \\ + \mu_{cc,cr} * \ln wag_{cc} + \varsigma_{cc,cr} * \ln med_{cc} \end{pmatrix}$$

where

$areaint_{cc,cr,j}$ is the area intercept,

$\varepsilon_{cc,cr,j}$ is the elasticity of area allocation with respect to prices,

$\lambda_{cc,cr}$ is the elasticity of area allocation with respect to capital costs,

$\mu_{cc,cr}$ is the elasticity of area allocation with respect to wages,

$\varsigma_{cc,cr}$ is the elasticity of area allocation with respect to costs of intermediates.

However, in order to ensure that total land demand does not exceed total land supply, and in order to meet *Model equation 4.13* and the overall equilibrium condition on the land market, which requires that

Model equation 4.15:

$$LS_{cc} = \sum_{cr} Area_{cc,cr} \quad ,$$

the land price increases. This, in turn, compensates the stimulating effect of increasing product prices on area demand to some extend, since the land price has been introduced as one argument into Model equation 4.14, which is now re-specified as:

Model equation 4.16:

$$Area_{Cr,C} = \exp\left(\begin{array}{l} \ln area\mathrm{int}_{cc,cr,j} + \sum_{j} \left(\varepsilon_{cc,cr,j} * \ln \left(PP_{cc,j} + DP_{cc,j} \right) \right) + \lambda_{cc,cr} * \ln capc_{cc} \\ + \mu_{cc,cr} * \ln wag_{cc} + \eta_{cc,cr} * \ln med_{cc} + \sigma_{cc} * \ln LP_{cc} \end{array} \right)$$

where

$\sigma_{,cc}$ is the area allocation elasticity with respect to the land price.

In contrast to all other input elasticities the area allocation elasticity with respect to the land price is the same for all kinds of area uses. The approach of determining this elasticity, however, corresponds to the determination of the labour, capital, and intermediate elasticities. A description of the determination of these elasticities follows in section 4.5.

In order to calibrate the parameters of the land supply function, β has been assumed to be proportional to the total land supply in each country. The parameter α has been calibrated in such a way that it reproduces the base data for land prices, total land supply, and effective total amount of land, which can potentially be used for agricultural production. Most land prices have been taken from EUROPEAN COMMISSION (2007) and LATRUFFE AND LE MOUEL (2006), who provided a comprehensive overview of the land markets in various member states of the EU. Due to a lack in data availability, however, some land prices rely on own estimations. Table 13 shows the levels of land prices assumed for the analysis in this work. Though ESIM-2007 does not distinguish between rental and purchase prices it shall be mentioned that these figures represent rental rates.

It is striking that for the time of the base period, i.e. prior to EU enlargement and implementation of the MTR reform, rental prices in the CEECs are far below average prices in EU-15 members. However, in both groups of member states significant differences among countries exist. Romania and Bulgaria are expected to have the lowest land prices within the group of CEECs. Land prices in Hungary, Poland, and the Czech Republic are three to four times higher.

Table 13: Land rental prices in EU member states in the base period (in Euro)

Austria	200		**Latvia**	10
Belgium/Luxembourg	185		**Romania**[1]	10
Denmark	290		**Slovenia**[1]	25
Finland	150		**Lithuania**	12.5
France	123		**Bulgaria**[1]	10
Germany	200		**Poland**	40
Greece	455		**Hungary**	45
Ireland[1]	200		**Czech Republic**	30
Italy	377		**Slovakia**	25
Netherlands	370		**Estonia**[1]	12
Portugal[1]	300			
Spain	400			
Sweden	140			
United Kingdom	199			

[1] own estimation

Source: EUROPEAN COMMISSION (2007), LATRUFFE AND LE MOUEL (2006), and own estimation.

Among the group of EU-15 members the highest prices for agricultural land exist in the Netherlands (370 Euro) as well as in the mediterranean countries (300 Euro to 455 Euro) except France (123 Euro), where the prices are the lowest. The high level of rental prices in the latter countries might occur due to the existence of irrigation systems on a number of agricultural areas, which have been installed by landowners and are provided for tenants. Another or additional explanation might be that the costs of irrigation are included in the rental prices. The reason for the high level of land prices in the Netherlands may be the large number of fruit and vegetable producing farms as well as the overall scarcity of land.

In case of the underlying modelling approach it is assumed that potentially available land, expressed by the asymptote *limiteff*, is the sum of the agricultural land currently used for production purposes and fallow land, which is neither obligatory nor voluntary set-aside land. The asymptote ω additionally includes obligatory set-aside area. Data for fallow land are obtained by EUROSTAT (2007) and FAO (2007). Table 14 illustrates the amount of total land demand, i.e the amount of land that is actually used for agricultural production, and the amount of land that could potentially be used for agricultural production (*limiteff*). In addition, the rate, by which ω is assumed to change year by year, is shown.

Table 14: Total land demand, potentially available land, and yearly change in area

	Total land demand	Limiteff	Gap Land demand / Limiteff (in % of Limiteff)	Change in ω
Austria	3140.77	3297.33	4.75	-0.10
Belgium/Luxembourg	1405.96	1431.79	1.80	0.00
Denmark	2660.94	2860.22	6.97	-0.20
Finland	2076.98	2274.81	8.70	0.30
France	26671.11	27957.24	4.60	-0.40
Germany	16390.38	17226.37	4.85	-0.50
Greece	1956.47	2440.02	19.82	0.00
Ireland	3820.65	4193.91	8.90	0.00
Italy	11769.50	12454.96	5.50	0.00
Netherlands	1735.06	1782.24	2.65	0.00
Portugal	1020.90	1325.80	23.00	-1.60
Spain	16621.24	19933.10	16.61	-1.00
Sweden	2784.52	3045.81	8.58	0.30
United Kingdom	10626.04	11086.31	4.15	-0.10
EU-15	102680.50	111309.89	7.75	-0.37
Latvia	1133.03	1224.23	7.45	-0.40
Romania	13096.61	14199.04	7.76	0.00
Slovenia	478.39	511.88	6.54	0.00
Lithuania	2292.28	2453.25	6.56	0.00
Bulgaria	4398.86	4833.59	8.99	-0.50
Poland	15154.71	17078.49	11.26	-0.50
Hungary	5437.57	5818.20	6.54	0.50
Czech Republic	4113.79	4202.77	2.12	0.20
Slovakia	2212.91	2367.82	6.54	0.00
Estonia	722.34	772.90	6.54	0.00
NMS	49040.48	53462.15	8.27	-0.14

Source: EUROSTAT (2007), and FAO (2007).

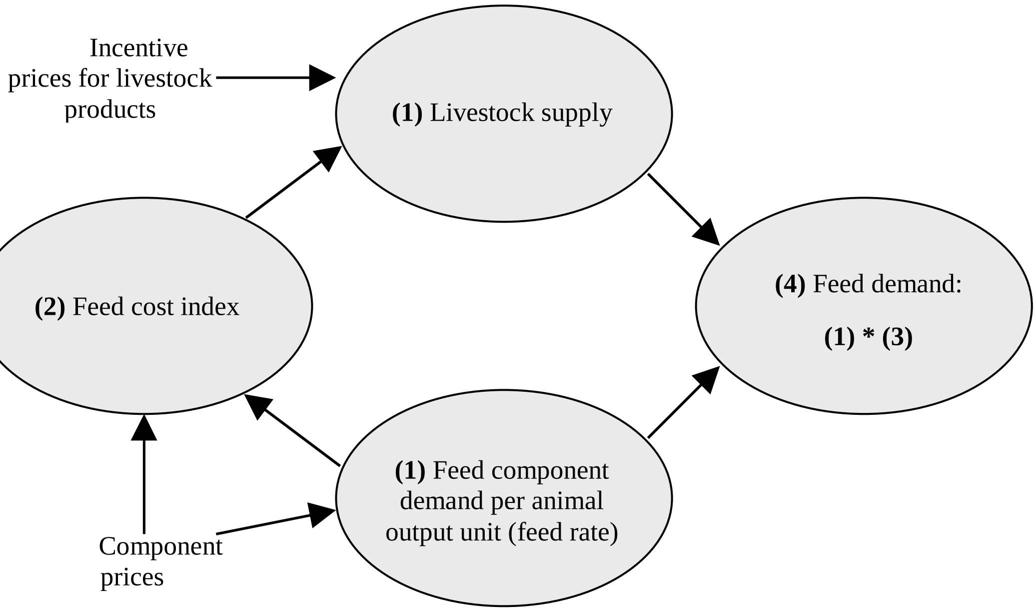
The table illustrates that in all countries of the enlarged EU additional land reserves exist, which could be converted into agricultural land. In the EU-15, approximately 8.6 mill. ha, and in the NMS, about 4.4 mill. ha, could additionally be taken into production. In both groups of countries unused land amounts to approximately 8 % of the maximum available agricultural area. These figures correspond to the share of unused land, which is assumed in Van Meijl et al. (2006), who assume that more than 10 % of the maximum available area is not used for production purposes. Among individual, countries, however, significant differences exist. With respect to EU-15 members the highest shares of unused land reserves are observed in the Mediterranean countries, Greece, Portugal, and Spain (16.6 % to 23.0 %). As expected, shares of unused land, which exceed the average value, also exist in Sweden, Finland, and Ireland (8.6 % to 8.9 %). In the member states of high population density, i.e. most of all the Netherlands and Belgium/Luxembourg, unused land reserves amount to less than 5 % of the maximum available area. According to recent time series obtained from EUROSTAT (2007) total available area in most EU-15 members is assumed to remain constant over time or to decrease by up to 1.6 % per year. An increase in total available agricultural area is assumed for Sweden and Finland only.

The situation in the NMS corresponds much to the situation in their Western partner countries. The share of unused land reserves in most countries lies between 6 % and 9 %. In Poland, however, this share is higher (11.3 %), while it is lower in the Czech Republic (2.1 %). The average decrease in maximum available agricultural area is somewhat lower on NMS average than on EU-15 average (-0.14 % compared to -0.37 %). Within the group of NMS total area is assumed to decrease in Latvia, Bulgaria, and Poland, while it increases in Hungary and the Czech Republic.

4.4 The feed model

As mentioned above, the depiction of the link between the fodder and the livestock supply sector is crucial with respect to the modelling and the analysis of decoupling effects. To depict the effects of decoupling, various links between the fodder/crop sector and the livestock sector have to be incorporated in the model structure. The most crucial questions in this context are if and how feed prices affect livestock production and how feed requirements are modelled. In the course of the underlying modelling work, feed demand has been depicted individually for each country. An overview of the feed model is given in Figure 6. Its structure is completely adopted from BANSE ET AL. (2005).

Figure 6: The feed model in ESIM-2007



Source: BANSE ET AL. (2005).

In ESIM-2007, the above mentioned links are recognised in the structure of the feed module as follows: As shown in Figure 6 wholesale prices of feed components determine the demand for feed per animal output unit (1), which has been specified as the feed rate. In iso-elastic notation the feed rate is specified as follows:

Model equation 4.16:

$$\mathrm{FRATE}_{cc,feed,livest} = \mathrm{frat\_int}_{cc,feed,livest} \bullet \prod_{feed1} \mathrm{PF}_{feed1}^{elastfd_{cc,feed,feed1,livest}} \bullet \mathrm{tp\_fr}_{cc,livest}$$

where

$frat\_int_{cc,feed,livest}$	is the feed rate intercept,
PF_{feed1}	is the price for feed components,
$elastfd_{cc,feed,feed1,livest}$	is the elasticity of feed demand with respect to feed prices.

According to changes in wholesale prices farmers change the composition of feed rations. Based on the resulting feed composition and wholesale prices of feed components a FCI is calculated (2). This FCI and, even more important, the incentive price for livestock products, consisting of the producer price and direct payments, determine livestock supply

(3). Finally, total feed demand (4) is the product of (1) and (3) plus the amount of feed demand that stems from animals not included in ESIM-2007.

The described structure of the feed module ensures that an increasing feed price for any feed component leads to a lower demand for this component by livestock producers due to the following two effects. The substitution effect leads to a substitution of other components for the more expensive ones and the output effect results, via a higher FCI, in lower animal production and thus lower feed demand.

4.5 Behavioural parameters

While intercepts are calibrated from the base data (see below), elasticities are exogenous to the model. These elasticities are not estimated as systems. Instead they stem from various sources and are partially adjusted according to plausibility considerations. Thereby, the exact value or at least the approximate magnitude of several, mostly regarded as very crucial, elasticities is fixed. The remaining elasticities, which are very often elasticities of cross relationships, are calibrated automatically by GAMS algorithms that are based on certain assumptions. This algorithm also ensures that the different sets of elasticities have system character, i.e. they fulfil the requirements of economic theory such as the homogeneity of degree zero, the symmetry of cross price effects and the adding-up condition. However, since ESIM-2007 contains iso-elastic supply and demand functions, the adding-up and the symmetry restrictions can be imposed only locally. Consequently, economic theory is not fulfilled in case of changing value shares during model simulations. The approach of using an algorithm in order to generate most exogenous model parameters became inevitable when the size of the model was more and more enlarged in terms of country and product coverage in the last years. It was developed and used for the first time for the modelling of ESIM-2005, which included 16 regions and more than 30,000 elasticities. It is described in much detail in BANSE ET AL. (2005). The further extended, underlying version includes 29 regions and even more than 50,000 elasticities, which provides a legitimation of the use of such an algorithm more than ever.

Since the character and the specification of most equations in ESIM-2007 have not been changed compared to ESIM-2005, the approach of generating elasticities has also not been changed. That is, if not indicated otherwise, the determination of elasticties for ESIM-2007 corresponds to the approach chosen for ESIM-2005 as described in BANSE ET AL. (2005). Nevertheless, the following sections explain for each category of elasticities how the elasticities are determined, though in a somewhat shortened way. In Annex A, the most important elasticity matrices are shown.

4.5.1 Elasticities of farm supply

In ESIM-2007, there are 16 crop products and 6 animal products, for which elasticities of supply for the 14 regions within the territory of the EU-15 are newly established. In case of the NMS, elasticities, which had already been generated under previous ESIM versions, have been adjusted by using the GAMS algorithm in order to account for the elasticity of area allocation with respect to the price of land, which has been newly introduced under ESIM-2007.

Elasticities for livestock supply are included in one matrix for each country. This matrix consists of own and cross price elasticities and elasticities with respect to prices of labour, capital, intermediate inputs, as well as feed. Since supply of crops consists of an area element and a yield element, there are also two elasticity matrices of crop supply, i.e. one determining area allocation and the other determining the yield level for each crop activity. The area matrix contains own and cross price elasticities with respect to prices of model endogenous products, and elasticities with respect to the prices of agricultural land, labour, capital, and intermediate inputs. The yield matrix contains an own price elasticity and an elasticity with respect to the price of intermediate inputs and wages. Capital costs as well as the land price do not directly influence the yield level.

“Crop products have only cross price elasticities with respect to the price of other crop products, but not to those of livestock products and vice versa. Via the feed costs, however, the price of feed crops has an effect on the production of animal products and vice versa (BANSE ET AL., 2005: 35)”. This effect, however, is fully captured by the feed model, which has been described above.

In order to guarantee that the condition of homogeneity is fulfilled for the complete elasticity matrix an aggregate product "other" is established. The production value of this aggregate corresponds to the aggregated production value of all annual crops that are not included in ESIM-2007. “This approach is not adopted for animal products. Alternatives for the allocation of labour and capital used in animal production are manifold and often non-agricultural. Therefore, the supply of animal products is not restricted to homogeneity of degree zero in prices at all (BANSE ET AL., 2007: 36)”.

The value of agricultural production, which is essential to impose theoretical conditions, is determined by the sum of farmgate prices and direct payments. In order to determine the value of quota products the shadow price is the relevant variable as far as it is below the market price.

Own price elasticities of supply

When establishing ESIM-2005 there have been intensive considerations regarding the value of the own price elasticities of supply. Partially, own price elasticities were based on an older, SuperCalc based, version of ESIM.

The own price elasticities of area allocation and animal production for the aggregated region of the EU-15, which have been used in ESIM-2005, refer as a basis for the determination of the member state specific own price elasticities in ESIM-2007. In order to address the individual situation of agricultural production in each member state, elasticities used in ESIM-2005 are changed according to the following criteria for each member state:

- *Technological feasibility to respond to changing market conditions;* that is, the higher the technological feasibility to respond to changing prices or political conditions, the higher is the value of the elasticity.
- *Geographical and geo-climatic conditions*; certain conditions might allow for the cultivation of some specific crops only so that the substitutability among crops as well as the response to changes in the own price is limited.
- *Historical and cultural conditions;* the production or cultivation of specific products has a long tradition in some countries so that changes in prices can not be expected to change farmers' behaviour so easily. Maybe also some kind of path dependency with respect to the production of certain commodities can be expected.

Thereby, country-specific situations relating to the second and the third criterion are assumed to allow for stronger deviations from the average EU-15 value than situations relating to the first criterion. If the technological feasibility to respond to changing market conditions deviates from the EU-15 average in a given country, several products are assumed to be affected, while the situation relating to the other criteria can affect individual products. Whenever an own price elasticity for a particular product is changed in one country or several countries according to the above mentioned criteria, the own price elasticity in question is adjusted in the remaining member states so that the elasticity value for the aggregated EU-15, as used in ESIM-2005, is approximately met. In case of pasture land, however, the average price elasticity of area allocation among individual EU-15 members does not correspond to the value of the EU-15 used in ESIM-2005, as it has been considered too low. It shall be noted that changes in elasticities as compared to the EU-15 average in ESIM-2005 do not have to result from the application of one criterion only. In some countries particular product markets are also influenced by two or all of the criteria mentioned above. Consequently, criteria-specific changes in elasticity values might add-up or compensate each other.

Table 15 provides an overview of those own price elasticities of area allocation and animal production, that deviate significantly from the EU-15 average value as a result of the application of the second and the third criterion. There are a lot of other elasticities that deviate from the EU-15 average, however, to a less extent. They are also depicted in Annex A.

Due to geographical and geo-climatic conditions and relative extensive systems of cattle husbandry the share of pasture land in total agricultural area in Austria and Ireland is extremely high (see base data in Annex B). Therefore, changes in prices for grass are not expected to lead to significant responses in supply so that elasticities are set to 0.07, which is well below the EU-average of approximately 0.12. Cereal production in the Mediterranean countries Greece, Portugal, and Italy heavily relies on durum for historical and geo-climatic reasons. Therefore, common wheat is relatively less important. It is questionable whether changes in relative prices would change this situation easily. Consequently, area allocation elasticities with respect to prices are assumed to be comparatively low (between 0.29 and 0.4).

Rapeseed plays a minor role in the agricultural sectors of Italy and Spain. The same is true for silage maize in the United Kingdom and Ireland. In these cases climatic conditions may be responsible. Consequently, elasticities for rapeseed and silage maize are reduced to values below 0.4, while the EU-average for both products is higher than 0.7. The major part of rye produced in the EU stemmed from Germany for a long time. Whether Germany remains a large producer of rye in the long-term even after abolishment of intervention remains to be seen. Therefore, the price elasticity of area allocation has only been reduced by 20 % to 0.32 compared to the value in other member states.

Table 15: Own price elasticities of area allocation for selected products and countries

Country	Product	Area allocation with respect to the own price	
		Applied in that country	EU-average
Pasture land	**Austria**	0.07	0.12
	Ireland	0.07	0.12
Durum	**Greece**	0.29	0.41
	Italy	0.29	0.41
	Portugal	0.29	0.41
Common wheat	**Greece**	0.35	0.50
	Italy	0.40	0.50
	Portugal	0.40	0.50
Rapeseed	**Italy**	0.37	0.88
	Spain	0.37	0.88
Silage maize	**Ireland**	0.38	0.77
	United Kingdom	0.38	0.77
Rye	**Germany**	0.32	0.40
Milk	**Greece**	0.57	1.02
Beef	**Greece**	0.52	1.06
Sheep	**Greece**	0.62	1.27

Source: Own composition.

Price elasticities with respect to ruminant production have been reduced considerably for Greece. Here, the share of sheep production in overall animal production is larger than in all other member states of the EU-15, which is also shown in the base data in Annex B. In absolute terms, sheep production is even higher than beef production. Since it can not be expected that this situation is easily changed by changes in relative prices, elasticities are assumed to be very low, i.e. between 0.52 and 0.62, for ruminant products including milk. Due to an assumed lower technological feasibility to respond to changes in market conditions price elasticities of animal production are reduced by 10 % in Italy and Spain and by 20 % in Greece and Portugal compared to the EU-15 average. Own price elasticities of area allocation and animal production for the NMS in ESIM-2007 correspond to the ones in ESIM-2005.

Supply elasticities with respect to input prices

Following BANSE ET AL. (2005) supply elasticities with respect to feed costs in ESIM-2007 are calculated by multiplying the own price elasticity of supply of the respective livestock product with the (negative) share of feed cost in total revenue. Thereby, however, the feed cost elasticity is treated such that it does not exceed 60 % of the own price elasticity in absolute terms. Elasticities of supply with respect to feed costs are also included in the matrices in Annex A.

In ESIM-2007, the generation of elasticities of crop and animal production with respect to prices of non-agricultural inputs, which are labour, capital, and intermediates, relies on similar assumption as the generation of these elasticities for ESIM-2005. The supply elastcities with respect to labour costs are assumed to amount to 12 % of the combined own price elasticity in the production of sugar and potatoes and to 7 % in case of all other crops. With respect to animal products the labour cost share varies between 1.2 % for pork and 17.1 % for milk. These values are identical to the values used in ESIM-2005. The combined own price elasticity is the sum of the own price elasticity of area allocation and the own price elasticity of yield. Supply elasticities with respect to the costs of non-agricultural intermediate inputs are set at 25 % of the absolute level of own price elasticities for potatoes and to 35 % for all other crops in all regions. Finally, supply elasticities with respect to capital costs make up for a share of 4 % to 12 % of the respective own price elasticity in case of crops and of 3.9 % to 22.6 % in case of livestock products. The assumed cost shares for capital and intermediate inputs are somewhat lower than in ESIM-2005.

For the generation of area allocation elasticities with respect to prices for agricultural land, which are newly introduced in the underlying work, a similar approach has been chosen as for labour, capital, and intermediate input costs, though somewhat more simplified. It can be described as follows:

The share of the area allocation elasticity with respect to the land price depends on the costs for land as compared to the costs for labour. That is, for example, if costs for land for the production of a given crop in a given country are twice as low as costs for labour, the share of the elasticity with respect to land prices in the own price elasticity of that crop is also twice as low as the share of the elasticity with respect to labour costs. Information on the costs for land and labour in the production on one hectare land have been collected from EUROSTAT (2006a), EUROPEAN COMMISSION (2007), and LATRUFFE AND LE MOUEL (2006). It turned out that the costs for land as compared to those for labour were relatively the highest in the Mediterranean countries, which is a logical consequence of the high rental prices for land and the comparatively low wage levels in this region.

After the shares of the area allocation elasticities with respect to land prices have been calculated for each type of land use it is easy to derive the absolute values of these elasticities by simply multiplying the calculated share by the absolute own price elasticity of the crop in question. The final land price elasticity of area allocation, which enters the model, however, is a weighted average of all land price elasticities. That is, the land price elasticity of area allocation is different among countries but the same across all types of land uses within one country. Due to the comparatively high prices for agricultural land in Southern European countries elasticities of area allocation with respect to land prices are also the highest in these countries. The values of these elastcities are also included in the matrices in Annex A to this work.

The elasticities of supply with respect to the price of non-agricultural intermediate inputs and with respect to labour costs enter both the yield and the area allocation matrix. To achieve homogeneity in the former, the two input elasticities appearing in this matrix (labour and intermediates) are set such that they add up to the negative value of the own price elasticity of the yield level, while holding their proportion constant (BANSE ET AL., 2005).

Cross price elasticities of supply

The determination of cross price elasticities is adopted from BANSE ET AL. (2005) and thus also corresponds to the approach chosen for ESIM-2005. “Starting values for cross price elasticities of area allocation are determined via their corresponding Allen-elasticities of substitution, which reflect the level of technical substitutability independently from the relative shares in production. The relative level of Allen-elasticities is based on several criteria, which are climatic requirements, soil requirements, and position in crop rotation. Allen-elasticities are chosen higher if two crops match in these criteria and lower if they do not. Exemptions are rice, which is considered to have slight substitution possibilities only with corn, and durum wheat, which due to legal and cultural circumstances is not as good a substitute to other crops as the grouping by the above criteria would suggest. Multiplying Allen-elasticities for each country by their corresponding value share resulted in starting values for cross price elasticities. The matrices do not contain cross price elasticities between ruminant and non-ruminant livestock production” (BANSE ET AL, 2005: 39).

Calibration of final price elasticities of supply

As mentioned above, the final GAMS mechanism ensures that economic conditions are fulfilled. This calibration process is conducted in two steps. Thereby, own and input price elasticities, which have been subject to intensive literature review and plausibility considerations, are held constant, while cross price elasticities are allowed to vary (BANSE ET AL., 2005). "In a first step, the matrix of Allen-elasticities of cross substitution is multiplied by a country-specific factor in order to minimise the resulting sum of squared deviations from homogeneity. In a second step, the final calibration to fulfil conditions from economic theory by an algorithm programmed in GAMS minimises the sum of squared deviations of the cross price elasticities from their starting values" (BANSE ET AL., 2005: 39).

4.5.2 Elasticities of human demand

When generating the elasticities of human demand the adding-up condition has to be established. Therefore, the individual value shares of the consumption of those products, which are included in ESIM, in overall consumption expenditures have to be calculated for each country of the EU-15. Data on overall consumption expenditure have been extracted from the INTERNATIONAL MONETARY FUND (2003). Elasticities of human demand in the NMS have already been generated by BANSE ET AL. (2005) for ESIM-2005. These elasticities have been adopted in ESIM-2007.

Income elasticities

The values of income elasticities of human demand in EU-15 members have been subject to plausibility considerations. Thereby, countries are categorised into three groups according to the assumptions on the size of the income elasticity. The group of lower incomes, specified as "low income EU-15" consists of Greece and Portugal. The group of middle incomes ("middle income EU-15") includes Italy and Spain and the remaining countries of the EU-15 belong to the group "high income EU-15".

In addition also products are categorised. Following the grouping chosen in BANSE ET AL. (2005) the categories are as follows: The category of staple foods consists of cereals, potatoes, and rice. Sugar is the only commodity representing the second group, since income responsiveness of sugar is expected to be different from the responsiveness of other products (BANSE ET AL., 2005). The third group consists of the low value animal products eggs and milk, while the fourth group includes meat as a typical product of a high value. Finally, vegetable oils are put in the fifth category.

Based on the income elasticities for the NMS and the EU-15 aggregate in ESIM-2005 the value of income elasticities for EU-15 countries has been derived. Table 16 shows the income elasticities for the EU-15 categories and for two country groupings of the NMS. The group “low income NMS” consists of Romania and Bulgaria, while the remainder belongs to the category “high income NMS”.

Table 16: Income elasticities of human demand

	Low income NMS	High income NMS	Low income EU-15	Middle income EU-15	High income EU-15
Staple foods	-0.1	-0.1	-0.1	0.0	0.0
Sugar	0.4	0.2	0.2	0.2	0.0
Dairy and eggs	0.2	0.1	0.1	0.1	0.1
Meat	0.4	0.3	0.3	0.3	0.2
Vegetable oils	0.0	0.0	0.0	0.0	0.0

Source: BANSE ET AL. (2005) and own composition.

Table 16 shows that income elastcities in low income countries of the EU-15 are assumed to be identical to high income countries in the NMS. For meat, dairy products, and eggs positive income elastcities apply for all groups of countries, though increasing with decreasing income. While sugar is assumed to have an income elasticity of 0.0 in high income countries of the EU-15, its elasticity amounts to 0.4 in Romania and Bulgaria. Income increases have a negative effect on demand for staple foods in all NMS and in Portugal and Greece. The whole matrix of income elasticities is depicted in Annex A.

Price elasticities of human demand

The determination of own price elasticities of human demand for individual members of the EU-15 is based on plausibilty considerations starting from the values for the aggregated region of the EU-15 as included in the framework of ESIM-2005. Following an approach developed by BANSE ET AL. (2005) cross price elasticities and thus a consistent set of price elasticities of human demand are again generated by a GAMS algorithm, which also ensures the fulfilment of the following restrictions of economic theory:

- Symmetry of Allen-elasticities
- Homogeneity of degree zero in all prices and income

- Adding-up of the weighted income elasticities to unity
- Non-positivity of the income effect
- Non-negativity of the cross price effects.
- Thereby, the following restrictions on the relations between products are met:
- Substitutability is higher within each of the product groups listed in Table 16 than among these groups
- Substitutability is higher within the groups of animal and arable products than between them.

4.5.3 Elasticities of feed demand

With respect to the analysis of decoupling effects the elasticities of feed demand play a major role as they determine as to what extend components of the feed rations of ruminants can be substituted among each other. For the purpose of the underlying work new sets of feed demand elasticities are established for individual countries of the EU-15. As in ESIM-2007 14 regions with 6 livestock activities and 20 feed products are newly included, 84 matrices with altogether 33,600 single elasticities are generated. As in case of the other elasticities a GAMS algorithm generates these values. Again, this algorithm has been developed and used for the first time in BANSE ET AL. (2005). From an economic and technical point of view the generation of the feed demand elasticities works as follows:

Starting from the assumption, that biological conditions of animals' digestive systems do not differ among countries, the animal-specific energy-protein-ratios of all feeds are calculated. Thereby, the absolute logarithms of the quotients of the energy-protein ratios of all combinations of feed components serve as a measure for substitutability among feed components. Additionally, the Allen-elasticities between the three groups of energy feeds, protein feeds, and roughages are adjusted downwards compared to the ones within the groups.

In the next step, assumptions on the level of own price elasticities in the feed demand elasticity matrix are made. Following the assumptions made by BANSE ET AL. (2005) for the aggregate of the EU-15, the own price elasticity for cereals in EU-15 member countries in ESIM-2007 is assumed to amount to -1.3. The assumed own price elasticity for protein feeds amounts to -1.6, for potatoes to -0.8, and for roughages to -0.6. Theses values determine the starting values for the Allen-elasticities on the diagonal. The GAMS calibration algorithm ensures that the conditions of symmetry, homogeneity, non-positivity of own price effects, and non-negativity of cross price effects are fulfilled, while minimising the squared relative deviations of Allen-elasticities from their starting values. Thereby, the deviations of the own-price effects are weighed double, since the assumptions on the own price elastcities in the feed demand elastcity matrix are considered more reliable than the mechanically generated assumptions for the cross price effects. In a last step, elasticity matrices are scaled in order to reflect the value of the own price elasticity that has been assumed (BANSE ET AL., 2005).

4.6 Base data for model calibration

4.6.1 Basic approach

For quantities, prices, and policy data an average of the years 2000 to 2002 serves as the base period in ESIM-2007. The complete set of base data for EU-15 counties is contained in Annex B to this documentation. Since base data for the NMS and the other remaining regions in ESIM-2007 have not been changed compared to ESIM-2005, they are not included in the Annex B but can be found in BANSE ET AL. (2005).

Base data used to model the individual member states of the EU-15 rely on information from EUROSTAT (2006b), EUROSTAT (2004), ZMP (2004), and FAO (2006). In addition, some base data have been subject to adjustments in order to guarantee consistency of commodity balances. This is, for example, true in case of the production and consumption quantities of the aggregate product “other dairy”. The following paragraphs illustrate, where data stems from and how it is adjusted.

4.6.2 Supply, trade, and demand

Table 17 shows the sources of data used for the depiction of the disaggregated EU-15. The sources used to obtain data for all other countries included in ESIM-2007 can be found in BANSE ET AL. (2005). Data for production, human demand, feed demand, processing demand, and area have been collected for each individual member state. Those for seed demand have been calculated by multiplying total seed demand on EU-15 level by the share of each country in total EU-15 area. All quantities in ESIM-2007 are depicted in 1,000 t.

According to information from databases there is some oil consumption in feed demand in some member states of the EU-15. Following the plausibility considerations made by BANSE ET AL. (2005) these numbers are set to zero. Instead, it is assumed that oil from rapeseed, sunflower seed, and soybeans is either used for human consumption or exported. Also data for rapeseed have been adjusted. It is assumed to be used for processing activities or trade purposes only. In EUROSTAT (2006b) some small figures on rapeseed in feed consumption were found. Data for sugar, which also include C-sugar in EU-15 countries, relate to the raw equivalent and quantities for rice are measured in milled equivalent.

Based on the approach conducted by BANSE ET AL. (2005) raw milk demand in butter and cheese producing industries is based on fixed coefficients per member state. That is, it is assumed that one ton of a processed dairy product requires a certain quantity of raw milk. In the member states of the EU-15 one ton of cheese requires between 4.5 tons and 5.6 tons of raw milk. For Butter this coefficient varies between 16.0 tons and 19.0 tons. Skimmed milk powder is a joint product of butter with fixed coefficients in each region that are calculated from base data. Furthermore, it is assumed that 20 % of the processed raw milk is devoted to the production of other dairy commodities. Thereby, one ton of other dairy products corresponds to one ton of raw milk.

Given the above mentioned coefficients in raw milk processing activities and the quantities of processed dairy products total raw milk demand for processing is calculated and compared with the base data. If the quantity of raw milk in the base data exceeds the calculated quantity of raw milk required to produce the dairy products, the production of other dairy products is increased until total requirement of processed milk equals base data. In contrast, whenever the required quantity of raw milk is higher than the quantity of raw milk in the base data, production and domestic use of all dairy products is reduced proportionally restricted to constant trade data (BANSE ET AL., 2005).

Table 17: Data sources for individual countries of the EU-15, 2000-2002

	Production /1	Human demand /1	Feed demand /1	Seed demand /2	Processing /1	Area /1
Barley	Eurostat	Eurostat /7	Agris	Eurostat		Eurostat
Beef	Eurostat	Eurostat				
Butter	Agris	Eurostat				
CGF			Eurostat			
Cheese	Agris /4	Eurostat /8				
Corn	Eurostat	Eurostat /7	Agris	Eurostat		Eurostat
Com. Wheat	Eurostat	Eurostat /9	Agris /13	Eurostat		Eurostat
Durum	Eurostat	Eurostat /10		Eurostat		Eurostat
Eggs	Agris	Eurostat				
Manioc			FAO			
Cons. Milk		Eurostat				
Milk	ZMP		ZMP		/14	
Other energy	/5		/5			
Other protein	/5		/5			
Other grains /3	Eurostat	Eurostat /7	Eurostat	Eurostat		Agris
Pork	Eurostat	Eurostat				
Potato	Eurostat	Agris /11	Agris	Agris		Agris
Poultry	FAO	Eurostat				
Rapmeal	FAO		FAO			
Rapoil	FAO	Agris /12				
Rapeseed	Eurostat			Eurostat	Eurostat /15	Agris
Rice	FAO	FAO /10		FAO		Eurostat
Rye	Eurostat	Eurostat /7	Agris	Eurostat		Eurostat
Sheep	Agris /6	Agris				
Milk powder	Eurostat	Eurostat	Eurostat			
Soybean	Eurostat	Eurostat	Eurostat	Eurostat	Eurostat /16	Eurostat
Soymeal	FAO		FAO			
Soyoil	FAO	Agris /12				
Sugar	Agris	Agris /12				Eurostat
Sunmeal	FAO		FAO			
Sunoil	FAO	Agris /12				
Sunsedd	Eurostat	Eurostat	Agris	Eurostat	Eurostat /16	Eurostat
Grass	Agris		Agris			Eurostat /17
Arable fodder	Agris		Agris			Agris
Silage maize	Agris		Agris			Eurostat

/1 = For individual member countries
/2 = For aggregate of individual member countries
/3 = Sum of oats, triticale and other cereals.
/4 = For Finland, Greece, Ireland, and Spain adjusted according to FAO data
/5 = Own calculation to guarantee protein and energy requirements in feed demand.
/6 = For Belgium/Luxembourg FAO
/7 = Sum of gross human consumption, industrial uses and others, for Belgium and Luxembourg adjusted according to FAO data and Agris
/8 = Sum of processed cheese impact and disappearance.
/9 = Sum of gross human consumption, industrial uses and others minus animal feed of durum.
/10 = Sum of gross human consumption, industrial uses, others and animal feed.
/11 = Residual of production minus feed demand minus seed demand.
/12 = Human demand plus feed demand.
/13 = Sum of animal feed from common and durum wheat
/14 = Residual of production minus human demand minus feed demand.
/15 = Industrial uses plus others plus animal feed.
/16 = Industrial uses plus others.
/17 = For United Kingdom for 2001 and 2002 adjusted according to Agris

4.6.3 Prices and policies

In ESIM-2007, product prices in the base period are identical across all member states of the EU-15. Price information is adopted from the prices for the EU-15 aggregate used in ESIM-2005. These prices and prices for other countries, in turn, have been provided by EUROPEAN COMMISSION (2004). In those cases, in which not both producer and wholesale prices were provided, BANSE ET AL. (2005) adopted certain margins between the producer and wholesale price, which are generally based on older ESIM versions. A very detailed description of the base data for prices and their use for the calibration of the logistic functions, which determine price transmission between the world market and domestic markets, can be found in BANSE ET AL. (2005).

Though the aggregated region of the EU-15 has been split up into 14 individual regions for the purpose of this work, it is still the aggregated EU-15 region, which operates on international markets, i.e. in terms of foreign trade with non-EU countries. As in ESIM-2005, tariffs for the EU are adopted from WTO schedules. Export subsidies are derived from WTO notifications. For the base period, i.e. pre-accession situation, no explicit policies are taken into account for the CEECs. Instead, foreign trade measures have been adopted from BANSE ET AL. (2005), who calculated foreign trade measures endogenously from price differences between respective domestic and world market prices. Export subsidy limits and TRQs are taken into account for the EU only.

All important aspects regarding direct payments under the MTR reform have been discussed in great detail in section 2.3. Direct payments during the base period, i.e. under Agenda 2000 conditions, are included in ESIM-2007 as average applied rates in the base period expressed in 2002 Euro. For durum wheat, rice, and sheep meat as well as beef, direct payments are calculated as average outlays for these payments for 2000-2002 divided by total EU production of the respective products.

ESIM-2007 does not distinguish between A-, B-, and C-sugar. For that reason, the sugar quota is treated as corresponding to the level of sugar production in each EU-15 member. In contrast, milk production results from the sum of the quota quantity and the amount of milk, which is used for feed. The shadow prices have been adopted from BANSE ET AL. (2005), which in turn received these prices from EUROPEAN COMMISSION (2004).

4.7 Feed rates

In course of splitting up the EU-15 into individual regions completely new feed rates had to be established for 14 new regions. The generation of these feed rates takes place in two steps, of which the first examines whether a country's quantity of feed demand complies with the nutrient requirements of animals. If necessary, adjustments in feed demand have to be made. In the second step, total feed per country is distributed among livestock production activities, whereby this distribution is influenced by a long list of restrictions. The approach of generating feed rates is again adopted from BANSE ET AL. (2005). However, due to the importance of feed rates for modelling and analysing the effects of decoupling a somewhat shorter overview of the underlying approach is provided below. Annex A includes the feed rates for the individual EU-15 members as well as for the NMS, whereby those for the NMS have been adopted from BANSE ET AL. (2005).

In order to check the consistency of feed demand with nutrient requirements of animals the energy requirement per ton of livestock product is determined in animal-specific units.

Based on the yield level per cow and year, which has been extracted from FAO (2006), and the assumption of a live weight (W) of 600 kg per cow the energy requirement in MJ NEL (Megajoule Nettoenergie-Laktation) is calculated using the following formula developed by KIRCHGESSNER (1982: 267-270):

$$W^{0.75} * 0.293 * 365 + 3.17 * \text{kg milk}.$$

This results in different energy requirements per ton of milk in each of the EU-15 member states. For beef, an energy requirement of 140,000 MJ ME (megajoule metabolisable energy) per ton of beef has been calculated taking into account all stages of the animal's life[34]. Applying the same approach for the remaining animal production activities in ESIM-2007 the energy requirement per ton of sheep meat is determined at 9.7 mill. StE (Stärkeeinheiten), at 48,166 MJ ME per ton of pig meat, 36,553 MJ ME per ton of poultry meat, and 30,760 MJ ME per ton of eggs (BANSE ET AL., 2005).

Lacking data on feed demand for the aggregates "other energy" and "other protein" BANSE ET AL. (2005) assumed the demand for these feeds at 5 % of total feed energy each[35].

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[34] The formulas are extracted from MENKE ET AL.(1987).

[35] "Other energy and other protein are expressed in equivalents of barley and rapeseed meal, respectively, i.e. energy content per ton is assumed to be equal to these products"(BANSE ET AL., 2005: 74).

This value has also been adopted in course of establishing ESIM-2007. If not enough energy is provided by total feed demand including other energy and other protein, these product aggregates are increased such that total energy requirements are met[36].

After it has been checked whether total feed demand complies with the energy requirements of a country's livestock production and necessary adjustments have been conducted, the final distribution of feed components to the animal production activities included in ESIM-2007 is determined. As mentioned above, this is done by a GAMS algorithm, which is, however, subject to several restrictions. Of course, also the consistency of feed demand with livestock production as well as the fulfilment of energy requirements must be maintained. One important underlying assumption affects the efficiency in energy use by different livestock activities: Pig and poultry production are considered equally efficient, while production of both is at least 20 % more efficient than beef production. Beef production, in turn, is at least 10 % more efficient than sheep production (BANSE ET AL., 2005).

Following BANSE ET AL. (2005) a long list of further restrictions applies with respect to the distribution of individual feed components. These restrictions are listed below:

a) "Restrictions on the specific allocation of feed components to animal production activities:

- Roughages are only used in ruminant production.
- Potatoes are only used in pig production.
- Milk is only used in milk production.
- Whole oilseeds are not used for poultry and egg production.
- Other energy which is considered to be made up mainly of waste of the food industry is not used for poultry and eggs either.
- Imported feed products which are not produced domestically (Manioc and CGF) are not used in sheep production.

[36] In order to cover the feed demand by animals (mainly horses and goats) that are not covered by ESIM-2007 an additive intercept in the feed demand function is calculated. The calculation of energy and feed requirements of these animals is described in BANSE ET AL. (2005).

b) Restrictions on the relative feed component shares in different animal production activities:

- All feed products are used in the same proportion in milk as in beef.
- All grains and oilseed meals are assumed to be used in the same proportion in all livestock feeding except poultry and egg production. For poultry and eggs, coarse grains (barley, rye, other grains) are assumed to make up for a much smaller share (25% of the share in other animal production activities).
- Roughages are used in the same proportions in all ruminants except for sheep, where silage maize is assumed to be used relatively less (25% of the roughage share for other ruminants).
- Total roughages are used more in sheep production than for other ruminants.
- Other energy, manioc and potatoes are summing up to the same share in each ration. In countries where extraordinarily much potatoes are used this assumption had to be released.
- Finally all rations for all animals have the same ratio of energy and protein feeds (except roughages)"(BANSE ET AL., 2005: 75-76).

Having imposed the above restrictions, a GAMS algorithm calculates suitable feed rates distributing the inefficiencies in each country as equal as possible within the specified range.

5 Effects of decoupling direct payments in individual EU member states

As the last countries of the enlarged EU Slovenia, Malta, Romania, and Bulgaria have implemented a system of decoupled direct payments in January 2007. Slovenia and Malta switched from the old arable scheme to the regionalised version of the SFP and Romania and Bulgaria adopted the SAPS in course of acceding to the EU. All other members have already started to pay decoupled subsidies to their producers in the years before. However, over the first years under the new political environment farmers are still looking for the most efficient production mixtures and accordingly adjustments on agricultural markets still take place today.

One of the most interesting questions is clearly whether the newly introduced eligibility for the receipt of direct payments for roughages leads to a substitution of roughages for grandes cultures in the area allocation process of the EU-15, though direct payments for ruminants decrease. The answers to this and other questions are of course heavily affected by country-specific decicions regarding the liberalisation of direct payments and nationally (co-)financed top-ups. As described in section 2.3, some members kept highly coupled payments after implementation of the MTR reform, while other opted for completely decoupled subsidies.

As shown above, several earlier studies have already discussed and analysed the potential effects of decoupling. Also ESIM has been used several times for this purpose. Thereby, most of the recent analyses were carried out either for the EU-15 aggregate or for specific EU member states.

Building on this work this thesis analyses potential decoupling effects in the member states of the EU. In section 5.1 the scenarios and assumption, which the analysis relies on, and described and discussed in much detail. Thereby, the focus is first on general assumptions that apply for all scenarios before the focus is on assumptions under specific scenarios. Section 5.2 presents and analyses ESIM-2007 results regarding the effects of the decoupling for the members of the EU-15. Thereafter, section 5.3 deals with the NMS, whereby Cyprus and Malta are not considered. The description and analysis of the results is focused on production and area allocation, which, of course also requires a close look on direct payments, product and land prices, as well as feed demand. To a minor degree also trade issues are addressed.

5.1 Scenarios and assumptions

In order to assess the effects of decoupled payments with ESIM-2007 three scenarios are formulated for the group of EU-15 members on the one hand as well as for the group of NMS on the other hand. The presentation of the simulation results partly differs among the two groups of members with respect to the design of the scenarios including the selection of reference scenarios and with respect to the projection years, for which ESIM-2007 results are compared.

As mentioned above, the system of decoupled direct payments, which is depicted for EU-15 members in ESIM-2007, is the regionalised version of the SFP. Apart from a changing combination of regionalised and historically based elements in overall decoupled payments in the course of time a basic modification in the CAP direct payments system is not foreseen until 2013. Other changes in the political environment, which have an impact on agricultural markets in particular years and under certain decoupling scenarios only, do not exist. As a consequence, relative differences between scenarios can not be expected to differ strongly among projection years. Therefore, scenario results for EU-15 members are compared for the final projection year 2013 only. In case of the NMS political options and requirements that are depicted in ESIM are more manifold and change over time. Initially, countries can choose between the SAPS and the regionalised version of the SFP, before they definitely have to switch to the SFP in 2011. In addition, direct payments, which are stepwise phased in, can be combined with nationally (co-)financed top-ups, which, in turn, are stepwise phased out from 2011 on. Thereby, NMS can decide upon the level of top-ups on a yearly basis. In order to adress possible differences in the market impacts of decoupling under the SAPS on the one hand and the SFP on the other hand scenario results for the NMS are compared for 2010 and 2013.

The present comparison of scenario results relies on a long list of assumptions. However, in order to analyse the pure effects of decoupling only those assumptions are changed among scenarios, which deal with the coupledness of direct payments. All other assumptions apply for all scenarios. The most important assumptions, which uniformly apply for all scenarios, are discussed below:

5.1.1 General assumptions

With respect to the political environment ESIM-2007 includes the accession of Latvia, Slovenia, Lithuania, Poland, Hungary, the Czech Republic, Slovakia, Estonia, Cyprus, and Malta in 2004[37]. Romania and Bulgaria accede in 2007 and albeit recent political discussions Turkey is assumed to become EU member in 2013. Thereby, all NMS apart from Slovenia and Malta apply the SAPS right from the date of their accession and shift to the regionalised version of the SFP in 2011. Slovenia and Malta opted for the old arable payments from 2004 to 2006 and switch to the SFP in 2007. These direct payments are stepwise phased in and reach their full level in 2013.

Apart from the commitments on the design of direct payments the regulations of the MTR reform are modelled to come into effect in 2004 under all scenarios. In detail, this is the abolishment of the rye intervention and a dynamic modulation, which amounts to 3 % in

[37] As mentioned above, Cyprus and Malta are not considered when comparing the scenario results.

2005, to 4 % in 2006, and to 5 % from 2007 onwards. Additionally, also changes in intervention prices for rice, butter, and skimmed milk powder are accounted for in ESIM-2007. The intervention price for rice is cut by 50 % in one step. The intervention price for butter is reduced by 25 % (7 % in 2004, 2005, and 2006, and 4 % in 2007), which is a stronger decrease of 10 percentage points compared to the conclusions under the Agenda 2000. For skimmed milk powder, prices will be cut by 15 % as agreed under Agenda 2000, however, implemented in 5 % steps over three years from 2004 on. The intervention for all remaining cereals is assumed to be abolished in 2009. This reflects the current discussions on the future of intervention systems. EU-Commissioner Fischer Boel recently proposed to abolish corn intervention as a result of further growing stocks and the reproach against Hungary to rip the system off. Other politicians, however, feared that this could lead to a distortion on the cereal markets in the sense that an abolishment of corn intervention could result in lower corn prices and finally to a substitution of corn for other cereals in the feed rations of animals. Therefore, it has been proposed to abolish the system of intervention completely (AGRA INFORMA, 2007). In general, intervention prices, of course, also apply to the NMS. For those products, for which the MTR reform does not foresee any changes in political support, Agenda 2000 regulations further apply[38].

The obligatory set-aside rate can be set on a year-to-year basis. From 2002 until now politicians mostly decided to leave it at 10 %. However, due to an expected decrease in intensity of agricultural production and an expected higher voluntary set-aside area once the regime of decoupled payments is established and due to the assumed abolishment of intervention for cereals, obligatory set-aside requirements are assumed to be of lower importance. Accordingly, the assumed rate of obligatory set-aside is assumed to decrease to 7.5 % in 2008 and to 5 % from 2011 on.

With full integration of the CEECs into the EU the Single Market extends price formation from the EU-15 level to the EU-25 level (2004), EU-27 level (2007), and EU-28 level (2013), respectively. That is, supply and demand in the NMS are taken into account when ESIM-2007 determines the tradeshare and price of tradable products in the EU.

Apart from political parameters the amount of technical progress in future production is also an important input to market models. It shifts the supply curve at given rates per year.

[38] The reform of the sugar market is not considered for this analysis, since discussions on possible changes in future quota levels are not completed yet.

Technological progress shifters currently applied in crop production are based on a historical yield trend analysis. This analysis refers to a period of 1985 to 2003 in case of EU-15 members. Technical progress rates for the latter group of countries have not been changed compared to ESIM-2005 and rely on the work of BANSE ET AL. (2005). For the EU-15, a long-term trend of 15 years and a short-term trend of the recent five years are calculated based on information from EUROSTAT (2006b). The final technical progress rate, which is used in ESIM-2007, is then calculated by a mixture of both trends with a heavier weight on the short term trend.

As shown in Table 18, technical progress in the NMS is assumed to be somewhat higher than in the EU-15 on average[39]. High technical progress rates of up to 3 % are assumed for more or less all crops in the Baltic states, Poland, Slovenia, and partly also in Romania and Bulgaria. A low or almost no technical progress for cereals is expected for Hungary, Slovakia, and the Czech Republic. While technical progress in oilseeds, rice, sugar, and potato production lies between 1.4 % and 3.0 % in Hungary, shifters in the Czech Republic and Slovakia remain well below the NMS average across almost all crops.

With respect to the EU-15 a clear ranking of countries by their rate of technical progress does not exist across all commodities. However, it is striking that Greece has continuously very low rates of technical progress, while shifters in Finland lie clearly above the average values. With regard to specific products and product categories EU-15 shifters for cereals, rice, and silage maize are mostly below 1 % with the lowest values in Greece and Portugal. Technical progress in rapeseed and soybean production is somewhat higher than for cereals. In case of sunflower seed production in the EU-15, however, no progress is assumed at all. In case of sugar, shifters mostly lie between 1.0 % and 2.0 %. Technical progress in potato production varies heavily among members between zero and almost 4.0 %. For arable fodder and grass shifters in the EU-15 are uniformly set below 1.0 % with somewhat lower values in Portugal and Greece. In the NMS technical progress amounts to 1 %.

[39] If a country does not produce a commodity, yield values in this table amount to 0.

Table 18: Assumed rates of technical progress in percent per year

	AT	BE	DK	FI	FR	GE	GR	IE	IT	NL	PT	ES	SW	UK
Wheat	0.1	0.9	0	1.1	0.2	0.2	0	0.6	1.1	0.7	0	0.2	0.4	0.4
Durum	0.3	0	0	0	0.5	0.3	0	0	0	0	0	0.8	0	1.4
Barley	0.4	0.3	0.1	1.1	0.5	0.3	0	0.2	0	0.2	0	0	0.9	0.5
Corn	0	1.3	0	0	0	0.5	0	0	0	2.9	2.4	0.8	0	0
Rye	0.9	3.3	0	1.3	0.7	0.1	0	0	0.8	0.3	0.1	0	1	1.1
Other grains	0.3	1.2	0.2	0.9	0.4	0.3	0	0.5	0.4	0.9	0.5	0.4	0.7	0.8
Rice	0	0	0	0	0.1	0	0	0	0.5	0	0.1	1.3	0	0
Sugar	0.8	1.1	2.3	1.5	1.1	1.5	1.1	0.8	0	1.2	1.5	3	1.7	1.3
Potato	1	0.9	0.7	1.6	1.7	1.3	2.2	3	0.9	0.1	0	3.8	0	0.8
Soybean	0	0	0	0	2.8	0	0	0	0	0	1.1	0	0	0
Rapseed	0.9	1.2	2.4	0	0.7	1.8	0	2.4	3.1	0	0	0.5	0.3	0.2
Sunflower seed	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silage maize	0	1	0	0	0.7	0.1	0.3	0.3	0	0	0.3	0.2	0	0.3
Arable fodder	0.8	0.8	0.8	0.8	0.8	0.8	0.4	0.8	0.8	0.8	0.4	0.8	0.8	0.8
Grass	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.5	0.5	0.5	0.3	0.5	0.5	0.5
Milk	2.9	2.4	2	2.5	1.7	2	0.9	1.7	0.4	1.3	2.8	3	2	2.1
Beef	0.6	0	0.2	2.1	0.5	0.4	0	0	0.8	0	0.2	0.1	1.3	0.8
Sheep	1	0	0	1.3	0.3	1.5	0	0	0	0	0.7	0	0.8	0.7
Pork	0.5	0.6	0.5	0.5	0.5	0.2	0	0.9	0.4	0.5	0	0.6	0.6	0.9
Poultry	2.6	0.5	0.4	3.1	1.2	1.7	0	0	0.7	2.5	0.8	0.3	0	0
Eggs	0	0.7	0.7	1.2	1.7	0.9	0	0	0.2	0.7	2.8	1.6	0.7	0

	CZ	EE	HU	LT	LV	PL	SI	SK	BG	RO
Wheat	0.3	0.9	0	3	3	1.5	1.5	0	0.4	0.7
Durum	0.2	0.9	0	3	3	1.5	1.5	0	0.4	0.7
Barley	0.2	1.6	0	3	2.5	2.1	2	0	0.7	0
Corn	3	1.6	1	3	3	3	3	0.9	2.8	1.6
Rye	0.3	2.2	0.3	2.7	1.6	0.9	2.4	0	2.6	3
Other grains	0.2	1.6	0	3	3	1.5	2	0	2.2	0.7
Rice	0.2	1.6	3	3	3	2.1	2	0	4.7	0
Sugar	2.8	3	3	3	3	2.8	2.6	2	2.5	1.6
Potato	1.3	3	3	2.2	0.4	1.9	3	1.8	0.4	1.2
Soybean	3	3	1.4	2.1	2.2	2	3	0.5	3	3
Rapseed	0.2	3	1.8	2.1	3	2.7	3	0.7	1	2.7
Sunflower seed	0.9	3	0	2.1	2.2	2	3	0	0	2.7
Silage maize	0.2	1.6	1	3	3	3	3	0.9	2.8	1.6
Arable fodder	1	1	1	1	1	1	1	1	1	1
Grass	1	1	1	1	1	1	1	1	1	1
Milk	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Beef	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sheep	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Pork	1.3	0.8	1.3	0.8	0.8	0.8	0.8	1.3	1.3	1.3
Poultry	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Eggs	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1

Source: EUROSTAT (2006b) and BANSE ET AL. (2005).

Technical progress shifters for animal products in the NMS are set to the same level across countries for each product except pork. They amount to 1.3 % for milk, 0.5 % for beef and sheep, and to 2.1 % for poultry and eggs. Technical progress shifters for pork vary between 0.8 % and 1.3 %. Shifters for milk are assumed to be higher in the EU-15 than in the

NMS with values above 1.0 % in all countries except Italy and Greece. No or very low technical progress in production of meat of ruminants is assumed for Belgium/Luxembourg, the Netherlands, Denmark, Greece, Ireland, and Spain. EU-15 shifters for pork lie between 0.2 % and 0.9 % for all countries but Greece and Portugal, where no technical progress occurs. Technical progress in poultry and egg production goes up to above 3 % in Finland. Again, there is no technical progress in Greece (EUROSTAT, 2006b, and BANSE ET AL, 2005).

Important macroeconomic indicators that are exogenous to ESIM-2007 are among other things the costs of the production factors labour, capital, and intermediates. Assumptions on the development of these costs rely on recent trends obtained from EUROSTAT (2006a), EUROSTAT (2006c), and BANSE ET AL. (2005). Costs for intermediates are expected to increase by 1.5 % per year in all countries. Capital costs remain unchanged in most EU-15 members, while a slight decrease of 1.5 % to 3 % takes place in the NMS and Greece. According to EUROSTAT (2006a) the historical development of labour costs, which consist of the wage rate and the working time per output unit, has surprisingly been quite different across countries reaching from stronger decreases to slight increases.

Other exogenous macroeconomic indicators are income and population growth, which both have a major impact on the development of human demand. According to trends between 1993 and 2003, which have been depicted from EUROSTAT (2006d), income is expected to increase across all members of the enlarged EU. However, growth rates are assumed to be higher in the NMS (between 3.3 % in Slovenia and 7.3 % in Latvia) than in the old member states, where incomes increase between 0.9 % in Italy and Portugal and 3.3 % in Ireland. Projection of population growth in the NMS is based on growth rates between 1995 and 2002. This information relies on FAOSTAT (2006).

Finally, another macroeconomic variable, which has a crucial impact on model results in general and which is also put exogenously to ESIM-2007, are the exchange rates. For the underlying analysis exchange rates have not been changed compared to BANSE ET AL. (2005). In general, the development of national currencies compared to the US-Dollar is relevant, since world market prices are measured in US-Dollar. Exchange rates directly enter the price transmission mechanisms when world market prices are converted into national currencies. The real value of CEEC-currencies against the Euro is important because direct payments, other subsidies, intervention prices, and specific tariffs, which all apply to the CEECs after accession, are valued in Euro. As a result, changes in exchange rates and, thus, changing real values of national currencies affect agricultural protection as well as production and consumption incentives. A more detailed description of the potential influence of exchange rate developments on agricultural markets and protection is provided in Münch (2002)[40].

A common pattern of the assumed developments of exchange rates is the appreciation of national currences in the CEECc against the US-Dollar, which lies between 0.2 % and 1.0 % per year. In 2003 and 2004 the Euro strongly appreciated against the US-Dollar. This appreciation also affects currencies in the CEECs, which accordingly decrease their real value against the Euro. From 2005 on, however, the Euro is expected to depreciate against the US-Dollar by an annual rate of 1 % and slightly stronger against currencies in the NMS.

5.1.2 Scenario-specific assumptions

The assumptions mentioned so far apply for all scenarios listed below. The design of direct payments and national top-ups, however, is different among scenarios. In detail, the three scenarios formulated for the member states of the EU-15 are as follows:

1. A COUPLED scenario, which serves as the reference scenario, with full implementation of the regulations of the MTR reform that have been described above but coupled direct payments. Also direct payments and top-ups in the NMS are linked to production. Voluntary set-aside area per farm is restricted.
2. An ACTUAL IMPLEMENTATION scenario including the full implementation of the MTR reform and (partially) decoupled payments in each member state. That is, direct payments are fully and partially decoupled depending on the actual implementation of the MTR reform in each country of the EU-27, respectively. A restriction of the voluntary set-aside area does not exist anymore.
3. A FULL DECOUPLING scenario with fully decoupled direct payments in each member state in the sense that the option to partially couple direct payments to production does not exist any longer. However, to avoid missunderstandings, the receipt of direct payments and top-ups is still linked to the use of land. Also in case of this scenario a restriction on voluntary set-aside is eliminated.

[40] BOJNEC, MÜNCH, AND SWINNEN (1998) show that the assumption on exchange rates drive the projected effects of accession in the CEEC to a large extent. TANGERMANN (1994) shows the large impact of assumptions on exchange rates on agricultural protection rates in the CEECs.

The three scenarios formulated for the NMS are designed as follows:

1. An ACTUAL IMPLEMENTATION scenario, which corresponds to the ACTUAL IMPLEMENTATION scenario that has been described for the EU-15 above. In case of the NMS, this means that Slovenia and Malta apply the old arable scheme from 2004 to 2006 before they switch to the regionalised version of the SFP in 2007. All other NMS apply the SAPS from 2004 to 2010 and the SFP from 2011 onwards. Under the SAPS partial decoupling of direct payments is not possible. Whether and to what extent direct payments under the SFP as well as nationally (co-)financed top-ups are coupled to production depends on the individual decisions in each member state as well as its negotiations with the European Commission (see section 2.3). Thereby, it is assumed that the coupledness of direct payments from 2011 on, when the NMS have to apply the SFP, relies on information and assumptions on the coupledness of top-ups. For example, member states that do not couple top-ups to a comparatively high degree are expected to opt for a low coupledness of payments from 2011 on and vice versa. As mentioned in section 2.3, however, several countries could neither manage to grant the top-ups in time nor to pay the level of subsidies they had initially promised. According to available information this is mainly true for the top-ups for arable crops. Since the NMS can additionally decide on the design of top-ups on a yearly basis it has been assumed that top-ups for arable crops amount to just 25 % of the maximum allowed level. However, as soon as the NMS switch to the SFP, direct payments for arable crops are assumed to be as high as possible due to the fact that the NMS are not responsible for financing. Top-ups and direct payments for ruminants are not assumed to be lower than negotiated with the European Commission. This scenario serves as the reference scenario for the group of NMS.

2. A FULL DECOUPLING scenario with fully decoupled direct payments and national top-ups in each member state, i.e. the design of this scenario corresponds to the FULL DECOUPLING scenario for the EU-15 members. Thereby, the highest possible spendings for nationally (co-)financed top-ups and, thus, higher spendings than under the ACTUAL IMPLEMENTATION scenario are assumed for all NMS. The reason to assume higher spendings on top-ups is to broaden the scope of the underlying thesis. The effects of shifting from partially to fully decoupled payments under a constant budget will already be identified in the analysis for the EU-15 members. The analysis

of granting subsidies to producers under a changing budget could therefore provide additional findings.

3. A NO TOP-UPS scenario, under which all top-ups are eliminated. The comparison of the results of this scenario with the results of the other scenarios is for most countries meaningful in the year 2010 only, since top-ups are not allowed to exist three years later in those countries that became member of the EU in 2004 anyway. In Romania and Bulgaria, in contrast, top-ups are still allowed to be granted in 2013 so that their elimination still can be expected to have some impact on markets in that year.

According to Table 4 in section 2.3 the coupledness of direct payments differs strongly among products and member states under the ACTUAL IMPLEMENTATION scenario.

Table 19 shows the degree of coupledness of direct payments and top-ups for beef as it enters ESIM-2007. The presented figures apply from the date of the introduction of direct payments until the end of the projection period, since it is not foreseen, that the degree of coupledness changes over time. That is, in the NMS national top-ups and direct payments under the SFP rely on the same degree of coupledness. The figures show, which share of the budget for the beef production sector is used for direct payments to beef producers under the MTR reform or, more precisely, which share of the coupled premium under fully coupled conditions is still paid to beef producers under the MTR reform. In case of direct payments the remaining share of the budget is reallocated in order to finance the regionalised decoupled payment. This is not true for national top-ups in the NMS. In this case countries have decided not to pay decoupled top-ups even if they had opted for relatively low coupled top-up levels.

With respect to the beef sector, the degrees of coupledness for Germany, Ireland, and the United Kingdom reflect the fact, that direct payments for beef are (almost) completely abolished. However, all other figures require some more detailed explanation: Since ESIM-2007 does not capture various beef production activities like husbandry of suckler cows or bull mast but only an aggregated activity of beef production, the extent as to which direct payments are coupled to production refers to an aggregate of beef production, too. Thus, the larger the share of the subsidised beef production activity in the overall beef production, the larger is the beef premium per ton. Accordingly, since calf and cattle slaughter account for the major share in overall beef production in the Netherlands, the decision to keep payments to these activities coupled leads to a high overall beef payment per ton and a comparatively low amount of money that is redistributed to the regionalised payment per hectare. The degree of coupledness of beef payments and, thus, also the level of beef payments in France, Portugal, and Spain, for example, are much higher than in Austria, though all countries opted for the highest possible degree of coupling. Again, this can be traced back to a relatively low share of the subsidised production activities in overall beef production in Austria.

Table 19: Degree of coupledness of beef payments and top-ups under the ACTUAL IMPLEMENTATION scenario

EU-15			NMS	
Austria	49.1		**Latvia**	22.8
Belg./Lux.	50.6		**Romania**	29.8
Denmark	28.3		**Slovenia**	53.3
Finland	51.1		**Lithuania**	34.0
France	67.2		**Bulgaria**	29.8
Germany	0.0		**Poland**	0.0
Greece	10.0		**Hungary**	29.4
Ireland	0.0		**Cz. Republic**	44.5
Italy	8.0		**Slovakia**	20.2
Netherlands	76.6		**Estonia**	46.2
Portugal	61.1			
Spain	67.7			
Sweden	28.6			
UK	1.0			

Source: AGRA INFORMA (2006), EUROPEAN COMMISSION (2006), and own composition.

In case of the NMS, Poland is the only country that forgoes direct subsidies for ruminants. The share of subsidised beef activities in Latvia, Lithuania, Hungary, and Slovakia in overall beef production is comparatively low so that levels of direct subsidies are well below those for Slovenia, Estonia and the Czech Republic. For Romania and Bulgaria average values are assumed, since information on the design of top-ups have not been available yet.

The information regarding the degree of coupledness of direct payments for products other than beef can be obtained from section 2.3, since production activities in ESIM-2007 directly correspond to the activities, which direct payments and top-ups are paid for.

As described in much detail in the chapters 2 and 3 there is considerable dissension as to what extend arable payments under the Agenda 2000 and direct payments under the MTR reform have an impact on production decisions of farmers. In the analysis in this chapter payments under both policy regimes are treated as having the same impact on production and area allocation like prices. The reason to do so is simply that payments are still tight to land and that it is expected that the effects of decoupling result from the redistribution of payments among production activities and from the extension of direct payments towards roughages, respectively. The payments under the MTR reform of course amount to the same level per hectare across all kinds of area uses that are eligible for the receipt of payments. However, there are indeed also good reasons to assume a reduced production effectiveness, at least for the payments under the MTR reform. In order to address this issue a sensitivity analysis with regard to varying levels of the impact of MTR reform payments is conducted in chapter 6.

In order to formulate a baseline for the projection horizon world market price projections are taken from the large scale model FAPRI (2004), which is designed and applied explicitly for such projections. Those projections are depicted in ESIM-2007 for the reference scenario COUPLED by adjusting supply and demand shifters in the ROW (BANSE ET AL., 2005). As shown in Figures 7 to 9 world market prices for agricultural raw products measured in US-Dollar are projected to increase continuously over the whole projection period.

Figure 7: World market price for cereals under the scenario COUPLED (US-$ and Euro)

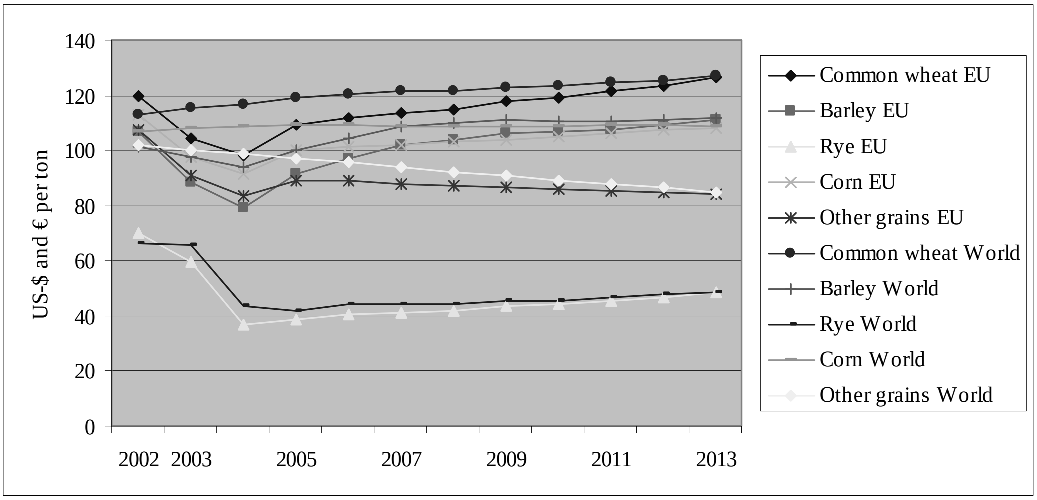


Figure 8: World market price for oilseeds under the scenario COUPLED (US-$ and Euro)

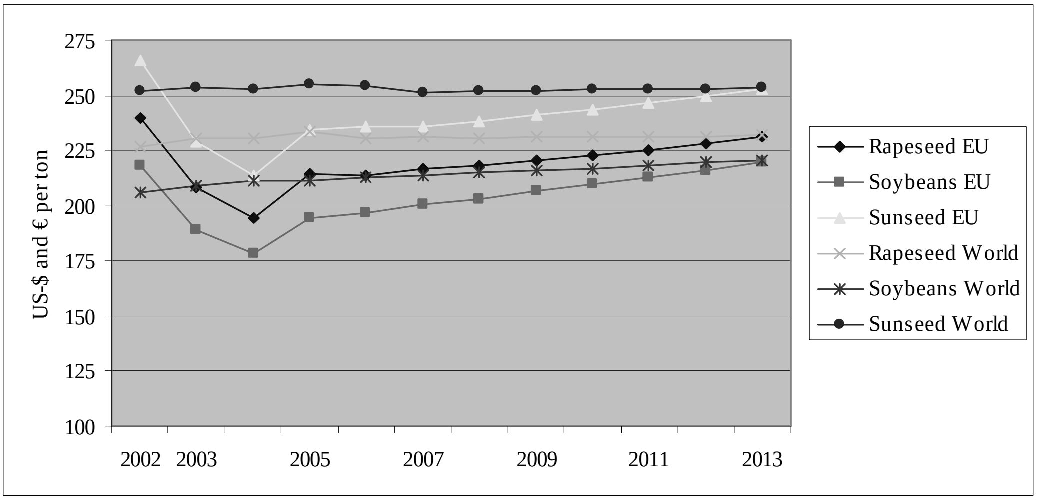
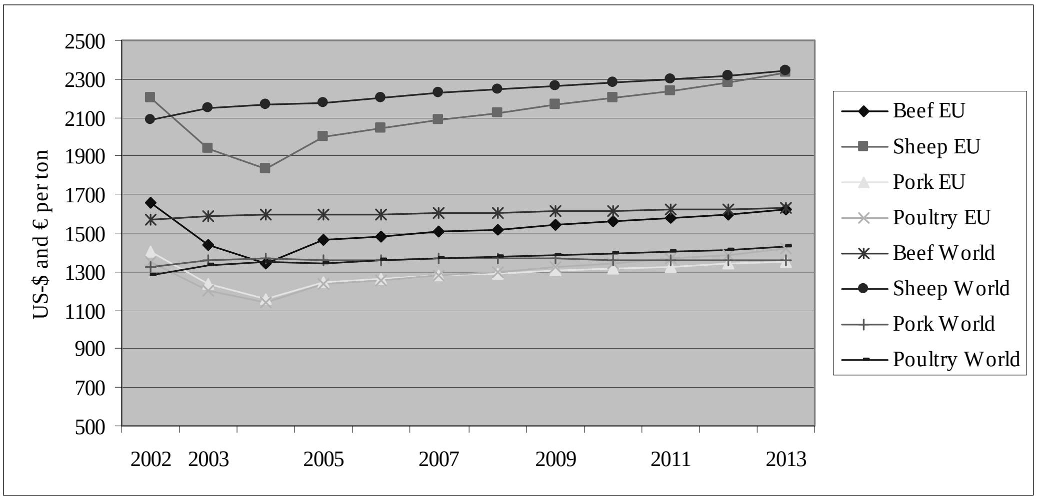


Figure 9: World market price for meat under the scenario COUPLED (US-$ and Euro)



Measured in Euro terms world market prices decrease strongly in the years 2003 and 2004 as a result of the above mentioned appreciation of the Euro against the US-Dollar. Thereafter, however, price projections follow the general increase in world market prices that are measured in US-Dollar.

5.2 ESIM-2007 results for the EU-15

Based on the scenarios and assumptions described above this section presents and analyses ESIM-2007 results regarding the effects of the decoupling for the members of the EU-15. Thereafter, section 5.3 deals with the NMS.

5.2.1 Direct payments

Table 20 depicts direct payments per hectare and per ton in the year 2013 for all scenarios described above, respectively. Values are depicted in Euro and in real terms. It is shown that direct payments differ significantly among member states as well as among products and product categories, respectively. In case of crops, one reason for that are varying projected actual yield and base yield levels among countries. As mentioned above, direct payments per hectare are calculated by a yield component multiplied by the premium per ton. Differences in direct payment levels for silage maize on the one hand and COP products on the other hand can additionally be traced back to different levels in the coupled premium per ton under the Agenda 2000. Under the COUPLED scenario there are direct payments for grandes cultures (including set-aside) as well as for ruminants. Of course, payments for arable fodder and pasture land do not exist. In case of the ACTUAL IMPLEMENTATION scenario, differences in direct payments among countries and products also arise from different coupling rates. In those member states, where a part of direct payments is kept coupled to production, the available budget for direct payments is not completely allocated to an uniform regionalised payment. That is, the maximum possible amount of the flat rate payment is only paid in Germany (325 Euro/ha) and Ireland (191 Euro/ha). According to the full decoupling approach applied in these countries, however, payments to ruminant producers are abolished.

In Austria, Belgium, the Netherlands, Sweden, and in the United Kingdom payments for beef remain coupled to production to different degrees[41]. In Denmark, Finland, France, Greece, Italy, Portugal, and Spain both beef and sheep meat payments are kept partly linked to production. Accordingly, farmers in these countries still receive direct payments for beef and/or sheep meat production on the expense of a higher budget allocated to the regionalised payment.

In those countries, where the payments for COP products are partly linked to production the payment per hectare is higher for COP than for set-aside and those products, which were not eligible for direct payments before the MTR reform was implemented (grass and fodder). This is particularly true for France and Spain and to a minor degree for Finland, Greece, and Italy. In France and Spain, for example, payments for COP products amount to 258 Euro and 93 Euro per ha, while payments for each grass, fodder, and set-aside amount to 184 Euro and 64 Euro per ha, respectively. In those member states, where COP payments are fully decoupled, direct payments for arable crops, fodder, grass, set-aside area, and silage maize have the same level.

As shown in Table 20 direct payments for cereals and oilseeds, set-aside, silage maize, fodder, and grassland have the same level under the Full DECOUPLING scenario. Payments for ruminants are completely abolished. Of course, variations of direct payments among countries still occur due to differences in yield and base yield levels.

[41] In the United Kingdom, however, payments for beef are coupled to production by 1 % only. This can be traced back to the fact that Scotland decided to pay 10 % of the beef payments as a coupled premium. Since Scottish beef production, however, amounts to just 10 % of the overall beef production in the United Kingdom, the degree of coupledness of direct payments for beef in the United Kingdom is 1 % only.

Table 20: Direct payments under various decoupling scenarios in the EU-15 (in Euro/ha) in 2013

	Cereals and oilseeds			Silage maize			Set-aside			Grass		
	Coupled	Actual	Full	Coupled	Actual	Full	Coupled	Actual	Full	Coupled	Actual	Full
Austria	270	155	174	240	155	174	267	155	174	0	155	174
Belgium/Luxembourg	299	264	325	269	264	325	299	264	325	0	264	325
Denmark	253	294	304	227	294	304	253	294	304	0	294	304
Finland	143	157	169	0	0	0	143	154	169	0	154	169
France	312	258	247	271	252	247	301	184	247	0	184	247
Germany	262	325	325	236	325	325	262	325	325	0	325	325
Greece	177	121	112	122	116	112	135	103	112	0	103	112
Ireland	254	191	191	229	191	191	254	191	191	0	191	191
Italy	216	178	174	162	174	174	180	163	174	0	163	174
Netherlands	301	326	426	271	326	426	301	326	426	0	326	426
Portugal	134	79	95	114	79	95	127	79	95	0	79	95
Spain	144	93	89	114	91	89	127	64	89	0	64	89
Sweden	203	177	186	0	0	0	203	177	186	0	177	186
United Kingdom	299	176	176	269	176	176	298	176	176	0	176	176

Table 20: Direct payments under various decoupling scenarios in the EU-15 (in Euro/ha) in 2013, continued

	Arable fodder			Beef (in Euro/t)			Sheep (in Euro/t)		
	Coupled	Actual	Full	Coupled	Actual	Full	Coupled	Actual	Full
Austria	0	155	174	531	261	0	1151	0	0
Belgium/Luxembourg	0	264	325	513	260	0	1113	0	0
Denmark	0	294	304	507	144	0	1101	550	0
Finland	0	154	169	531	271	0	1151	576	0
France	0	184	247	525	353	0	1139	569	0
Germany	0	325	325	543	0	0	1177	0	0
Greece	0	103	112	419	42	0	908	45	0
Ireland	0	191	191	438	0	0	951	0	0
Italy	0	163	174	485	39	0	1053	53	0
Netherlands	0	326	426	474	363	0	1029	0	0
Portugal	0	79	95	459	280	0	995	507	0
Spain	0	64	89	459	310	0	995	497	0
Sweden	0	177	186	531	152	0	1151	0	0
United Kingdom	0	176	176	537	5	0	1164	0	0

Compared to the ACTUAL IMPLEMENTATION scenario direct payments for cereals and oilseeds as well as silage maize increase in those countries, which have (almost) completely decoupled COP payments under the ACTUAL IMPLEMENTATION scenario while subsidies for beef and/or sheep meat have remained partly coupled. This is true for Austria, Belgium/Luxembourg, Denmark, Finland, the Netherlands, Portugal, Sweden, and the United Kingdom. In these countries, financial resources, which have been used to finance the payments for ruminant producers under the ACTUAL IMPLEMENTATION scenario, are now reallocated to the uniform regionalised payment, which accordingly increases.

A decrease in direct payments for cereals and oilseeds and silage maize under the FULL DECOUPLING scenario occurs, wherever COP payments have been coupled to production to a relatively high degree before. This is the case in France, Greece, and Spain as well as in Italy in case of cereals and oilseeds. In these countries, funds for coupled COP payments under the ACTUAL IMPLEMENTATION scenario are now evenly distributed over all hectares. The level of payments remains the same in those countries, which have applied the full decoupling approach under the ACTUAL IMPLEMENTATION scenario already (Germany and Ireland).

Compared to the ACTUAL IMPLEMENTATION scenario, direct payments for set-aside, arable fodder, and grass increase across all countries apart from Germany, Ireland, and the United Kingdom under the FULL DECOUPLING scenario.

5.2.2 Impacts on agricultural markets

The introduction of direct payments for roughages under the ACTUAL IMPLEMENTATION scenario results in higher incentive prices and higher roughage area in all countries across the EU-15 (see Tables 21 and 23). On aggregated EU-15 level pasture and arable fodder area are about 4.0 mill. ha (+10.6 %) and 1.6 mill. ha (+14.3 %) higher than in case of the COUPLED scenario, respectively. Country-specific increases in pasture area vary between 4.4 % in Austria and 29.4 % in Greece. Arable fodder area is extended by around 3 % in Spain, Italy, Portugal, and Greece to more than 40 % in the Netherlands.

While roughage area is expected to decrease over time in all member states except Finland and Sweden, if it is not eligible for direct payments, this area strongly increases under the actual implementation of the MTR reform. According to simulation results pasture area on EU-15 level will decrease from 39.2 mill. ha in the base period 2000 to 2002, further referred to as 2002, to 38.5 mill. ha in 2013 under the COUPLED scenario and rise up to 42.6 mill. ha in 2013 in case of the ACTUAL IMPLEMENTATION scenario. Arable fodder area is expected to fall from 11.9 mill. ha to 11.3 mill. ha in case of no payments for roughages and to increase to 12.9 mill. ha when this area becomes eligible to receive subsidies. The decrease in total roughage area over time, which takes place under the COUPLED scenario, can be explained by the technical progress in roughage production, which requires a lower area in order to respond to the feed demand by livestock producers (see Table 22 and below). As shown in Annex C the overall feed demand by ruminants is slightly increasing over time, though beef and sheep supply is slightly decreasing, which reflect a higher feed demand per animal unit and the constant production of milk, which corresponds to the quota quantity and requires a hugh amount of feedstuff.

Fodder area and grassland increase even stronger under the FULL DECOUPLING scenario than under the ACTUAL IMPLEMENTATION scenario in most countries of the EU-15. On aggregated EU-15 level pasture area increases by 4.5 mill. ha (11.6 %) and arable fodder area by 1.8 mill. ha. (15.6 %) compared to the COUPLED scenario. The differences in area growth rates between both scenarios are the largest in those countries, where direct payments increase strongly and accordingly relative incentive prices change to the advantage of fodder and grass (Belgium/Luxembourg, France, Netherlands, Portugal, and Spain) or where ruminant supply and, thus, demand for fodder and/or grass are higher (mainly Greece and Italy). For example, in France and the Netherlands direct payments are coupled to production to a comparatively high degree under the ACTUAL IMPLEMENTATION scenario. Accordingly, payments for arable fodder and grass increase significantly under the FULL DECOUPLING scenario, i.e. by 37 % and 31 %, respectively. As a result, incentive prices increase and, thus, fodder and grass area increase. Thereby, the positive effect on incentive prices that results from higher direct payments is stronger than the negative influence by lower producer prices, which in turn result from the increase in production (see Table 24). In France, for example, increases in arable fodder and pasture area amount to 18.1 % and 8.3 % under the ACTUAL IMPLEMENTATION scenario, respectively. Under the FULL DECOUPLING scenario these increases amount to 21.1 % and 9.8 %, respectively.

The increase in roughage area under the ACTUAL Implementation scenario is partly offset by a decrease in grandes cultures area, which occurs in all countries apart from Finland and lies in 2013 between 1.3 % in Germany and 8.4 % in Italy (see Table 21). The decrease rate on the aggregated EU-15 level amounts to 4.8 % (2.2 mill. ha) with cereal (-5.0 %) and oilseed area (-5.6 %) falling by more or less the same rate[42]. Over the whole projection period grandes cultures area is thus decreasing even stronger under the ACTUAL IMPLEMENTATION scenario (-4.5 mill. ha) than under the reference scenario COUPLED (-2.3 mill. ha).

The absolute decrease in area between 2002 and 2009 under the COUPLED scenario can be traced back to the strong appreciation of the Euro against the US-Dollar and a resulting strong decrease in world market prices valued in Euro in 2003 and 2004. Until 2009, this drop in prices can neither be completely compensated by continuously increasing world market prices valued in US-Dollar nor by a slight depreciation of the Euro against the US-Dollar in the years after 2004. The accession of the CEECs to the EU in 2004 is not projected to affect prices significantly, since a major change in the net trade position of the EU does not take place.

In case of decoupling, the general shift in area from cereals and oilseeds towards fodder and pasture is due to the relative decrease in incentive prices of cereals and oilseeds compared to those of grass and fodder resulting from the introduction of direct payments for the latter products. While incentive prices for grass, for example, in some areas quadruple or even quintuple, incentive prices for grandes cultures decrease in most countries between 1.3 % (Belgium/Luxembourg) and 11.1 % (United Kingdom). In some members incentive prices for cereals and oilseeds rise due to an increase in direct payments per ha after decoupling (Germany, Denmark, Finland, and the Netherlands). Thereby, the absolute change in incentive prices does not equal the absolute change in direct payments since producer prices rise as a result of decreasing area and supply.

Relative changes in grandes cultures area under the FULL DECOUPLING scenario do not differ much from those under the ACTUAL IMPLEMENTATION scenario in most member states. Differences in area changes between both scenarios do not exceed 1.5 percentage points. Thus, farmers in countries, which opted for partially coupled payments for grandes cultures (France and Spain, and to a minor degree also Finland, Greece, and Italy), can not be expected to benefit significantly from these decisions.

[42] The average decrease in grandes cultures area is smaller than the decrease in both cereal and oilseed area, since voluntary set-aside area, which also belongs to the aggregate of grandes cultures area, increases (see below).

Table 21: Area under various decoupling scenarios in the EU-15 in mill. ha and as relative changes compared to Coupled

	Grandes cultures							Cereals						
	Coupled			Actual		Full		Coupled			Actual		Full	
	2002	2009	2013	2013	change (%)	2013	change (%)	2002	2009	2013	2013	change (%)	2013	change (%)
Austria	1017.7	982.4	980.0	924.6	-5.7	929.2	-5.2	820.4	799.5	799.2	758.4	-5.1	762.8	-4.6
Belgium/Lux.	527.7	513.5	511.6	473.5	-7.5	475.2	-7.1	332.4	336.7	341.7	317.3	-7.1	318.3	-6.9
Denmark	1726.2	1685.7	1689.7	1655.0	-2.1	1659.3	-1.8	1521.1	1497.7	1503.8	1470.8	-2.2	1474.6	-1.9
Finland	1325.7	1276.4	1274.3	1274.6	0.0	1287.6	1.0	1171.3	1131.0	1129.6	1115.2	-1.3	1125.1	-0.4
France	12733.8	12191.2	12118.5	11513.9	-5.0	11377.7	-6.1	9087.8	8878.5	8880.9	8441.2	-5.0	8376.7	-5.7
Germany	9648.3	9304.4	9289.4	9166.6	-1.3	9165.4	-1.3	6990.1	6827.4	6829.0	6718.7	-1.6	6710.3	-1.7
Greece	1321.4	1263.6	1260.0	1210.0	-4.0	1202.5	-4.6	1276.2	1220.6	1217.6	1166.8	-4.2	1159.0	-4.8
Ireland	316.2	302.0	299.3	280.5	-6.3	280.5	-6.3	288.1	275.6	273.3	256.3	-6.2	256.2	-6.2
Italy	4729.5	4593.5	4583.0	4197.0	-8.4	4167.2	-9.1	3967.5	3866.5	3856.6	3525.8	-8.6	3498.0	-9.3
Netherlands	444.5	426.7	425.8	406.4	-4.6	411.3	-3.4	231.4	225.6	226.5	211.6	-6.6	213.2	-5.9
Portugal	701.9	637.7	622.4	594.5	-4.5	601.2	-3.4	504.2	457.3	446.1	423.9	-5.0	429.2	-3.8
Spain	8125.8	7526.2	7380.1	6939.3	-6.0	6898.3	-6.5	6519.7	6025.4	5900.0	5542.8	-6.1	5486.1	-7.0
Sweden	1348.3	1309.4	1311.1	1237.7	-5.6	1239.4	-5.5	1163.1	1130.7	1132.4	1052.3	-7.1	1053.1	-7.0
UK	4016.4	3901.9	3914.9	3600.7	-8.0	3598.6	-8.1	3202.7	3146.2	3165.8	2910.1	-8.1	2907.8	-8.2
EU-15	47983.3	45914.7	45660.1	43474.3	-4.8	43293.5	-5.2	37075.9	35818.6	35702.4	33911.0	-5.0	33770.3	-5.4

Table 21: Area under various decoupling scenarios in the EU-15 in mill. ha and as relative changes compared to Coupled, continued

	Oilseeds							Silage maize						
	Coupled			Actual		Full		Coupled			Actual		Full	
	2002	2009	2013	2013	change (%)	2013	change (%)	2002	2009	2013	2013	change (%)	2013	change (%)
Austria	91.1	80.0	79.0	70.2	-11.2	71.3	-9.8	73.2	70.0	68.7	61.6	-10.4	60.1	-12.6
Belgium/Lux.	8.3	7.4	7.4	6.7	-9.3	6.9	-6.4	184.0	166.4	159.5	146.1	-8.4	146.5	-8.1
Denmark	87.3	73.3	71.7	68.4	-4.6	68.8	-4.1	78.8	75.7	75.1	70.5	-6.1	70.5	-6.2
Finland	64.4	55.4	54.7	53.0	-3.1	54.6	-0.3							
France	1875.4	1648.0	1617.1	1523.0	-5.8	1507.0	-6.8	1428.6	1322.8	1278.5	1197.7	-6.3	1125.9	-11.9
Germany	1196.0	1039.3	1033.9	1030.9	-0.3	1027.5	-0.6	1136.2	1111.7	1100.5	1040.2	-5.5	1051.7	-4.4
Greece	18.6	16.7	16.4	16.0	-2.2	15.9	-2.7	6.5	6.2	6.1	5.8	-3.8	5.8	-4.0
Ireland	2.4	2.0	2.0	1.7	-14.9	1.7	-14.9	17.7	16.5	16.1	14.3	-11.0	14.4	-10.4
Italy	433.7	405.2	403.7	375.4	-7.0	372.5	-7.7	284.3	277.7	278.7	248.7	-10.8	249.3	-10.5
Netherlands	0.7	0.6	0.6	0.6	-6.7	0.6	-1.7	208.5	196.6	194.8	189.9	-2.5	193.0	-0.9
Portugal	43.7	35.9	34.0	30.6	-10.1	31.7	-6.6	108.0	98.5	96.3	94.4	-2.0	93.2	-3.2
Spain	838.0	741.0	722.7	673.9	-6.8	661.5	-8.5	80.1	71.8	69.4	66.1	-4.8	62.6	-9.7
Sweden	53.3	46.7	46.7	40.5	-13.3	40.8	-12.8							
UK	430.5	374.6	369.0	317.6	-13.9	317.5	-14.0	118.1	116.1	115.1	100.9	-12.4	101.6	-11.8
EU-15	5143.4	4526.2	4458.9	4208.5	-5.6	4178.2	-6.3	3723.9	3529.9	3458.8	3236.2	-6.4	3174.5	-8.2

Table 21: Area under various decoupling scenarios in the EU-15 in mill. ha and as relative changes compared to Coupled, continued

	Voluntary set-aside							Pasture						
	Coupled			Actual		Full		Coupled			Actual		Full	
	2002	2009	2013	2013	change (%)	2013	change (%)	2002	2009	2013	2013	change (%)	2013	change (%)
Austria	33.0	33.0	33.0	34.5	4.6	35.1	6.4	1917.2	1915.2	1915.2	1998.6	4.4	2000.2	4.4
Belgium/Lux.	3.0	3.0	3.0	3.4	13.0	3.5	15.3	586.0	583.4	582.8	634.0	8.8	636.0	9.1
Denmark	39.0	39.0	39.0	45.3	16.2	45.5	16.7	183.6	181.5	182.6	205.6	12.6	205.8	12.7
Finland	90.0	90.0	90.0	106.4	18.2	108.0	19.9	25.1	25.7	26.0	30.1	15.9	30.3	16.6
France	342.0	342.0	342.0	352.0	2.9	368.1	7.6	9965.3	9840.5	9826.3	10642.7	8.3	10791.5	9.8
Germany	326.0	326.0	326.0	376.7	15.5	376.0	15.3	5011.6	4943.8	4922.2	5296.2	7.6	5301.0	7.7
Greece	20.0	20.0	20.0	21.5	7.3	21.8	8.9	240.1	235.2	233.8	302.4	29.4	306.8	31.3
Ireland	8.0	8.0	8.0	8.2	3.0	8.2	2.9	3248.2	3186.3	3178.3	3432.5	8.0	3432.7	8.0
Italy	44.0	44.0	44.0	47.1	7.1	47.4	7.8	4364.3	4375.8	4393.0	5104.1	16.2	5126.3	16.7
Netherlands	4.0	4.0	4.0	4.4	9.7	4.5	12.8	892.1	893.4	897.8	956.4	6.5	956.7	6.6
Portugal	46.0	46.0	46.0	45.6	-0.8	47.0	2.2	186.6	181.8	179.7	206.6	15.0	213.5	18.8
Spain	688.0	688.0	688.0	656.5	-4.6	688.1	0.0	7180.3	6826.8	6718.7	7692.5	14.5	7889.3	17.4
Sweden	132.0	132.0	132.0	144.9	9.8	145.6	10.3	408.6	411.6	414.0	479.3	15.8	480.4	16.0
UK	265.0	265.0	265.0	272.1	2.7	271.8	2.6	4999.5	5017.5	5029.8	5590.3	11.1	5586.8	11.1
EU-15	2040.0	2040.0	2040.0	2118.6	3.9	2170.5	6.4	39208.4	38618.6	38500.1	42571.3	10.6	42957.3	11.6

Table 21: Area under various decoupling scenarios in the EU-15 in mill. ha and as relative changes compared to Coupled, continued

	Arable fodder						
	Coupled			Actual		Full	
	2002	2009	2013	2013	change (%)	2013	change (%)
Austria	138.4	131.4	129.2	159.2	23.3	158.4	22.7
Belgium/Lux.	134.0	121.9	118.1	156.2	32.2	160.6	35.9
Denmark	656.3	626.8	626.4	748.7	19.5	748.3	19.5
Finland	664.1	681.4	691.5	745.7	7.8	736.0	6.4
France	3377.1	3190.5	3140.3	3709.1	18.1	3806.2	21.2
Germany	989.3	953.4	940.4	1070.9	13.9	1080.9	14.9
Greece	293.7	282.4	279.2	287.0	2.8	289.3	3.6
Ireland	209.6	183.5	179.2	228.1	27.3	229.7	28.2
Italy	2134.3	2067.8	2082.0	2151.5	3.3	2179.2	4.7
Netherlands	120.5	113.0	112.6	159.4	41.6	170.6	51.5
Portugal	47.2	45.9	45.3	47.1	3.8	47.3	4.4
Spain	967.4	859.8	834.5	859.3	3.0	838.1	0.4
Sweden	939.6	932.8	934.3	1233.1	32.0	1242.0	32.9
UK	1273.3	1225.7	1212.2	1392.2	14.8	1404.9	15.9
EU-15	11944.8	11416.3	11325.1	12947.6	14.3	13091.6	15.6

Table 22: Livestock supply under various decoupling scenarios in the EU-15 in mill. tons and as relative changes compared to Coupled

	Beef							Sheep						
	Coupled			Actual		Full		Coupled			Actual		Full	
	2002	2009	2013	2013	change (%)	2013	change (%)	2002	2009	2013	2013	change (%)	2013	change (%)
Austria	209.6	204.3	201.1	200.6	-0.3	185.0	-8.0	8.0	7.6	7.9	6.1	-22.4	6.7	-15.0
Belg./Lux.	298.7	258.5	244.8	245.2	0.2	225.8	-7.8	4.4	3.8	3.6	2.8	-22.1	3.1	-14.9
Denmark	155.8	139.8	134.2	134.8	0.4	131.0	-2.4	2.0	1.7	1.7	1.9	10.3	1.5	-8.2
Finland	89.1	108.8	119.7	124.2	3.8	115.5	-3.5	0.5	0.5	0.5	0.5	6.7	0.4	-10.0
France	1589.0	1538.4	1488.5	1617.2	8.6	1483.1	-0.4	138.3	122.9	120.0	122.9	2.5	111.9	-6.7
Germany	1330.5	1301.5	1257.1	1115.0	-11.3	1171.7	-6.8	45.2	46.0	48.8	41.2	-15.6	42.1	-13.7
Greece	61.6	58.0	58.1	57.0	-2.1	57.3	-1.4	122.4	108.6	104.2	96.3	-7.6	96.8	-7.1
Ireland	533.4	441.4	438.5	399.7	-8.8	413.4	-5.7	75.7	60.9	56.4	47.1	-16.6	48.2	-14.6
Italy	1136.7	1156.6	1214.0	1126.8	-7.2	1150.2	-5.3	66.0	59.7	58.0	52.1	-10.1	52.5	-9.6
N'lands	417.4	338.1	321.8	337.7	4.9	284.2	-11.7	18.2	15.0	14.2	10.7	-24.5	11.5	-19.3
Portugal	99.8	84.7	82.0	81.4	-0.8	75.0	-8.5	25.3	23.0	22.3	21.4	-4.0	19.1	-14.2
Spain	647.6	549.7	535.8	553.8	3.4	507.5	-5.3	250.7	217.8	206.8	204.3	-1.2	186.9	-9.7
Sweden	146.0	159.5	166.1	168.9	1.7	164.5	-1.0	4.3	3.9	3.9	3.5	-11.1	3.7	-5.7
UK	680.7	686.9	683.3	585.2	-14.4	616.2	-9.8	328.7	308.8	312.9	262.1	-16.2	268.8	-14.1
EU-15	7395.9	7026.3	6945.1	6747.3	-2.8	6580.3	-5.3	1089.9	980.1	961.2	872.9	-9.2	853.1	-11.2

Table 22: Livestock supply under various decoupling scenarios in the EU-15 in mill. tons and as relative changes compared to Coupled, continued

	Non-ruminants						
	Coupled			Actual		Full	
	2002	2009	2013	2013	change (%)	2013	change (%)
Austria	613.0	666.5	687.8	693.4	0.8	696.1	1.2
Belg./Lux.	1482.7	1496.7	1537.4	1558.0	1.3	1566.2	1.9
Denmark	1911.0	1990.7	2016.8	2036.2	1.0	2043.7	1.3
Finland	251.5	282.9	291.8	295.4	1.3	296.5	1.6
France	4507.1	4642.6	4608.9	4649.8	0.9	4674.2	1.4
Germany	4906.1	5187.7	5250.6	5304.5	1.0	5316.3	1.2
Greece	293.8	285.1	286.0	285.4	-0.2	285.3	-0.3
Ireland	363.5	355.2	376.8	387.1	2.7	387.5	2.8
Italy	2637.9	2751.8	2773.8	2785.5	0.4	2789.1	0.6
N'lands	2248.8	2362.9	2481.0	2492.4	0.5	2500.2	0.8
Portugal	591.4	560.5	556.2	559.9	0.7	561.6	1.0
Spain	4011.6	4006.7	3970.7	3989.9	0.5	4001.3	0.8
Sweden	376.6	396.5	400.3	405.2	1.2	406.5	1.6
UK	2370.0	2275.9	2269.8	2306.1	1.6	2314.7	2.0
EU-15	26564.8	27261.8	27508.0	27748.8	0.9	27839.2	1.2

Table 23: Effects of various decoupling scenarios on incentive prices in the EU-15 relative to the reference scenario Coupled (in 2013)

	Grandes cultures		Cereals		Oilseeds		Silage maize		Grass		Arable fodder	
	Actual	**Full**	**Actual**	**Full**	**Actual**	**Full**	**Actual**	**Full**	**Actual**	**Full**	**Actual**	**Full**
Austria	-10.9	-8.5	-10.6	-8.3	-13.2	-10.7	-13.1	-14.8	142.7	153.3	30.9	31.8
Belgium/Luxembourg	-1.3	3.5	-1.2	3.5	-2.6	3.5	-3.7	-0.8	119.0	141.2	59.5	72.8
Denmark	5.8	7.2	5.6	6.9	5.2	6.4	3.1	3.6	115.5	118.2	39.5	40.2
Finland	3.8	6.6	3.7	6.3	4.2	7.1			125.2	133.9	15.8	14.8
France	-3.9	-4.1	-3.7	-4.2	-3.8	-5.1	-4.2	-10.8	94.6	118.2	31.5	36.9
Germany	7.7	7.8	7.1	7.4	6.9	7.1	0.9	2.6	95.2	98.4	31.2	33.5
Greece	-9.7	-11.1	-9.7	-11.2	-3.3	-4.2	-5.5	-5.9	271.1	298.4	2.8	3.6
Ireland	-4.9	-4.7	-4.8	-4.6	-5.0	-4.8	-11.9	-10.1	402.7	405.4	46.3	48.1
Italy	-5.1	-5.6	-6.1	-6.6	-0.2	-0.4	-5.2	-4.2	271.6	292.2	13.9	16.7
Netherlands	4.0	11.3	3.2	10.8	3.4	14.1	8.4	14.9	282.2	363.6	85.7	116.1
Portugal	-9.1	-5.8	-9.1	-6.1	-18.0	-11.5	-3.6	-4.1	98.8	140.1	2.1	4.6
Spain	-10.3	-10.3	-9.5	-9.7	-7.4	-9.3	-3.1	-8.6	170.4	231.3	5.6	2.7
Sweden	-2.9	-1.4	-2.6	-1.2	-2.9	-1.5			162.3	170.1	59.5	62.9
United Kingdom	-11.1	-10.9	-10.0	-9.8	-13.1	-12.9	-21.0	-19.2	420.9	424.0	25.8	27.8
EU-15	-2.4	-2.1	-2.6	-2.4	-1.3	-1.8	-2.3	-3.7	143.3	161.4	26.4	29.4

Table 23: Effects of various decoupling scenarios on incentive prices in the EU-15 relative to the reference scenario Coupled (in 2013), continued

	Voluntary set-aside		Beef		Sheep		Non-ruminants	
	Actual	Full	Actual	Full	Actual	Full	Actual	Full
Austria	-41.9	-34.8	-4.1	-11.6	-19.9	-17.5	0.8	1.0
Belgium/Luxembourg	-11.8	8.6	-3.4	-11.1	-19.5	-17.2	0.8	1.0
Denmark	16.4	20.4	-8.4	-11.0	-4.8	-17.0	0.7	1.0
Finland	7.8	18.1	-3.6	-11.6	-5.0	-17.5	0.8	1.1
France	-39.0	-18.1	0.2	-11.4	-5.0	-17.4	0.8	1.1
Germany	24.1	24.0	-15.9	-12.0	-20.2	-17.8	0.8	1.1
Greece	-23.6	-17.0	-10.9	-9.4	-15.7	-14.8	0.6	0.8
Ireland	-24.8	-24.9	-13.4	-9.8	-17.6	-15.4	0.7	0.9
Italy	-9.6	-3.8	-12.6	-10.6	-17.4	-16.5	0.7	0.9
Netherlands	8.2	41.4	2.5	-10.4	-18.6	-16.3	0.7	0.9
Portugal	-38.7	-24.7	-0.8	-10.1	-4.1	-15.9	0.7	0.9
Spain	-49.2	-30.0	0.6	-10.1	-4.4	-15.9	0.7	0.9
Sweden	-12.8	-8.6	-8.9	-11.6	-19.9	-17.5	0.8	1.0
United Kingdom	-41.1	-41.1	-15.5	-11.8	-20.1	-17.7	0.9	1.2
EU-15	-21.1	-11.8	-7.5	-11.1	-13.3	-16.8	0.8	1.0

Table 24: Effects of various decoupling scenarios on producer prices in the EU-15 relative to the reference scenario Coupled (in 2013)

	Grandes cultures		Cereals		Oilseeds		Silage maize		Grass		Arable fodder	
	Actual	**Full**	**Actual**	**Full**	**Actual**	**Full**	**Actual**	**Full**	**Actual**	**Full**	**Actual**	**Full**
Austria	2.1	2.5	2.3	2.6	1.3	1.4	-0.8	-8.2	-17.7	-27.2	-28.5	-35.4
Belgium/Luxembourg	1.3	0.2	1.8	2.1	1.3	1.5	-5.3	-17.3	-22.3	-33.2	-34.6	-44.5
Denmark	1.1	1.3	1.4	1.7	1.3	1.5	-14.8	-17.2	-31.8	-34.2	-35.2	-37.1
Finland	1.2	1.7	1.3	1.7	1.3	1.5			-30.4	-36.9	-18.3	-22.7
France	1.8	2.3	2.0	2.4	1.3	1.5	-2.5	-12.7	-16.3	-31.0	-21.9	-35.9
Germany	1.1	1.3	1.4	1.7	1.3	1.5	-20.5	-17.5	-33.0	-29.6	-34.6	-32.0
Greece	4.3	4.6	4.3	4.6	1.2	1.3	-5.8	-5.4	-55.8	-57.2	-19.5	-20.6
Ireland	1.6	1.9	1.7	2.0	1.3	1.5	-9.5	-6.5	-36.2	-32.8	-45.3	-43.2
Italy	3.1	3.4	3.5	3.8	0.5	0.5	-9.2	-7.8	-37.3	-36.4	-25.1	-24.8
Netherlands	0.6	-2.7	1.7	1.9	1.3	1.5	1.6	-10.7	-12.3	-22.0	-40.6	-51.6
Portugal	3.2	3.3	3.3	3.7	1.4	1.5	2.7	-1.3	-91.2	-94.2	-32.8	-38.4
Spain	2.5	3.1	2.5	3.0	1.4	1.5	0.5	-5.4	-26.6	-40.7	-12.7	-22.7
Sweden	1.0	1.3	1.4	1.7	1.3	1.5			-47.3	-49.7	-48.8	-50.9
United Kingdom	0.9	1.1	1.6	1.9	1.3	1.5	-11.6	-8.4	-45.4	-42.2	-42.4	-40.2
EU-15	1.7	2.0	2.0	2.3	1.2	1.3	-8.8	-13.1	-25.9	-32.1	-27.4	-32.4

Table 24: Effects of various decoupling scenarios on producer prices in the EU-15 relative to the reference scenario Coupled (in 2013), continued

	Beef		Sheep		Non-ruminants	
	Actual	Full	Actual	Full	Actual	Full
Austria	10.1	15.2	14.1	17.4	0.8	1.0
Belgium/Luxembourg	10.2	15.2	13.8	17.1	0.8	1.0
Denmark	10.2	15.1	13.7	17.0	0.7	1.0
Finland	10.1	15.2	14.1	17.4	0.8	1.1
France	10.2	15.2	14.0	17.3	0.8	1.1
Germany	10.0	15.2	14.3	17.7	0.8	1.1
Greece	9.0	13.4	12.4	15.3	0.6	0.8
Ireland	9.3	13.8	12.7	15.7	0.7	0.9
Italy	9.9	14.7	13.4	16.6	0.7	0.9
Netherlands	9.8	14.5	13.2	16.4	0.7	0.9
Portugal	9.6	14.2	13.0	16.1	0.7	0.9
Spain	9.6	14.2	13.0	16.1	0.7	0.9
Sweden	10.1	15.2	14.1	17.4	0.8	1.0
United Kingdom	10.1	15.2	14.2	17.6	0.9	1.2
EU-15	9.9	14.9	13.5	16.7	0.8	1.0

In case of silage maize, it makes a clear difference for member states whether COP payments a kept partly linked to production or not. In those member states, which kept their premiums coupled to the maximum possible degree (France and Spain), silage maize area decreases like in all other countries under the ACTUAL IMPLEMENTATION scenario. However, in contrast to all other countries this area decrease is by far lower than under the FULL DECOUPLING scenario. More specifically, silage maize area in France and Spain decreases by 6.3 % and 4.8 % under the ACTUAL IMPLEMENTATION scenario, while it decreases by 11.9 % and 9.7 % under the FULL DECOUPLING scenario, respectively. The weighted average decrease in the silage maize area in all other members of the EU-15 is 6.5 % under the ACTUAL IMPLEMENTATION scenario and even slightly lower under the FULL DECOUPLING scenario (5.8 %). In contrast to the full decoupling approach applied in other EU-15 member states direct payments for silage maize in France and Spain are still higher than for the substitutes grass and fodder. This leads to a relative benefit in silage maize production and, thus, to a significantly lower decrease in silage maize area than under the FULL DECOUPLING scenario. In the latter scenario fodder and grass are substituted for silage maize in the feed rations of ruminants. That is, the decrease in silage maize is significantly stronger if countries apply the full decoupling approach instead of the partial decoupling approach.

Voluntary set-aside area increases in almost all countries of the EU-15 resulting from i) the abolishment of the limit for voluntary set-aside area, ii) decreasing incentive prices for alternative land uses and, thus, less flexibility in the production decisions of farmers, and, iii) in case of some member states, even increasing incentive prices for voluntary set-aside. On EU-15 level, voluntary set-aside area under the ACTUAL IMPLEMENTATION scenario increases by almost 4 % from 2.04 mill. ha to 2.12 mill. ha as compared to the COUPLED scenario. The strongest increase in set-aside area occurs in Finland (18.2 %) followed by Denmark (16.2 %), and Germany (15.5 %). In these three member states set-aside payments even increased in the course decoupling. In general, increases in voluntary set-aside area are lower in those countries, where the even distribution of money over the total area leads to decrease in direct payments for set-aside. In Ireland, France, and the United Kingdom, for example, growth rates in voluntary set-aside area are not higher than 3 %. In Spain and Portugal, voluntary set-aside area is even expected to decrease under the ACTUAL IMPLEMENTATION scenario compared to the scenario COUPLED. The absolute increase in the regionalised payment in Germany, Denmark, Finland, and the Netherlands can be explained by relatively low coupling rates in the ruminant sector and a comparatively low total area where the available budget for decoupled payments is distributed on.

Compared to the ACTUAL IMPLEMENTATION scenario voluntary set-aside area under the FULL DECOUPLING scenario increases most in those countries, which have opted for partially coupled payments for grandes cultures under the ACTUAL IMPLEMENTATION scenario. In these countries, money that has been used to finance partially coupled payments is now redistributed evenly to all area uses and, thus, direct payments for voluntary set-aside increase while those for grandes cultures decrease. In France, for example, voluntary set-aside area increases by 4.7 percentage points. In Spain, voluntary set-aside area is 4.6 percentage points higher than under the ACTUAL IMPLEMENTATION scenario and is now exactly as high as in case of the reference scenario COUPLED. In all other countries, changes in voluntary set-aside area between the ACTUAL IMPLEMENTATION scenario and the FULL DECOUPLING scenario are lower.

In total, the increase in roughage area clearly overcompensates the decrease in cereal, oilseed, and silage maize area in each member state of the EU-15 apart from Portugal so that additional land, which has not been used at all under the COUPLED scenario, is used for production purposes under the ACTUAL IMPLEMENTATION scenario[43]. More specifically, in most member states total area rises between one and five percent. In Portugal, total area decreases slightly by 0.1 %, whereas area in Ireland (+7.6 %) and Sweden (+10.2 %) is projected to increase comparatively strongly[44].

The driving factors for the development of total area demand under the ACTUAL IMPLEMENTATION scenario are manifold: Firstly, area changes of course depend on the development of producer prices and direct payments. In this context, however, the degree of dependency of agricultural activities on prices plays a major role. For example, in Ireland and Austria, where pasture land accounts for a high share of total agricultural land due to geological and climatic conditions, prices are assumed to affect grassland cultivation only slightly. Secondly, major changes in prices and/or payments can only lead to significant changes in total area, if the landuse activity, which is directly affected by changing prices and/or payments, accounts for a comparatively large share in total area. For example, since roughages account for less than 25 % of total area, which is the lowest rate across all members of the EU-15, total area in Portugal does not increase, although incentive prices and area of roughages are rising heavily in relative terms. Thirdly, the physical endowment of

[43] Note that the land, which is not used for agricultural production at all, is different from voluntary and obligatory set-aside area.
[44] In addition to the products covered by Table 21, total area demand consists of sugar, rice, and potato area.

available land of course prevents an unrestricted extension of land that is used for agricultural activities. The more land is used for agricultural production the higher are the prices for land. That is, under the ACTUAL IMPLEMENTATION scenario higher prices for agricultural land thwart the area increasing effect of significantly increasing incentive prices for roughages. Table 25 shows that land prices are increasing heavily in all members except Portugal, Greece, Spain, and Finland as a result of a higher demand for land in the course of decoupling. Land prices increase the most in those members, where a high share of roughage area (Austria, Ireland, Netherlands, Italy, Sweden, France, Belgium/Luxembourg) and/or a relatively high dependency of roughage area on prices (Belgium/Luxembourg, Denmark, France, Germany, Italy, Sweden) and/or a comparatively scarce availability of non-used land (Germany, United Kingdom, Netherlands, France, Italy, Belgium/Luxembourg) exists.

Table 25: Effects of decoupling on land prices in EU-15 members under the Actual Implementation scenario compared to the COUPLED scenario (in %)

	Actual	Full			Actual	Full
Austria	++	++		**Ireland**	+++	+++
Belgium/Lux.	+++	+++		**Italy**	++	++
Denmark	++	++		**Netherlands**	+++	+++
Finland	+	+		**Portugal**	0	0
France	+++	+++		**Spain**	+	+
Germany	+++	++		**Sweden**	+++	+++
Greece	0	0		**United Kingdom**	+++	+++

+++: increase > 100 %
++: increase between 50 % and 100 %
+: increase between 10 % and 50 %
0: between 10 % decrease and 10 % increase

As mentioned above, beef and sheep production is developing downwards over time under the reference scenario COUPLED. Thereby, the production decrease is stronger between 2002 and 2009 than in the following period. Until 2009, beef (sheep) production on aggregated EU-15 level falls by about 370,000 tons (110,000 tons). From 2009 onwards, decreases amount to approximately 80,000 tons and 20,000 tons, respectively. As is case of grandes cultures, the reason for the strong decrease in ruminant production until 2009 is the strong appreciation of the Euro against the US-Dollar. In the years after, the rather moderate decrease in ruminant supply results from decreasing real values of policy measures like direct payments, intervention prices, and boarder measures.

As mentioned above, the introduction of direct payments for fodder and pasture under the ACTUAL IMPLEMENTATION scenario has a positive effect on roughage supply. This leads to a decline in prices and in most countries to a lower FCI for ruminants (see Table 26).

Table 26: Feed cost index in the EU-15 under various decoupling scenarios compared to the Coupled scenario (in %)

	Beef		Sheep		Non-ruminants	
	Actual	**Full**	**Actual**	**Full**	**Actual**	**Full**
Austria	-10.6	-16.4	-14.4	-21.6	0.9	1.1
Belgium/Luxembourg	-11.8	-18.9	-17.3	-25.7	0.5	0.5
Denmark	-22.6	-24.3	-29.6	-31.4	0.5	0.6
Finland	-13.6	-17.0	-15.7	-19.6	0.4	0.6
France	-12.3	-23.6	-16.0	-29.1	0.7	0.7
Germany	-20.9	-18.7	-26.5	-23.8	0.5	0.7
Greece	-2.8	-2.8	-6.2	-6.4	1.5	1.9
Ireland	-11.7	-10.4	-18.2	-16.3	-1.4	-0.9
Italy	-14.4	-14.0	-19.7	-19.2	0.9	1.2
Netherlands	-2.4	-5.2	-4.4	-7.9	1.0	1.1
Portugal	0.7	0.1	0.5	0.1	0.8	0.9
Spain	-5.0	-8.8	-8.6	-14.7	0.9	1.0
Sweden	-24.7	-26.0	-33.3	-35.0	0.5	0.7
United Kingdom	-12.7	-11.6	-19.9	-18.4	0.1	0.3
EU-15	-13.3	-16.2	-14.9	-17.4	0.6	0.8

Under the ACTUAL IMPLEMENTATION scenario feed costs for beef (sheep) producers are projected to decrease between 2.4 % (4.4 %) in the Netherlands and 24.7 % (33.3 %) in Sweden and by 13.3 % (14.9 %) on EU-15 average. This, in turn, has a stimulating effect on ruminant production. Accordingly, feed demand for arable fodder and grass increases, while it decreases for cereals, oilseeds, and most of all silage maize (see Annex C). As shown in Table 27 the share of those products, which have already been eligible for direct payments under the Agenda 2000, in the feed ration of beef (sheep) decreases between 1.2 % (2.2 %) in Portugal and more than 20 % in Sweden and Denmark when the ACTUAL IMPLEMENTATION scenario is applied. Under the FULL DECOUPLING scenario decreases are even somewhat more pronounced. In other words, roughages are substituted for grandes cultures in the feed rations for ruminants.

Table 27: Share of grandes cultures in feed rations of beef and sheep in the EU-15 under various scenarios compared to the Coupled scenario (in %)

	Actual		Full	
	Beef	Sheep	Beef	Sheep
Austria	-11.1	-16.4	-14.0	-21.9
Belgium/Luxembourg	-12.6	-16.5	-13.7	-19.3
Denmark	-20.9	-23.9	-21.7	-23.9
Finland	-14.8	-15.6	-19.7	-21.9
France	-12.3	-15.3	-19.0	-23.7
Germany	-12.5	-16.3	-11.8	-15.3
Greece	-4.5	-9.1	-4.8	-9.9
Ireland	-13.3	-18.0	-12.2	-16.4
Italy	-10.9	-19.5	-11.5	-19.5
Netherlands	-4.5	-7.5	-4.1	-9.5
Portugal	-1.2	-2.2	-1.2	-2.9
Spain	-6.4	-8.4	-10.6	-14.3
Sweden	-28.3	-31.0	-30.1	-33.0
United Kingdom	-15.0	-18.2	-14.1	-17.5
EU-15	-11.4	-12.0	-14.4	-14.8

While the decrease in feed costs has a positive effect on ruminant supply the decrease in direct payments for ruminants, of course, has a negative effect. The decrease in payments lies between lies between 23.4 % (Netherlands) and 100 % (Germany and Ireland) in case of beef and between 49.0 % (Portugal) and 100 % (Austria, Germany, Belgium/Luxembourg, Ireland, Netherlands, Sweden, and the United Kingdom) in case of sheep meat. In those countries, which have decoupled ruminant payments to a large extent or even completely, incentive prices decrease strongly so that the negative effect of decreasing direct payments dominates the supply effect, i.e. ruminant supply is decreasing and production systems become much more extensive. Due to the lower ruminant production on the aggregated EU-15 level, i.e beef production drops by almost 200,000 tons (2.8 %) and sheep supply by almost 90,000 tons (9.2 %), producer prices on EU-15 level increase by 9.9 % for beef and 13.5 % in case of sheep so that producers are (partly) compensated for the decreases in direct payments. In some of those member states, which keep their beef payments coupled to production to a large extent, this increase in producer prices even overcompensates the reductions in direct payments so that incentive prices increase (France, Netherlands, and Spain). In the end, beef and/or sheep meat production increases in those countries, where the supply decreasing effect of lower direct payments is offset by the production stimulating effect of lower fodder/grass prices and higher producer prices for ruminants. This is true in almost all EU-15 members that have kept larger parts of ruminant payments coupled to production. In detail, beef production in Finland (+3.8 %), France (+8.6 %), the Netherlands (+4.9 %), Spain (+3.4 %), Sweden (+1.7 %), Denmark (+0.4 %), and Belgium/Luxembourg (0.2 %) is higher under the ACTUAL IMPLEMENTATION scenario than under the COUPLED scenario. Sheep meat supply rises in Denmark (+10.3 %), Finland (+6.7 %), and France (+2.5 %). Here, the production decreasing effect of lower incentive prices (about -5 %) is compensated by extremely dropping prices for the major feed components grass and arable fodder. In general, decreases in ruminant production are much stronger in those countries, which have not opted for highly coupled ruminant payments.

In contrast to the ACTUAL IMPLEMENTATION scenario production of both beef and sheep under the FULL DECOUPLING scenario is lower than under the Coupled scenario in all countries across the EU-15. The largest decrease in beef supply occurs in the Netherlands (11.7 %) followed by the United Kingdom (9.8 %) and Portugal (8.5 %). On EU-15 level beef supply would decrease by 5.3 %. Also sheep meat supply decreases most strongly in the Netherlands (19.3 %). However, in several other countries as well as on aggregated EU-15 level sheep supply is also projected to decrease by more than 10 % in case of the full decoupling approach.

Compared to the ACTUAL IMPLEMENTATION scenario, ruminant production under the FULL DECOUPLING scenario is lower in those countries, which keep their ruminant payments partly coupled under the ACTUAL IMPLEMENTATION scenario. That is, ruminant producers in France, Austria, Belgium/Luxembourg, Finland, Portugal, Spain and most of all the Netherlands would suffer heavily, if their governments decide to abandon the option of granting payments for ruminants one day. While beef production in these countries even increases relative to the reference scenario COUPLED when the actual MTR reform comes into effect, it is lower than under coupled payments when member states fully decouple their payments. For example, beef production in the Netherlands and France is projected to be 54,000 tons and 134,000 tons lower under the FULL DECOUPLING scenario than under the ACTUAL IMPLEMENTATION scenario, respectively. The projected decrease in production takes place as a result of the elimination of direct payments, which can be offset neither by decreasing costs for the most important feed components fodder and grass nor by increasing producer prices for ruminants.

As a result of further decreasing ruminant supply on EU-level under the FULL DECOUPLING scenario, producer price increases that are measured relative to the COUPLED scenario are even stronger than under the ACTUAL IMPLEMENTATION scenario. More specifically, beef producer prices are about five percentage points and sheep producer prices approximately three percentage points higher than under the ACTUAL IMPLEMENTATION scenario. This partly compensates ruminant producers for the elimination of direct payments. Member states that have already abolished ruminant payments under the actual implementation of the MTR reform would strongly benefit if all other countries had to forgo these payments under a FULL DECOUPLING scenario. For example, as a result of lower beef supply and, thus, higher producer prices on European level, beef production in Germany, the United Kingdom, Ireland, and Italy would decrease much less if all countries abolished their beef premiums. In other words: Countries, which keep partially coupled ruminant payments under the MTR reform, provide their own farmers higher incentive prices and harm other countries' producers by contributing to lower producer prices, whereas countries that opt for an elimination of premiums leave their own producers to the market and contribute indirectly to higher producer prices on the international level.

Compared to the results for beef and sheep, incentive prices and supply of meat of non-ruminants, i.e. pork and poultry, change only slightly in EU-15 members. That is, incentive prices increase uniformly by somewhat less than one percent and supply changes vary between -0.2 % in Greece and +2.7 % in Ireland. This is no surprise as pork and poultry production is not directly affected by decoupling, but only indirectly via cross effects from other products and mostly through changing feed prices.

5.3 ESIM-2007 results for the new member states

In this section simulation results of ESIM-2007 for the NMS are described and interpreted. As mentioned above the design of one scenario as well as the choice of the reference scenario is different from the ones chosen for the analysis of the simulation results for the EU-15. The results of the ACTUAL IMPLEMENTATION scenario are not measured relative to a scenario with coupled direct payments, since there have never been coupled direct payments in the NMS, so that such a scenario would be highly hypothetical. Instead, the ACTUAL IMPLEMENTATION scenario itself is declared as the reference scenario. In order to address potential differences in market impacts of the SAPS on the one hand and the SFP on the other hand scenario results for the NMS are depicted and analysed for the years 2010 and

2013. The market developments under the reference scenario, which occur over time, are additionally described.

5.3.1 Direct payments

Table 28 shows that direct payments do not only differ among products and countries within the EU-15 but also within the group of NMS. As in case of their Western partners these differences can be traced back to different yield levels and coupling degrees of direct subsidies[45]. After the SAPS will be expired in 2011 NMS are not only allowed to link their top-ups to production but also to opt for partially coupled direct payments under the regionalised version of the SFP. As described above, these decisions have been partly different among countries. Table 28 presents the levels of direct payments under various scenarios in 2010 and 2013. Again, values are depicted in Euro and in real terms.

Apart from very few exemptions direct subsidies for cereals and oilseeds, silage maize, pasture, and arable fodder are higher in 2013 than in 2010. This is not only true for the NO TOP-UPS scenario, but also for the two other scenarios depicted in Table 28. Two aspects are responsible for this difference: Firstly, in 2010 NMS are assumed to apply the SAPS, which forsees a larger number of crops that is eligible to receive direct subsidies than the SFP, which will be in force from 2011 on. That is, since money is allocated to a larger area under the SAPS, direct subsidies per ha are lower than under the SFP. In case of the ACTUAL IMPLEMENTATION scenario, where differences in direct payments between 2010 and 2013 are higher than under the FULL DECOUPLING scenario, another, probably even more important reason exists: As mentioned in the description of the scenarios, the NMS are not assumed to pay the full amount of top-ups they have negotiated with the European Commission, i.e the level of top-ups does not reach 30 % of the final rate. As a result, the sum of direct payments and top-ups in 2010 also does not equal the final rate, while direct payments in 2013, which are fully paid by the EU-budget, of course reach the final rate.

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[45] As mentioned above, for the analysis of decoupling in the NMS the term “direct subsidies” is used as the aggregate of direct payments and national top-ups, if not indicated otherwise.

Table 28: Direct payments under various decoupling scenarios in the new member states (in Euro/ha) in 2010 and 2013

	Cereals and oilseeds						Silage maize						Pasture					
	Actual		Full		No top-ups		Actual		Full		No top-ups		Actual		Full		No top-ups	
	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013
Latvia	24	52	25	42	17	52	24	50	25	42	17	50	17	34	25	42	17	34
Romania	21	24	30	30	16	20	20	23	30	30	16	20	16	20	30	30	16	20
Slovenia	153	185	174	179	133	185	146	179	174	179	129	179	88	126	174	178	88	126
Lithuania	56	93	74	73	45	93	55	90	74	73	45	90	45	59	74	73	45	59
Bulgaria	38	51	53	64	30	44	38	51	53	64	30	44	30	44	53	64	30	44
Poland	79	131	100	120	68	131	78	127	100	120	68	127	68	97	100	119	68	97
Hungary	106	188	137	193	92	188	105	184	137	193	92	184	92	147	137	192	92	147
Czech Rep.	122	183	168	172	106	183	121	178	168	172	106	178	106	131	168	172	106	131
Slovakia	79	145	101	141	67	145	78	142	101	141	67	142	67	110	101	141	67	110
Estonia	51	87	73	78	42	87	50	85	73	78	42	85	42	62	73	77	42	62
	Arable fodder						Beef (Euro/ton)						Sheep (Euro/ton)					
	Actual		Full		No top-ups		Actual		Full		No top-ups		Actual		Full		No top-ups	
	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013
Latvia	19	34	25	42	17	34	26	71	0	0	0	71	124	338	0	0	0	338
Romania	16	20	30	30	16	20	24	17	0	0	0	0	88	63	0	0	0	0
Slovenia	88	126	174	178	88	126	273	249	0	0	191	249	556	506	0	0	389	506
Lithuania	45	59	74	73	45	59	37	117	0	0	0	117	183	573	0	0	0	573
Bulgaria	30	44	53	64	30	44	37	31	0	0	0	0	135	114	0	0	0	0
Poland	77	97	100	119	68	97	0	0	0	0	0	0	0	0	0	0	0	0
Hungary	92	147	137	192	92	147	38	108	0	0	0	108	140	398	0	0	0	398
Czech Rep.	106	130	168	172	106	131	74	232	0	0	0	232	181	567	0	0	0	567
Slovakia	67	110	101	141	67	110	26	74	0	0	0	74	140	398	0	0	0	398
Estonia	42	62	73	77	42	62	69	206	0	0	0	206	161	484	0	0	0	484

In 2010 direct subsidies under the FULL DECOUPLING scenario are higher than under the ACTUAL IMPLEMENTATION scenario. Of course, this is true only for crop products, since direct subsidies for beef and sheep do not exist under the FULL DECOUPLING scenario. The reason for this difference is simply the design of the scenarios. As mentioned above, member states are not assumed to spend the maximum possible amount of money for top-ups under the ACTUAL IMPLEMENTATION scenario, while they do so in case of the FULL DECOUPLING scenario.

Direct subsidies for ruminants do not exist in Poland. Since it decided to forgo national top-ups in that sector, it is assumed that it also forgoes direct payments for beef and sheep as soon as the SFP has to be applied in the NMS. All other countries negotiated top-ups for ruminants and are, thus, also expected to opt for ruminant payments under the SFP. Again, direct subsidies in 2013 are higher than in 2010. While they reach 74 Euro (Czech Republic) in case of beef and 183 Euro (Lithuania) for sheep in 2010, they reach 232 Euro and 573 Euro in 2013, respectively[46]. The reason for this difference is the fact that ruminant subsidies are allowed to be higher under the SFP than as a pure top-up within the SAPS. As in case of the EU-15 members the level of direct subsidies differs significantly among members. In first instance, this has to be traced back to varying levels of ruminant subsidies and to differences in the structure of ruminant husbandry. For example, according to the reports on the negotiations of the NMS with the European Commission Slovakia negotiated a top-up for suckler cows only. Husbandry of suckler cows in Slovakia, however, accounts for a smaller share in the country's total beef production than the subsidised ruminant production activities in the Czech Republic, Estonia, or Lithuania. Since the top-up for suckler cows in Slovakia does not have a higher level than the top-ups paid for various production activities in the latter countries, the aggregated beef subsidy per ton is lower in Slovakia. More specifically, in 2013 the direct subsidiy for beef in Slovakia amounts to 74 Euro. In the Czech Republic, Estonia, and Lithuania it reaches 232 Euro, 206 Euro, and 117 Euro, respectively. Slovenia has opted to apply the regionalised version of the SFP already from 2007 on and is therefore allowed to use higher degrees of coupling and to pay higher direct subsidies than the other countries in 2010. Direct subsidies in Bulgaria and Romania are mostly lower than in other countries due to their later accession to the EU.

[46] Slovenia is not considered here, since it is allowed to grant higher direct subsidies resulting from an earlier shift to the SFP (see also below).

In contrast to the ACTUAL IMPLEMENTATION scenario, subsidies for all products equalise in case of the FULL DECOUPLING scenario. Of course, subsidies for ruminants are abolished. Under the NO TOP-UPS scenario direct subsidies in 2010 are lower than in case of the other scenarios. In 2013 direct subsidies under the NO TOP-UPS scenario equal the values under the ACTUAL IMPLEMENTATION scenario, since at that point of time top-ups are completely phased out anyway in all countries but Romania and Bulgaria.

5.3.2 Impacts on agricultural markets

In the aftermath of EU-accession roughage area is projected to increase in all NMS (see Table 29)[47]. On aggregated NMS level pasture area rises from 14.5 mill. ha in 2002 to 15.0 mill. ha in 2007. Within the same period of time arable fodder area increases from 4.7 mln ha to 5.3 mill. ha. Thus, total roughage area goes up by more than 1.0 mill. ha. Two aspects are responsible for this development: On the one hand, the introduction of direct payments and top-ups; on the other hand, the strong increase in ruminant production and the resulting increases in feed demand. According to ESIM-2007 results beef supply goes up from 870,000 tons prior to accession to 1,143 mill. tons in 2007. Sheep supply is expected to more than double from 125,000 tons to 294,000 tons. Thereby, Romania and Bulgaria, the heavyweights of sheep production in the NMS, contribute by far the most to this increase.

One reason for the increase in ruminant production in the NMS are high producer prices on the EU market that are protected by border measures (ad valorem tariffs, specific duties, and export subsidies) and also apply for farmers in the CEECs after accession. Since most NMS additionally grant top-ups to ruminant producers, increases in incentive prices are even higher than in producer prices. However, though EU prices, of course, also apply for Slovenia, beef supply declines in the course of accession. The reason for this decrease in production are substantial subsidies that are granted for Slovenian exports prior to accession. While Slovenia is a net exporter of beef, the EU, whose price is relevant for each country that has acceded, is a net importer (see also below). Since EU tariffs can not hold up a price level that is as high as in Slovenia, Slovenian beef producers even face lower prices when their country accedes to the EU. However, due to stepwise phased in direct subsidies beef supply slowly recovers from 2004 on and is even expected to exceed its pre-accession level in 2013. Also in Slovakia, the Czech Republic, and Bulgaria border measures support high domestic beef prices prior to accession so that in case of an EU-membership increases in beef production are lower than in other countries.

In the CEECs, markets for sheep meat were not protected at all prior to accession to the EU so that farmers faced world market prices. In the EU, however, which is a net importer of sheep meat, market prices are higher due to protection by ad valorem tariffs and specific duties. For that reason, sheep supply is higher in 2007 than in 2002 in all NMS.

Between 2007 and 2010 relative beef supply increases are most significant in Romania (+9.9 %), Bulgaria (+6.5 %), and Slovenia (+4.2 %), where the effects of EU-accession and the introduction of the SFP are still obvious, respectively. In all other countries beef supply increases more moderately or decreases even slightly. From 2010 on, beef supply is expected to increase everywhere as a result of higher direct subsidies under the SFP. Increasing world market prices and slight decreases in feed costs, which result from an increase in roughage production, provide additional production incentives for ruminant producers and contribute to an overall trend of increasing supply over the whole projection period.

The area allocated to grandes cultures is slightly increasing over time under the ACTUAL IMPLEMENTATION scenario. While it amounts to 27.5 mill. ha in 2002, it goes up to 28.0 mill. ha in 2007 and to 28.3 mill. ha in 2013. In absolute terms, this area increase is more or less evenly distributed over cereals and oilseeds. Also silage maize area is increasing over the projection period as a result of higher feed demand by an increasing supply of ruminants and by higher direct subsidies after implementation of the SFP in 2011. Relative increases in grandes cultures area the strongest in Poland (+5.0 %) and Hungary (6.3 %), where farmers benefit from comparatively strongly increasing producer prices in the course of accession to the EU. The increase in grandes cultures area between 2010 and 2013 in most NMS can be traced back to higher direct payments after introduction of the SFP in 2011.

Between 2002 and 2007 oilseed area is increasing in all countries except Hungary and Estonia as a result of increasing world market prices. In the latter countries area is declining as a result of decreasing producer prices in the course of accession. More specifically, Hungary imposed export subsidies for rapeseed and sunflower seed, which led to comparatively high national prices prior to accession. Estonia was a net importer of oilseeds

[47] Section 5.2 has shown that decoupling does not affect non-ruminant production significantly. Consequently, the effects of the two decoupling scenarios, which have been formulated and run for the NMS, are not presented for non-ruminants.

in 2002 and benefited from a moderate tariff protection and, thus, relatively high domestic producer prices. After accession to the EU, however, farmers in both countries had to accept somewhat lower prices around the world market level, since the EU does not apply any boarder measures for oilseeds.

As shown above, the market developments from 2002 to 2013 under the reference scenario ACTUAL IMPLEMENTATION a largely driven by overall accession effects for the CEECs, which not only include the introduction of direct payments and top-ups but in first instance the adoption of boarder measures and internal EU prices. In the following paragraphs, however, the effects of different decoupling options regarding the design of direct payments and top-ups are described.

When looking at the ESIM-2007 results for the NMS it is striking that relative differences between scenario results are generally smaller than in case of the results for the EU-15 members (see Tables 29 to 32). This can be traced back to several reasons: First of all, in both years analysed for the NO TOP-UPS scenario and in the year 2010 of the FULL DECOUPLING scenario it is only the volume of top-ups, which is variable among scenarios. Top-ups, however, mostly account for a rather small share in each product’s incentive price, so that their influence is limited. Secondly, in case of grandes cultures countries are assumed not to pay the full amount of top-ups they would be allowed to pay.

Table 29: Area under various decoupling scenarios in the NMS in mill. ha and as % changes relative to Actual Implementation

	Grandes Cultures											
	Actual				Full				No top-ups			
	2002	2007	2010	2013	2010	chg.	2013	chg.	2010	chg.	2013	chg.
Latvia	438.6	433.4	432.0	435.3	430.5	-0.4	430.5	-1.1	429.4	-0.6	435.3	0.0
Romania	6787.5	6830.7	6818.1	6854.7	6794.7	-0.3	6835.2	-0.3	6805.9	-0.2	6854.7	0.0
Slovenia	128.5	130.0	131.0	130.6	127.8	-2.5	128.1	-2.0	130.2	-0.6	130.6	0.0
Lithuania	997.3	970.9	964.4	965.6	950.3	-1.5	945.8	-2.0	958.2	-0.6	965.6	0.0
Bulgaria	2625.4	2615.2	2611.2	2599.9	2614.2	0.1	2599.8	0.0	2600.3	-0.4	2599.9	0.0
Poland	9262.7	9598.4	9626.2	9721.7	9666.2	0.4	9643.1	-0.8	9577.1	-0.5	9721.7	0.0
Hungary	3581.6	3697.1	3746.0	3805.9	3695.5	-1.3	3728.8	-2.0	3728.0	-0.5	3805.9	0.0
Czech Rep.	2191.5	2223.6	2236.4	2273.2	2200.4	-1.6	2227.0	-2.0	2225.8	-0.5	2273.2	0.0
Slovakia	1135.5	1157.8	1160.8	1175.0	1153.0	-0.7	1158.1	-1.4	1153.7	-0.6	1175.0	0.0
Estonia	322.3	321.6	323.1	326.9	318.6	-1.4	320.4	-2.0	321.0	-0.6	326.9	0.0
NMS	27471.0	27978.7	28049.2	28288.8	27951.0	-0.3	28016.7	-1.0	27929.6	-0.4	28288.8	0.0
	Cereals											
	Actual				Full				No top-ups			
	2002	2007	2010	2013	2010	chg.	2013	chg.	2010	chg.	2013	chg.
Latvia	426.3	420.0	418.7	421.7	417.2	-0.3	417.1	-1.1	416.2	-0.6	421.7	0.0
Romania	5786.5	5703.5	5671.4	5687.2	5643.3	-0.5	5665.9	-0.4	5667.8	-0.1	5687.2	0.0
Slovenia	102.4	104.1	105.2	105.3	102.9	-2.2	103.6	-1.6	104.9	-0.3	105.3	0.0
Lithuania	937.7	907.2	900.8	899.9	887.1	-1.5	883.1	-1.9	895.8	-0.6	899.9	0.0
Bulgaria	2075.7	2039.2	2041.9	2027.0	2032.4	-0.5	2017.4	-0.5	2041.0	0.0	2027.0	0.0
Poland	8643.0	8918.3	8945.4	9028.9	8981.5	0.4	8957.0	-0.8	8900.5	-0.5	9028.9	0.0
Hungary	2962.7	3070.2	3102.6	3114.1	3047.9	-1.8	3051.3	-2.0	3095.4	-0.2	3114.1	0.0
Czech Rep.	1611.9	1604.1	1609.4	1622.1	1574.3	-2.2	1595.1	-1.7	1607.3	-0.1	1622.1	0.0
Slovakia	854.5	865.9	868.5	871.4	859.9	-1.0	860.1	-1.3	865.3	-0.4	871.4	0.0
Estonia	292.1	291.7	292.7	295.8	288.6	-1.4	290.2	-1.9	291.0	-0.6	295.8	0.0
NMS	23692.9	23924.0	23956.4	24073.2	23835.0	-0.5	23840.7	-1.0	23885.0	-0.3	24073.2	0.0

Table 29: Area under various decoupling scenarios in the NMS in mill. ha and as % changes relative to Actual Implementation, continued

	Oilseeds											
	Actual				Full				No top-ups			
	2002	2007	2010	2013	2010	chg.	2013	chg.	2010	chg.	2013	chg.
Latvia	11.2	12.2	12.2	12.5	12.1	-0.7	12.2	-2.0	12.1	-1.1	12.5	0.0
Romania	956.4	1080.4	1099.4	1120.0	1103.2	0.3	1121.1	0.1	1091.4	-0.7	1114.7	-0.5
Slovenia	1.0	1.2	1.2	1.3	1.2	-0.8	1.2	-1.6	1.2	-1.6	1.3	0.0
Lithuania	50.7	54.6	54.9	57.0	54.5	-0.7	54.3	-4.7	53.8	-2.0	57.0	0.0
Bulgaria	501.7	523.2	517.8	522.4	529.5	2.3	531.4	1.7	508.6	-1.8	515.3	-1.4
Poland	440.3	494.6	502.0	516.9	504.6	0.5	510.5	-1.2	498.2	-0.7	517.0	0.0
Hungary	486.5	474.0	487.6	521.6	488.7	0.2	510.4	-2.1	480.6	-1.4	521.7	0.0
Czech Rep.	356.9	388.1	395.4	409.1	395.1	-0.1	399.0	-2.5	391.1	-1.1	409.1	0.0
Slovakia	180.6	187.2	188.3	195.5	188.3	0.0	191.9	-1.9	186.1	-1.2	195.5	0.0
Estonia	30.0	29.6	30.0	30.8	29.7	-1.1	29.9	-2.8	29.7	-1.0	30.8	0.0
NMS	3015.4	3245.1	3288.7	3386.9	3307.0	0.6	3361.9	-0.7	3252.9	-1.1	3374.8	-0.4

	Silage maize											
	Actual				Full				No top-ups			
	2002	2007	2010	2013	2010	chg.	2013	chg.	2010	chg.	2013	chg.
Latvia	1.1	1.2	1.2	1.2	1.2	0.0	1.1	-1.7	1.2	-0.9	1.2	0.0
Romania	44.5	46.8	47.4	47.6	48.3	1.9	48.3	1.5	46.7	-1.4	47.1	-0.9
Slovenia	25.1	24.7	24.6	24.1	23.7	-3.6	23.2	-3.7	24.1	-2.0	24.1	0.0
Lithuania	8.9	9.2	8.8	8.7	8.7	-0.9	8.4	-3.3	8.7	-1.3	8.7	0.0
Bulgaria	48.1	52.9	51.6	50.5	52.2	1.3	51.0	1.1	50.7	-1.6	49.8	-1.2
Poland	179.4	185.5	178.9	175.9	180.1	0.7	175.6	-0.2	178.4	-0.3	175.9	0.0
Hungary	132.4	153.0	155.8	170.3	158.9	2.0	167.1	-1.8	152.0	-2.4	170.3	0.0
Czech Rep.	222.7	231.3	231.7	242.1	231.0	-0.3	232.9	-3.8	227.4	-1.8	242.1	0.0
Slovakia	100.3	104.7	104.0	108.1	104.8	0.8	106.2	-1.8	102.3	-1.6	108.2	0.0
Estonia	0.3	0.3	0.3	0.3	0.3	-3.4	0.3	-3.4	0.3	0.0	0.3	0.0
NMS	762.7	809.5	804.1	828.6	809.0	0.6	814.1	-1.8	791.8	-1.5	827.7	-0.1

Table 29: Area under various decoupling scenarios in the NMS in mill. ha and as % changes relative to Actual Implementation, continued

	Pasture											
	Actual				Full				No top-ups			
	2002	2007	2010	2013	2010	chg.	2013	chg.	2010	chg.	2013	chg.
Latvia	609.1	640.6	635.2	635.0	640.6	0.8	640.0	0.8	635.6	0.1	635.0	0.0
Romania	4937.0	4974.3	4989.0	4981.1	5023.9	0.7	5007.7	0.5	4992.9	0.1	4983.6	0.0
Slovenia	307.5	316.6	322.4	327.1	333.6	3.5	333.3	1.9	322.0	-0.1	327.1	0.0
Lithuania	373.3	388.6	389.1	387.6	392.4	0.8	391.4	1.0	390.0	0.2	387.6	0.0
Bulgaria	1615.1	1729.5	1714.6	1697.6	1732.2	1.0	1709.3	0.7	1715.2	0.0	1699.0	0.1
Poland	3766.1	3882.2	3857.0	3819.8	3915.3	1.5	3876.9	1.5	3869.8	0.3	3820.2	0.0
Hungary	1058.5	1135.4	1153.7	1165.6	1169.0	1.3	1180.0	1.2	1158.2	0.4	1165.7	0.0
Czech Rep.	912.9	950.6	966.5	965.2	977.6	1.2	983.8	1.9	971.7	0.5	965.2	0.0
Slovakia	841.9	874.2	882.6	891.1	900.6	2.0	907.8	1.9	885.5	0.3	891.2	0.0
Estonia	121.1	125.3	125.4	124.4	125.4	0.0	125.2	0.7	125.8	0.3	124.4	0.0
NMS	14542.5	15017.2	15035.5	14994.5	15210.6	1.2	15155.4	1.1	15066.5	0.2	14998.9	0.0
	Arable fodder											
	Actual				Full				No top-ups			
	2002	2007	2010	2013	2010	chg.	2013	chg.	2010	chg.	2013	chg.
Latvia	17.8	20.1	19.7	19.6	19.9	0.7	19.7	0.6	19.6	-0.4	19.6	0.0
Romania	1049.5	1138.1	1165.6	1181.6	1187.7	1.9	1200.2	1.6	1163.1	-0.2	1180.0	-0.1
Slovenia	28.7	29.0	29.3	29.7	30.5	3.8	30.2	1.9	29.1	-0.8	29.7	0.0
Lithuania	790.7	891.1	894.3	901.2	937.8	4.9	923.3	2.5	894.3	0.0	901.3	0.0
Bulgaria	100.4	121.9	123.1	124.4	127.6	3.6	128.1	3.0	122.4	-0.6	123.9	-0.4
Poland	726.2	848.5	855.8	862.2	882.0	3.1	895.0	3.8	846.5	-1.1	862.3	0.0
Hungary	696.5	862.3	906.8	985.1	992.9	9.5	1074.2	9.0	910.5	0.4	985.3	0.0
Czech Rep.	883.3	917.6	927.8	932.4	974.4	5.0	965.3	3.5	928.4	0.1	932.5	0.0
Slovakia	178.5	182.4	182.1	185.2	188.3	3.4	191.3	3.3	182.6	0.2	185.2	0.0
Estonia	255.3	288.8	292.9	298.4	306.0	4.5	305.2	2.3	292.7	-0.1	298.5	0.0
NMS	4726.9	5299.7	5397.5	5519.8	5646.9	4.6	5732.6	3.9	5389.2	-0.2	5518.3	0.0

Table 30: Livestock supply under decoupling scenarios in the NMS in mill. tons and as % changes relative to Actual Implementation

	Beef											
	Actual				Full				No top-ups			
	2002	2007	2010	2013	2010	chg. (%)	2013	chg. (%)	2010	chg. (%)	2013	chg. (%)
Latvia	18.9	29.5	29.5	31.1	30.3	2.7	31.3	0.8	29.2	-0.9	31.1	0.1
Romania	154.2	183.5	201.6	216.9	207.5	3.0	222.9	2.8	200.1	-0.7	215.7	-0.5
Slovenia	48.6	45.5	47.4	48.9	44.3	-6.5	45.9	-6.2	45.7	-3.5	48.9	0.0
Lithuania	53.5	74.8	70.8	71.3	73.3	3.6	71.1	-0.4	69.8	-1.4	71.4	0.1
Bulgaria	60.7	70.4	75.0	79.4	77.0	2.7	81.3	2.5	74.2	-1.1	78.7	-0.9
Poland	316.0	500.8	510.1	535.4	530.1	3.9	554.8	3.6	510.3	0.1	535.7	0.1
Hungary	37.1	45.6	46.8	51.3	48.9	4.4	52.0	1.4	46.2	-1.3	51.3	0.0
Czech Rep.	130.1	130.3	131.8	142.5	135.9	3.1	139.3	-2.2	128.9	-2.2	142.5	0.0
Slovakia	38.9	42.7	43.7	47.1	45.4	4.0	48.1	2.1	43.4	-0.7	47.1	0.0
Estonia	14.2	20.2	19.7	21.0	20.1	1.9	20.2	-3.9	19.2	-2.7	21.0	0.0
NMS	872.1	1143.4	1176.2	1244.7	1212.8	3.1	1266.8	1.8	1167.0	-0.8	1243.4	-0.1
	Sheep											
	Actual				Full				No top-ups			
	2002	2007	2010	2013	2010	chg. (%)	2013	chg. (%)	2010	chg. (%)	2013	chg. (%)
Latvia	0.4	0.7	0.8	0.9	0.8	-1.3	0.8	-8.0	0.8	-2.6	0.9	0.0
Romania	51.5	135.9	149.7	162.5	148.9	-0.5	163.1	0.4	146.9	-1.9	160.6	-1.1
Slovenia	1.0	3.7	4.1	4.1	3.7	-9.5	3.7	-9.5	4.0	-3.6	4.1	0.7
Lithuania	0.9	1.5	1.4	1.5	1.4	-1.4	1.3	-11.6	1.4	-4.9	1.5	0.7
Bulgaria	57.7	121.0	126.1	129.4	124.1	-1.6	128.3	-0.8	122.3	-3.1	126.3	-2.4
Poland	1.2	2.2	2.4	2.5	2.5	2.1	2.6	2.8	2.4	0.0	2.5	0.4
Hungary	8.3	19.0	20.9	24.0	21.4	2.1	22.9	-4.4	20.3	-3.2	24.1	0.5
Czech Rep.	2.0	4.7	5.0	5.4	5.1	1.4	5.1	-6.1	4.9	-3.0	5.5	0.6
Slovakia	1.9	4.5	4.9	5.5	4.9	-0.2	5.1	-6.4	4.7	-3.3	5.5	0.4
Estonia	0.3	0.6	0.6	0.6	0.6	1.7	0.6	-7.9	0.6	-3.4	0.6	1.6
NMS	125.2	293.7	315.9	336.4	313.3	-0.8	333.5	-0.8	308.1	-2.5	331.6	-1.4

Table 31: Effects of various decoupling scenarios on incentive prices in the NMS compared to Actual Implementation in %

	Grandes cultures				Cereals				Oilseeds			
	Full		No top-ups		Full		No top-ups		Full		No top-ups	
	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013
Latvia	0.6	-2.8	-2.4	0.0	0.6	-2.8	-2.4	0.0	0.4	-2.0	-1.6	0.0
Romania	2.9	2.0	-1.5	-1.0	2.9	2.0	-1.5	-1.0	2.8	1.9	-1.5	-1.0
Slovenia	2.7	0.1	-1.9	0.0	2.6	-0.1	-1.9	0.0	2.9	-0.5	-2.5	0.0
Lithuania	5.2	-4.5	-3.1	0.0	5.2	-4.4	-3.0	0.0	4.6	-4.2	-2.7	0.0
Bulgaria	4.5	3.5	-2.4	-1.9	4.1	3.2	-2.2	-1.7	5.6	4.4	-3.2	-2.5
Poland	4.9	-1.9	-2.5	0.0	5.1	-1.9	-2.6	0.0	3.2	-1.3	-1.6	0.0
Hungary	5.2	0.9	-2.3	0.0	5.0	0.9	-2.2	0.0	6.1	0.8	-2.8	0.0
Czech Rep.	7.9	-1.3	-2.8	0.0	7.8	-1.4	-2.8	0.0	7.3	-1.4	-2.6	0.0
Slovakia	4.9	-0.5	-2.6	0.0	4.9	-0.4	-2.5	0.0	4.7	-0.7	-2.6	0.0
Estonia	8.6	-2.8	-3.2	0.0	9.2	-2.9	-3.4	0.0	5.4	-1.8	-2.0	0.0
NMS	4.8	-0.2	-2.3	-0.3	4.7	-0.3	-2.3	-0.3	4.7	0.3	-2.2	-0.4

	Silage maize				Grass				Arable fodder			
	Full		No top-ups		Full		No top-ups		Full		No top-ups	
	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013
Latvia	1.7	-2.3	-2.4	0.0	7.5	4.6	-1.1	0.0	2.4	1.0	-1.2	0.0
Romania	5.5	4.1	-2.8	-1.9	11.1	8.0	-1.8	-1.2	5.5	4.2	-1.3	-0.9
Slovenia	-0.8	-4.0	-4.4	0.0	34.2	16.4	-2.6	0.1	11.9	5.0	-2.7	0.1
Lithuania	6.5	-5.0	-3.3	0.0	23.3	7.9	-1.0	0.0	15.8	5.2	-0.8	0.0
Bulgaria	5.5	4.6	-3.8	-3.0	15.8	12.1	-3.4	-2.6	9.1	7.5	-2.4	-1.9
Poland	4.6	0.0	-1.4	0.0	16.7	9.9	-0.2	0.0	7.0	5.7	-2.2	0.0
Hungary	9.7	1.1	-4.8	0.0	28.0	19.9	-1.0	0.0	20.9	16.5	-1.1	0.0
Czech Rep.	10.2	-5.0	-5.3	0.0	34.1	16.5	-1.5	0.0	19.2	7.2	-2.0	0.0
Slovakia	7.8	-1.2	-4.4	0.0	26.9	16.9	-0.8	0.0	11.8	7.4	-1.2	0.0
Estonia	7.8	-3.7	-3.5	0.0	25.2	7.9	-1.7	0.0	17.3	5.4	-1.4	0.0
NMS	7.0	-1.7	-3.7	-0.1	18.2	11.5	-1.3	-0.5	13.2	7.9	-1.6	-0.2

Table 31: Effects of various decoupling scenarios on incentive prices in the NMS compared to Actual Implementation in %, continued

	Beef				Sheep			
	Full		No top-ups		Full		No top-ups	
	2010	2013	2010	2013	2010	2013	2010	2013
Latvia	3.4	0.6	-1.4	0.1	-1.9	-7.9	-3.7	0.5
Romania	3.5	3.6	-1.3	-0.9	-0.7	0.7	-2.5	-1.6
Slovenia	-9.4	-8.2	-4.0	0.1	-14.2	-12.6	-4.5	0.5
Lithuania	2.7	-1.8	-2.0	0.1	-3.7	-14.3	-5.5	0.5
Bulgaria	2.7	2.8	-2.0	-1.6	-2.2	-1.0	-4.1	-3.3
Poland	4.9	4.6	0.1	0.1	2.4	3.0	0.4	0.6
Hungary	2.7	-1.3	-2.0	0.1	-2.4	-9.6	-4.2	0.5
Czech Rep.	0.6	-7.4	-4.0	0.1	-3.7	-14.1	-5.5	0.5
Slovakia	3.4	0.5	-1.4	0.1	-2.4	-9.6	-4.2	0.5
Estonia	0.9	-6.2	-3.7	0.1	-3.0	-12.0	-4.9	0.5
NMS	3.0	1.2	-1.3	-0.2	-1.7	-1.5	-3.4	-1.9

Table 32: Effects of various decoupling scenarios on producer prices in the NMS compared to Actual Implementation in %

	Grandes cultures				Cereals				Oilseeds			
	Full		No top-ups		Full		No top-ups		Full		No top-ups	
	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013
Latvia	0.2	0.3	0.0	0.0	0.2	0.4	0.0	0.0	0.1	0.2	0.1	0.0
Romania	0.4	0.4	0.0	0.0	0.4	0.4	-0.1	0.0	0.0	0.1	0.1	0.0
Slovenia	0.2	0.5	0.1	0.0	0.5	0.5	0.0	0.0	0.1	0.2	0.0	0.0
Lithuania	0.3	0.1	-0.1	0.0	0.2	0.4	0.0	0.0	0.1	0.2	0.1	0.0
Bulgaria	0.1	0.1	0.2	0.1	0.3	0.3	0.0	0.0	0.0	0.1	0.1	0.1
Poland	0.2	0.3	0.0	0.0	0.2	0.5	0.0	-0.1	0.1	0.2	0.1	0.0
Hungary	0.2	0.4	0.1	0.0	0.4	0.4	0.0	0.0	0.0	0.1	0.1	0.0
Czech Rep.	0.3	0.2	0.0	0.0	0.2	0.3	0.0	0.0	0.1	0.2	0.1	0.0
Slovakia	0.1	0.3	0.1	0.0	0.3	0.4	0.0	0.0	0.1	0.2	0.1	0.0
Estonia	0.2	0.1	0.0	0.0	0.2	0.4	0.0	0.0	0.1	0.2	0.1	0.0
NMS	0.2	0.3	0.0	0.0	0.3	0.4	0.0	0.0	0.1	0.2	0.1	0.0

	Silage maize				Grass				Arable fodder			
	Full		No top-ups		Full		No top-ups		Full		No top-ups	
	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013
Latvia	1.1	1.0	0.1	0.0	0.1	-2.0	-1.3	0.1	0.3	-1.5	-0.7	0.0
Romania	-1.5	-0.5	0.5	0.4	-0.9	0.5	-2.1	-1.4	-2.5	-1.0	-1.5	-1.0
Slovenia	-8.3	-6.1	-1.9	0.1	-19.7	-15.4	-5.0	0.2	-18.2	-13.9	-3.8	0.1
Lithuania	-0.5	0.4	0.4	0.0	-4.0	-6.1	-1.7	0.1	-7.5	-6.8	-1.3	0.0
Bulgaria	-2.0	-1.0	-0.3	-0.4	-4.1	-2.1	-4.6	-3.9	-7.9	-5.7	-3.1	-2.6
Poland	0.7	1.7	0.5	0.0	-0.7	-0.7	-0.4	0.0	-2.2	-3.1	1.5	0.0
Hungary	-6.0	-4.7	0.8	0.1	-7.5	-10.8	-2.9	0.2	-13.2	-15.7	-2.6	0.2
Czech Rep.	-4.8	-7.0	-1.8	0.1	-6.8	-13.0	-4.3	0.1	-9.4	-13.5	-3.7	0.1
Slovakia	-2.2	-1.8	0.1	0.1	-3.9	-6.0	-2.0	0.1	-4.7	-6.7	-1.8	0.1
Estonia	-1.4	-2.1	-0.8	0.0	-4.7	-8.1	-2.9	0.1	-8.5	-8.6	-2.2	0.0
NMS	-2.4	-2.2	-0.2	0.0	-2.4	-2.2	-2.0	-0.9	-6.2	-6.9	-1.4	-0.3

Table 32: Effects of various decoupling scenarios on producer prices in the NMS compared to Actual Implementation in %, continued

	Beef				Sheep			
	Full		No top-ups		Full		No top-ups	
	2010	2013	2010	2013	2010	2013	2010	2013
Latvia	4.9	4.6	0.1	0.1	2.4	2.9	0.4	0.6
Romania	4.9	4.6	0.1	0.1	2.4	2.9	0.4	0.6
Slovenia	4.9	4.6	0.1	0.1	2.4	2.9	0.4	0.6
Lithuania	4.9	4.6	0.1	0.1	2.4	2.9	0.4	0.6
Bulgaria	4.9	4.6	0.1	0.1	2.4	2.9	0.4	0.6
Poland	4.9	4.6	0.1	0.1	2.4	2.9	0.4	0.6
Hungary	4.9	4.6	0.1	0.1	2.4	2.9	0.4	0.6
Czech Rep.	4.9	4.6	0.1	0.1	2.4	2.9	0.4	0.6
Slovakia	4.9	4.6	0.1	0.1	2.4	2.9	0.4	0.6
Estonia	4.9	4.6	0.1	0.1	2.4	2.9	0.4	0.6
NMS	4.9	4.6	0.1	0.1	2.4	2.9	0.4	0.6

With respect to particular products and product categories ESIM-2007 projects a higher production of beef under the FULL DECOUPLING scenario than under the ACTUAL IMPLEMENTATION scenario for most NMS (see Table 30). In some countries also sheep supply is expected to increase. On the first view, an increase in ruminant supply is quite surprising, since direct payments for ruminants are completely abolished under the full decoupling approach. However, since not only direct subsidies in the NMS but also direct payments in EU-15 countries are eliminated, supply on the aggegated EU level is decreasing. As shown above for the year 2013, EU-15 beef and sheep production under the FULL DECOUPLING scenario is approximately 170,000 tons and 20,000 tons lower than under the ACTUAL IMPLEMENTATION scenario, respectively. Due to the decrease in supply on the aggregated EU level, producer prices for beef (sheep) increase by 4.9 % (2.4 %) in 2010 and 4.6 % (2.9 %) in 2013. This increase in producer prices, in turn, has a supply stimulating effect. Another production increasing effect results from lower costs for roughages (see Table 32). This decrease in feed costs results from the abolishment of coupled subsidies for grandes cultures and the resulting substitution of grass and arable fodder for grandes cultures in the area allocation process (see Table 29). Finally, ruminant supply increases in those countries, where the supply increasing effect of higher producer prices and reduced costs for feed components overcompensate the decrease in direct payments. In case of beef this is true for all countries that have opted for comparatively low or moderate levels of subsidies. In 2010, when direct subsidies for ruminants consist of relatively low top-ups only, beef production increases in all countries except Slovenia, which is already allowed to grant direct payments for beef under the SFP. In 2013, however, when all NMS apart from Romania and Bulgaria apply the SFP, beef production under the FULL DECOUPLING scenario also decreases in Estonia, the Czech Republic, and Lithuania. These countries as well as Slovenia opted for the highest levels of subsidies among the group of NMS.

In case of sheep, for which all countries apart from Poland opted for the same level of payments, production in the year 2010 goes up in Poland, Hungary, the Czech Republic, and Estonia. As shown in Tables 31 and 33, the three latter member states benefit from prices for grass and arable fodder as well as from the FCI that are expected to decrease stronger than in most other countries. Poland does not only benefit from a lower FCI but also from an increase in the incentive price for sheep (+2.4 %) that results from a higher producer price for sheep on the European level (+2.4 %).

Table 33: Feed cost index for beef and sheep meat in the new member states under various decoupling scenarios compared to the Actual Implementation scenario (in %)

	Beef				Sheep			
	Full		No top-ups		Full		No top-ups	
	2010	2013	2010	2013	2010	2013	2010	2013
Latvia	0.2	-0.8	-0.6	0.0	0.2	-1.2	-0.9	0.0
Romania	-0.2	0.4	-0.7	-0.5	-0.4	0.3	-1.0	-0.6
Slovenia	-7.1	-5.2	-1.8	0.0	-10.5	-7.9	-2.6	0.1
Lithuania	-3.0	-2.9	-0.6	0.0	-4.1	-4.0	-0.9	0.0
Bulgaria	-0.7	-0.2	-1.0	-0.8	-1.2	-0.5	-1.5	-1.2
Poland	-0.2	0.0	0.1	0.0	-0.4	-0.4	0.1	0.0
Hungary	-4.6	-5.5	-1.0	0.1	-6.6	-8.2	-1.6	0.1
Czech Rep.	-6.8	-10.5	-3.0	0.1	-7.7	-12.0	-3.5	0.1
Slovakia	-3.0	-4.2	-1.2	0.1	-3.6	-5.2	-1.6	0.1
Estonia	-3.2	-3.5	-1.0	0.0	-4.6	-5.0	-1.4	0.0
NMS	-1.5	-1.5	-0.6	-0.2	-1.4	-0.6	-1.3	-0.9

In 2013, low costs for feed components can not outweigh the production decreasing effect of abolished direct payments so that a more pronounced increase in sheep supply only takes place in Poland. Since Poland did not opt for ruminant subsidies under the MTR reform it does not have to suffer from their abolishment under the FULL DECOUPLING scenario. Since Bulgaria and Romania still pay relatively low levels of top-ups and no direct payments at all in 2013, the elimination of direct subsidies under the FULL DECOUPLING scenario does not lead to major changes in sheep supply.

Under the NO TOP-UPS scenario beef and sheep production is almost 10,000 tons (-0.8 %) and 8,000 tons (-2.5 %) lower than under the ACTUAL IMPLEMENTATION scenario, respectively. The only country, which would not be affected from an abolishment of top-ups in 2010, is Poland. In all other NMS beef production is reduced between 0.7 % (Slovakia and Romania) and 3.5 % (Slovenia), while supply of sheep decreases between 1.9 % in Romania and 4.9 % in Lithuania. Again, the abolishment of national top-ups for beef matters the most in those countries that have opted for relatively high levels of top-ups under the MTR reform and vice versa.

In comparison to the FULL DECOUPLING scenario beef and sheep supply under the NO TOP-UPS scenario is even about 45,000 tons and approximately 5,000 tons lower, respectively. This difference in ruminant production occurs although subsidies for beef and sheep are eliminated under both scenarios. However, in contrast to the Full Decoupling approach the volume of subsidies under the NO TOP-UPS scenario is not transferred to grandes cultures and roughages either. As a result, direct payments, incentive prices, and finally roughage production is lower under the NO TOP-UPS scenario so that costs for the major feed components decrease more moderately. The production incentive for ruminants is accordingly lower.

As mentioned above arable fodder and pasture area increases in most NMS under conditions of fully decoupled payments and top-ups. This is clearly due to a relative increase in incentive prices for roughages compared to grandes cultures on the one hand and a higher feed demand by ruminant producers on the other hand. Incentive prices for pasture land and grass in the NMS increase by 18.2 % and 13.2 % in the year 2010 and by 11.5 % and 7.9 % three years later, respectively.

Area growth rates for arable fodder vary between 0.7 % in Latvia and 9.5 % in Hungary in 2010 and between 0.6 % in Latvia and 9.0 % in Hungary in 2013. Thereby, Poland and Latvia dispose of the lowest increase rates in 2010, since they have opted for coupled top-ups for arable fodder under the MTR reform so that top-ups decrease in case of full decoupling. The consequences of introducing fully decoupled payments for grassland are more moderate. That is, the increase on NMS level does not amount to more than 1.2 %. The effects of the NO TOP-UPS scenario on roughage area can be neglected.

As a result of the shift of financial means from the ruminant production sector to the plant production sector and the assumed increase in overall spendings for top-ups, direct payments and incentive prices for grandes cultures in 2010 are higher under the FULL DECOUPLING scenario than in case of the ACTUAL IMPLEMENTATION scenario. Thereby, the increase in incentive prices is additionally supported by a slight increase in producer prices, which follows from a lower supply of grandes cultures in the enlarged EU. On NMS average incentive prices for grandes cultures in 2010 rise by 4.8 %. However, since direct payments and incentive prices for grass (+18.2 %) and arable fodder (+13.2 %) increase more significantly in relative terms, grandes cultures area falls slightly in most countries. Thereby, the strongest decrease occurs in Slovenia, which has to forgoe the highest amount of money for grandes cultures in course of distributing financial means evenly among hectares. For the year 2013 the projected overall decrease in grandes cultures is still moderate, though somewhat stronger than in 2010. This can be explained by the fact that the increase in overall spendings for top-ups, which is assumed for the FULL DECOUPLING scenario, only influences the comparison of the results of the FULL DECOUPLING and the ACTUAL IMPLEMENTATION scenario in 2010, since top-ups are completely phased out in 2013 anyway. In general, the smallest decreases or even slight increases in grandes cultures area are projected for Latvia, Romania, Bulgaria, and Poland. Here, increases in incentive prices and area of roughages are the lowest among all NMS. Compared to the ACTUAL IMPLEMENTATION scenario area in the NMS is 100,000 ha lower in 2010 (-0.3 %) and about 270,000 ha lower in 2013 (-1.0 %).

The effects of an abolishment of top-ups are also very moderate. In 2010 grandes cultures area on aggregated NMS level decreases by 0.4 %. Compared to the decreases in cereal and oilseed area the area allocated to silage maize decreases to a somewhat larger extent of 1.5 % (12,000 ha), since not only top-ups for silage maize itself but also those for ruminants are abolished. This, in turn, has an additional negative effect on production.

The abolishment of direct subsidies for ruminants combined with an even distribution of total available money among hectares and the increase in total spendings for top-ups under the FULL DECOUPLING scenario leads to an increasing demand for agricultural land in all NMS. As a result, additional land is taken into agricultural production and land prices increase. Table 34 shows the change in land prices under the FULL DECOUPLING and the NO TOP-UPS scenario relative to the ACTUAL IMPLEMENTATION scenario. Thereby relative changes as a result of the implementation of the full decoupling approach are presented for the year 2013. Results for the NO TOP-UPS scenario are depicted for 2010.

Under the FULL DECOUPLING scenario, the smallest increases in prices for agricultural land compared to the ACTUAL IMPLEMENTATION scenario occur in those countries, where no or almost relatively low levels of direct payments for ruminants exist under the ACTUAL IMPLEMENTATION scenario. This can be explained as follows: The smaller the amount of money, which is transferred from the ruminant to the plant production sector when switching to the full decoupling approach, the smaller are ceteris paribus the additional direct subsidies granted to plant producers. Accordingly land prices in Poland, Latvia, and Slovakia do not increase by more than 10 %. In contrast, land prices in Slovenia are projected to rise by more than 50 %. However, the effect of introducing a full decoupling approach on land prices does not only depend on the transfer of financial means to plant producers. For example, the size of the ruminant sector and the size of area, where the transferred money is distributed to, as well as the endowment of additional land, which could possibly used for production purposes, also determine the influence of policy changes on land prices. Therefore, expected increases in land prices in Estonia and the Czech Republic, for example, are not as high as those for Slovenia, though the level of direct payments per ton of sheep or beef is not much lower.

Table 34: Effetcs of decoupling on land prices in the new member states under various scenarios compared to the ACTUAL IMPLEMENTATION scenario (in %)

	Full	No top-ups		Full	No top-ups
Latvia	0	0	**Poland**	0	0
Romania	+	0	**Hungary**	+	0
Slovenia	++	0	**Czech Republic**	+	-
Lithuania	0	0	**Slovakia**	0	0
Bulgaria	+	0	**Estonia**	+	-

++: increase between 50 % and 100 %
+: increase between 10 % and 50 %
0: between 10 % decrease and 10 % increase
-: decrease between 20 % and 50 %

Land prices for Romania and Bulgaria are projected to increase by more than 20 % because these countries still receive top-ups, for which spendings under the FULL DECOUPLING scenario increase compared to the ACTUAL IMPLEMENTATION scenario. Accordingly, the demand for additional agricultural land and, thus, the level of land prices increase. In case of the NO TOP-UPS scenario direct payment and incentive price levels decrease in comparison to the ACTUAL IMPLEMENTATION scenario. As a result, land prices fall slightly between 4 % in Slovakia and 14 % in Estonia. Of course, the effect of eliminating top-ups on land prices depends among other things on the share of top-ups in the incentive price and on the overall scarcity of land.

5.4 Effects of decoupling on trade

As shown in sections 5.2 and 5.3 decoupling can have major effects on area allocation, production, and demand patterns for most agricultural activities. The projected impact of decoupling, of course, varies among scenarios, countries, and products. On aggregated level of the enlarged EU extreme simulation results in specific countries are outweighed to some extent. However, also on EU-level decoupling is expected to have a considerable effect. In relative terms this is most of all true for grandes cultures, roughages, and sheep meat. Therefore, decoupling can be expected to have some effect on the overall trade position of the EU, which is addressed in this section.

Table 35 illustrates net exports and the net trade position of the EU-25 under the scenarios COUPLED, ACTUAL IMPLEMENTATION, and FULL DECOUPLING in the year 2013[48]. For the NMS the scenario COUPLED is a hypothetical construct to some extent, since payments are modelled as coupled payments that are stepwise phased in. Apart from rapeseed, the direction of the EU's trade position is not changed for any commodity. In case of rapeseed, the position changes from a net exporting status with a surplus of almost 600,000 tons under the COUPLED scenario to a net importeing status of almost 200,000 tons under the FULL DECOUPLING scenario. As shown above, this does, however, not lead to an increase in European prices, since the EU market for oilseeds is not protected by boarder measures at all so that the world market prices applies in each trade situation.

Though the EU's trade position is not shifted from an import to an export position or vice versa for all products other than rapeseed, major changes in the quantities traded still exist among scenarios. In case of cereals, for example, net exports are simulated to decrease from 23.4 mill. tons under the COUPLED scenario to 16.6 mill. tons and 15.6 mill. tons under the ACTUAL IMPLEMENTATION and the FULL DECOUPLING scenario, respectively. Thereby, the net export position of most types of cereals is weakened to some extend. In case of Corn, however, the EU strengthens its weak net import position. Net imports are increased from 8,000 tons under the COUPLED scenario to 90,000 tons and 112,000 tons under the alternative scenarios, respectively.

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[48] Results are not depicted for the NO TOP-UPS scenario. As shown above, under this scenario relative changes on production and area allocation have a direct impact on the NMS only and are projected to be rather moderate so that the effects on the overall trade position of the EU can also be expected to be rather small.

Table 35: Net exports of the EU under various scenarios (in 1,000 tons) in 2013

	2013		
	Coupled	**Actual**	**Full**
Cereals	23437	16595	15624
Common wheat	15361	10906	10135
Durum	1599	386	373
Barley	3843	3086	2946
Corn	-8	-90	-112
Rye	2568	2247	2235
Other grains	74	59	48
Oilseeds	-21457	-22906	-23112
Soybean	-19491	-19851	-19915
Rapeseed	597	-91	-199
Sunflower seed	-2563	-2964	-2998
Beef	-374	-422	-444
Sheep	-218	-245	-259

Apart from rapeseed the strong deficit situation in the EU's oilseed trade is further strengthened. With respect to ruminants the slight import situation becomes somewhat stronger, that is net imports increase by 48,000 (70,000) tons in case of beef and by 27,000 (41,000) tons for sheep meat under the ACTUAL IMPLEMENTATION and the FULL DECOUPLING scenario, respectively.

5.5 Summary

According to the results of ESIM-2007 decoupling has a clear impact on agricultural markets. The simulation results show that decoupling in EU-15 members and the shift from partially coupled subsidies to fully decoupled subsidies in the NMS lead to an area shift from grandes cultures towards grass and arable fodder. Thereby, overall area demand and thus prices for agricultural land increase, which in turn dampens the overall increase in area to some extent. In the EU-15 region grandes cultures area decreases by 4.8 % on average, while pasture area and area allocated to arable fodder increases by 10.6 % 14.3 %, respectively. In the NMS effects are less pronounced amounting to a decrease of 0.3 % in case of grandes cultures and to an increase of 1.2 % and 4.6 % for grassland and arable fodder area, respectively. In more general terms, the more decoupled direct payments, the stronger is the substitution of roughages for grandes cultures. However, decrease rates for grandes cultures differ strongly between partial and full decoupling only in case of silage maize.

Voluntary set-aside area is measured for the old member states only. Under the actual implementation of the MTR reform it increases in almost all countries (between 2.9 % and 18.2 %) resulting mainly from the abolishment of the limit for voluntary set-aside area. Under fully decoupled payments area is even higher than under partial decoupled payments, since funds, which have been allocated to coupled payments for ruminants and/or COP products before, are now evenly distributed over the total eligible area so that direct payments for set-aside are higher.

In contrast to the grandes culture area, ruminant supply crucially depends on the decoupling option chosen under the MTR reform. The policy option of keeping beef and/or sheep meat payments partly coupled to production under the MTR reform can even lead to an increase in beef and/or sheep production compared to a situation under coupled payments. Thus, beef production in Begium/Luxembourg (+0.2 %), Denmark (+0.4 %), Finland (+3.8 %), France (+8.6 %), the Netherlands (+4.9 %), Spain (+3.4 %), and Sweden (+1.7 %) as well as sheep meat production in Denmark (+10.3 %), Finland (+6.7 %), and France (2.5 %) seem to benefit from the decoupling options chosen by their governments. On EU-15 average, however, beef and sheep meat supply decrease by 2.8 % and 9.2 %, respectively. In the case that all countries had to abolish direct payments for ruminants, producers in highly coupling countries would suffer compared to their situation under the MTR reform. Producers, whose countries opted for low subsidy levels or forgo direct payments for ruminants completely would benefit from further increasing producer prices on the Single European market.

If top-ups were abolished, ruminant production in most NMS would decrease moderately. i.e. between 0.7 % in Romania and Slovakia and 3.5 % in Slovenia. Poland, however, would not be affected at all due to its decision to forgo subsidies for ruminants completely. The decreases in overall grandes cultures area are rather neglectable (between 0.2 % and 0.6 %).

Due to changes in production and demand decoupling is expected to influence the net trade position of the EU. With respect to the cereal aggregate, the clear net export position is projected to be weakened. For soybeans and sunflower seed, the EU remains a strong net importer. In case of rapeseed, it changes from a weak net export to a weak net import position. Finally, a moderately stronger import situation is expected for ruminants.

6 Sensitivity analysis

The simulation results regarding the effects of decoupling, which have been presented in the previous section, rely on the assumption that even the so-called decoupled payments under the MTR reform have a full impact on production decisions of farmers in the sense that they enter the area allocation function like market prices. Thereby, payments per ha are, of course, equal among various types of land uses. However, as shown above there are also good reasons to assume that the production effectiveness of decoupled payments lies well below 100 %. Based on the discussions on the impact of decoupled payments on production the simulations presented in the previous chapter have been rerun for lower levels of the production effectiveness of decoupled payments. The results are presented and analysed in section 6.1.

ESIM-2007 results regarding the effects of decoupling can be expected to depend crucially on certain model elasticities, for which the empirical foundation is limited. The influence of these parameters on simulated decoupling effects under varying levels of the production effectiveness of decoupled payments is subject to the sensitivity analysis in section 6.2.

6.1 Variation of the production effectiveness of decoupled payments

For the analysis in this section the production effectiveness of decoupled payments, which enters model equation 4.4,

$$PI_{cc,ag} = PP_{cc,ag} + DP_{cc,ag},$$

is reduced to 50 % and 0 %, respectively.

That is in model equation 4.5,

$$DP_{one,comm} = CDP_{one,comm} + DDP_{one,comm} * coupcoeff,$$

the value of the coupling coefficient *coupcoeff* is reduced to 0.5 and 0, respectively.

In Table 37 results are compared with the simulation results in the previous section. The figures presented for each value of the coupling coefficient refer to the relative change between the ACTUAL IMPLEMENTATION scenario and the COUPLED scenario in the year 2013. For purposes of clarity this analysis is limited to the EU-15 countries.

Table 36 shows the level of direct payments in 2013 for cereals, oilseeds, and silage maize under the COUPLED scenario and for various values of the coupling coefficient under the ACTUAL IMPLEMENTION scenario. In case of a coupling coeffcient of 1 direct payments increase in some countries in course of the implementation of the MTR reform, while they decrease in others. This has already been shown in Table 20 in section 5.2. If the production effectiveness of decoupled payments is reduced or completely abolished, the level of payments decreases by the same rate of reduction in those countries, which opted for fully decoupled COP payments under the MTR reform. If countries, however, decided to keep partially coupled COP payments, direct payments are reduced by a lower rate than the coupling coefficient, since coupled payments are still assumed to have a full impact on production. Accordingly, direct payments for cereals, oilseeds, and silage maize still exist in France, Spain, Greece, Italy, and Finland (only cereals and oilseeds) when decoupled payments are completely excluded from the incentive price equation.

Table 36: Direct payments for cereals, oilseeds, and silage maize under various coupling coefficients and scenarios (in Euro/ha) in 2013

	Cereals and oilseeds				Silage maize			
	Coupled	Actual			Coupled	Actual		
		Coeff 1	Coeff 0.5	Coeff 0		Coeff 1	Coeff 0.5	Coeff 0
Germany	262	325	162	0	236	325	162	0
Austria	270	155	77	0	240	155	77	0
Belg./Lux.	299	264	132	0	269	264	132	0
Denmark	253	294	147	0	227	294	147	0
Finland	143	157	80	3	0	0	0	0
France	312	258	166	74	271	252	160	68
Greece	177	121	69	18	122	116	64	12
Ireland	254	191	96	0	229	191	96	0
Italy	216	178	97	15	162	174	93	12
Netherlands	301	326	163	0	271	326	163	0
Portugal	134	79	40	0	114	79	40	0
Spain	144	93	61	29	114	93	61	29
Sweden	203	177	89	0	0	0	0	0
UK	299	176	88	0	269	176	88	0

Direct payments for grass, arable fodder, and voluntary set-aside decrease by the same rate as the production effectiveness of decoupled payments. Finally, direct payments for ruminants are not affected by a variation of the coupling coefficient.

When looking at the market effects it is obvious that grandes cultures area is decreasing stronger, while the increase in roughage area is lower when the assumed influence of decoupled payments on production is reduced. On EU-15 level grandes cultures area decreases by 4.8 % in case of a coupling coefficient of 1 and by 6.1 % and 9.4 % when the coupling coefficient is reduced to 0.5 and 0, respectively. Roughage area rises by 11.4 % under a full production effectiveness of decoupled payments. Under the alternative scenarios growth rates amount to 7.7 % and 2.1 % only (see Table 37). In other words, the lower the coupling coefficient assumed, the lower is the area of grandes cultures and roughages and ceteris paribus also the total area used for agricultural production depicted in ESIM-2007[49]. It is striking that the differences in the simulated decoupling effects on area allocation are larger between a coupling coefficient of 0.5 (*coupcoeff* 0.5) and a coupling coefficient of 0 (*coupcoeff* 0) than between a coupling coefficient of 1 (*coupcoeff* 1) and *coupcoeff* 0.5, though decreases in direct payments are the same in both cases. This phenomenon can be traced back to the underlying land supply function and the development of land prices. It can be explained as follows: Due to the asymptotic character of the land supply function changes in land prices under a marginally changing total land supply are the stronger the more land is used for agricultural production and vice versa. That is, as a result of lower direct payments, incentive prices and accordingly demand for land, land prices under *coupcoeff* 0.5 decrease stronger than in case of *coupcoeff* 1. Thus, land prices are lower under *coupcoeff* 0 than under *coupcoeff* 0.5. However, the lower the level of total land used for production, the lower are decreases in land prices under marginally decreases in total land use. Thus, compared to *coupcoeff* 1 decreases in land prices under *coupcoeff* 0 are less than twice as strong as under *coupcoeff* 0.5, though direct payments decrease twice as much. That is, the area increasing effect of decreasing land prices under *coupcoeff* 0 does not compensate the area decreasing effect of lower payments as much as the area increasing effect of decreasing land prices under *coupcoeff* 0.5 does. Of course, differences in the price sensitivity and varying endowments of land among countries affect the phenomenon described above.

[49] It can not be expected that a potential increase in area allocated to the remaining crops in ESIM-2007, i.e. rice, potatoes, and sugar, compensates the overall decrease in grandes cultures and roughage area.

Table 37: Effects of the Actual Implemenation scenario compared to the Coupled scenario under various coupling coefficients in the EU-15 in 2013 (in %)

	Grandes culture area			Roughage area			Beef & sheep production			Beef & sheep prod.price		
	Coup-coeff 1	Coup-coeff 0.5	Coup-coeff 0	Coup-coeff 1	Coup-coeff 0.5	Coup-coeff 0	Coup-coeff 1	Coup-coeff 0.5	Coup-coeff 0	Coup-coeff 1	Coup-coeff 0.5	Coup-coeff 0
Austria	-5.7	-7.3	-10.6	5.6	4.0	1.6	-1.1	-1.2	-1.5	9.8	11.7	13.8
Belgium/Lux.	-7.5	-8.7	-10.7	12.7	8.9	3.3	-0.2	-1.0	-2.2	10.1	12.0	14.1
Denmark	-2.1	-4.4	-9.1	18.0	10.6	3.0	0.5	-2.5	-5.5	10.3	12.1	14.3
Finland	0.0	-3.8	-11.6	8.1	5.9	4.1	3.8	2.9	2.4	10.2	12.0	14.2
France	-5.0	-5.7	-7.5	10.7	7.4	3.7	8.2	6.0	3.7	10.4	12.0	14.2
Germany	-1.3	-3.6	-8.1	8.6	5.9	1.8	-11.5	-12.8	-14.4	10.1	12.0	14.1
Greece	-4.0	-6.5	-9.9	14.9	8.9	0.1	-5.6	-5.5	-5.2	10.8	12.1	13.6
Ireland	-6.3	-7.1	-8.8	9.0	5.9	-0.6	-9.7	-9.4	-9.5	9.3	10.9	12.7
Italy	-8.4	-8.1	-7.5	12.1	8.3	0.8	-7.3	-7.4	-7.5	10.1	11.8	13.8
Netherlands	-4.6	-7.7	-11.1	10.4	7.5	2.0	3.7	4.5	5.3	9.3	11.0	13.0
Portugal	-4.5	-7.9	-15.0	12.7	5.1	0.7	-1.5	-0.6	0.5	10.3	11.8	13.7
Spain	-6.0	-7.5	-12.5	13.2	9.0	3.0	2.1	2.3	2.4	10.3	11.8	13.6
Sweden	-5.6	-6.3	-13.0	27.0	14.7	2.6	1.4	-1.7	-5.0	10.1	11.9	14.1
United Kingdom	-8.0	-8.4	-11.2	11.9	8.2	0.3	-15.0	-14.9	-15.1	11.5	13.0	14.8
EU-15	-4.8	-6.1	-9.4	11.4	7.7	2.1	-3.6	-4.4	-5.3	10.1	11.4	12.5

Table 37: Effects of the Actual Implemenation scenario compared to the Coupled scenario under various coupling coefficients in the EU-15 in 2013 (in %), continued

	FCI beef & sheep			Incentive price gr. cultures			Incentive price grass			Incentive price arable fodder		
	Coup-coeff 1	Coup-coeff 0.5	Coup-coeff 0	Coup-coeff 1	Coup-coeff 0.5	Coup-coeff 0	Coup-coeff 1	Coup-coeff 0.5	Coup-coeff 0	Coup-coeff 1	Coup-coeff 0.5	Coup-coeff 0
Austria	-10.7	-6.7	-1.2	-10.9	-19.1	-27.0	142.7	67.8	-4.3	30.9	10.0	-8.5
Belgium/Lux.	-11.8	-5.2	3.9	-1.3	-10.8	-20.2	119.0	56.8	0.3	59.5	24.8	-3.5
Denmark	-22.7	-14.2	-3.9	5.8	-10.3	-25.9	115.5	51.4	-7.2	39.5	13.4	-8.7
Finland	-13.6	-9.4	-5.4	3.8	-11.6	-25.7	125.2	56.9	-6.4	15.8	3.9	-8.1
France	-12.6	-6.6	0.6	-3.9	-12.0	-19.9	94.6	45.8	-0.6	31.5	13.1	-3.6
Germany	-21.1	-14.9	-6.8	7.7	-8.2	-23.7	95.2	37.9	-15.7	31.2	7.1	-14.1
Greece	-4.9	-3.6	-2.1	-9.7	-18.1	-26.3	271.1	119.3	-12.3	2.8	-3.5	-9.9
Ireland	-12.3	-9.1	-4.0	-4.9	-13.8	-22.4	402.7	189.8	-14.1	46.3	13.2	-12.8
Italy	-14.6	-10.8	-6.1	-5.1	-14.2	-23.2	271.6	124.2	-14.9	13.9	0.6	-12.2
Netherlands	-2.5	-0.4	2.4	4.0	-8.0	-19.6	282.2	139.4	2.7	85.7	37.0	-2.3
Portugal	0.7	1.1	1.5	-9.1	-16.2	-22.6	98.8	22.7	-13.6	2.1	-4.9	-12.4
Spain	-5.9	-3.6	-0.9	-10.3	-16.7	-21.7	170.4	79.8	-5.6	5.6	-0.3	-6.6
Sweden	-24.9	-15.6	-3.8	-2.9	-15.4	-26.6	162.3	70.6	-11.4	59.5	20.2	-10.7
United Kingdom	-14.9	-10.9	-5.4	-11.1	-19.5	-27.2	420.9	194.4	-22.6	25.8	2.6	-17.0
EU-15	-13.5	-8.8	-3.0	-2.4	-12.8	-23.2	143.3	65.5	-7.9	26.4	7.4	-9.1

Supply of beef and sheep is only indirectly affected by varying assumptions on the production effectiveness of direct payments. However, via changing production and price levels of feed components that are directly affected by variations in coupling coefficients the level of ruminant supply also differs among scenarios. In most countries ruminant production decreases with decreasing coupling coefficients. The strongest differences between production under *coupcoeff* 1 and production under *coupcoeff* 0 occurs in Denmark and Sweden. Here, production changes amount to +0.5 % and +1.4 % under *coupcoeff* 1 and to -5.5 % and -5.0 % in case of *coupcoeff* 0, respectively. Thereby, ruminant producers suffer mainly from a lower roughage area and increasing feed costs. While the FCI decreases by 13.5 % on EU-15 average when decoupled payments are treated as having a full impact on production, it is projected to decrease by 3.5 % only under *coupcoeff* 0 (see Table 37).

The lower the production effectiveness of decoupled payments and the production of ruminants on aggregated EU-15 level, the higher is the producer price for ruminants. In those countries, where the FCI is only slightly increasing with lower coupling coefficients, the production increasing effect of increasing producer prices overcompensates the supply decreasing effect of higher costs for feeding stuff so that ruminant supply increases with a lower coupling coefficient. This is true for the Netherlands, Spain, Portugal, and Greece.

In general, the direction of decoupling effects does not vary among different assumptions on the production effectiveness of decoupled payments. Area of roughages and grandes cultures as well as the production of ruminants decrease with a lower influence of decoupled payments. It is rather the magnitude of decoupling effects on area allocation, which varies relatively strongly.

The differences in the effects of various decoupling strategies existing among member states on ruminant production are obvious under each level of production effectiveness of decoupled payments chosen. Not only under a coupling coefficient of 1 but also under assumed values of 0.5 and 0 ruminant production increases the most in those member states, which coupled their payments to production to the highest degree possible (the Netherlands, France, and Spain). A difference between decoupling effects on grandes cultures area in countries that couple COP payments partially to production and the effects in those countries that fully decouple these payments is neither obvious under *coupcoeff* 1 nor under *coupcoeff* 0.5 and *coupcoeff* 0.

Excursus: The influence of the land market mechanism on area allocation

In the previous section decoupling effects under various assumptions on the production effectiveness of decoupled payments have been compared. The analysis has shown that simulation results for both roughage as well as grandes cultures area are the lower the more the coupling coefficient is reduced. According to the underlying structure of the land market model in ESIM-2007 land prices decrease with an overall decreasing incentive price level and a decrease in total area used for agricultural production.

As already shown in section 5.2 the actual implementation of the MTR reform leads to strongly increasing incentive prices for roughages and an increase in area that is used for agricultural production. This causes higher prices for land in most countries of the EU-15, which, in turn, thwart the supply increasing effect of higher incentive prices for arable fodder and grass (see Table 38). This causal chain, however, only applies under the assumption that decoupled payments fully affect production decisions of farmers.

Table 38: Land prices under the Actual Implementation scenario compared to the Coupled scenario under varying coupling coefficients

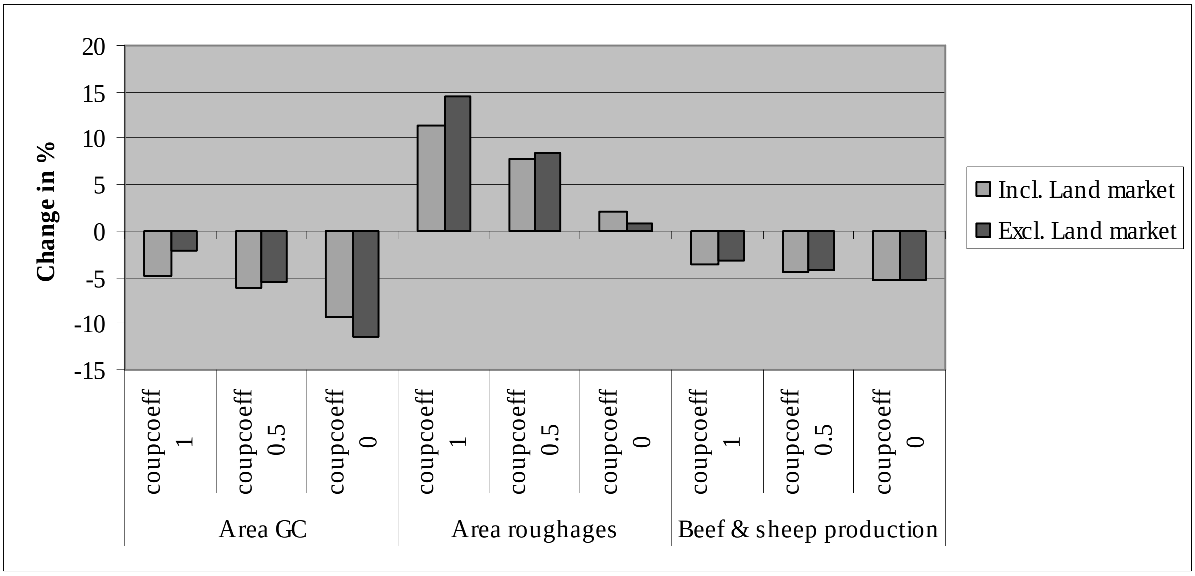
	Coupcoeff 1	Coupcoeff 0.5	Coupcoeff 0
Austria	++	0	-
Belgium/Lux.	+++	+	-
Denmark	++	0	-
Finland	+	0	-
France	+++	+	-
Germany	++	0	--
Greece	0	0	-
Ireland	+++	++	0
Italy	++	+	-
Netherlands	+++	+	-
Portugal	0	0	-
Spain	+	0	-
Sweden	+++	+	-
United Kingdom	+++	0	-

Under assumed coupling coefficients of 0.5 and 0 direct payments, incentive prices, and finally total area demand are lower than in case of a coupling coefficient of 1. Accordingly, land prices are significantly lower and even decrease in comparison to the COUPLED scenario when decoupled payments are assumed to have no impact on production at all. A decrease in land prices thwarts the supply decreasing effect of lower direct payments and incentive prices.

The projected increase in land prices in case of decoupling under *coupcoeff* 1 and partly *coupcoeff* 0.5 reflects general expectations on the development of land prices in the literature (see section 2.3). A decrease in land prices as projected under *coupcoeff* 0 is not expected. Thus, one might argue that ESIM-2007 results under *coupcoeff* 0 are distorted to some extend in the sense that low prices for land provide an area increasing effect so that ceteris paribus area decreases compared to the COUPLED scenario are not as strong as in case of the higher expected level of land prices. However, based on the underlying model structure of ESIM-2007, it is not possible to depict a decreasing production incentive by eliminating the production effectiveness of decoupled payments on the one hand and at the same time a continuing high level of total area demand, which keeps land prices high, on the other hand.

Figure 10 shows as to what extent the underlying mechanism of the land market in ESIM-2007 influences the effects of decoupling under the well-known assumptions on the production effectiveness of direct payments. Therefore, results for grandes cultures and roughage area as well as for ruminant production obtained by running the standard ESIM-2007 version are compared with the results of a model version, which does not include the land market at all. That is, under the latter model version a regulation of land supply and demand does not exist so that total area is allowed to vary freely[50].

Figure 10: Effect of the land market model in ESIM-2007 on area allocation and production under the Actual Implementation scenario relative to the Coupled scenario



[50] Of course, a model version without a mechanism that regulates supply and demand of land does not reflect reality. However, it is a suitable tool, which helps to identify the influence of the land market mechanism on area use under the standard model version.

In case of *coupcoeff* 1 increases in roughage area are lower and decreases in grandes cultures area are stronger under the regulating influence of land prices than in a model that does not include a land market module. This difference can be traced back to the existence of an area decreasing effect of higher land prices in the standard version of ESIM-2007, which does not occur in the alternative model version.

It is obvious that area under the standard model version increases relatively to the alternative version the more the production effectiveness of decoupled payments in reduced. In other words, in contrast to *coupcoeff* 1, grandes cultures area decreases less and roughage area increases stronger under ESIM-2007 than under the alternative version when the coupling coefficient amounts to 0. In this case the area increasing effect of significantly lower land prices prevents from stronger decreases in grandes cultures area and makes somewhat more pronounced increases in roughage area possible. Ruminant production is affected only indirectly by the land market mechanism included in ESIM-2007. The projected changes in supply are almost the same under both model versions and among varying assumptions on the production effectiveness of decoupled payments.

In general, differences between the results of both model versions are moderate. In absolute terms this is most of all true for the scenarios, which rely on coupling coefficients of 0.5 and 0. In case of *coupcoeff* 0 grandes cultures area decreases by 9.4 % under the standard model version and by 11.4 % in case of a model version that does not include a land market. Differences in the increase of roughage area amount to 1.4 percentage points. Thus, a major distortion of ESIM-2007 results under *coupcoeff* 0 and *coupcoeff* 0.5 that results from land prices that might lie below the expected level in reality, does not occur.

6.2 Variation of elasticities

Apart from assumptions on political parameters and the production effectiveness of decoupled payments, ESIM-2007 results regarding the effects of decoupling are also expected to depend crucially on certain model elasticities, for which the empirical foundation is limited. These are the own price elasticities of ruminants, the own and cross price elasticities of pasture area, and the own price and substitution elasticities of feed demand per unit of animal output. For that reason a sensitivity analysis with respect to these parameters is conducted. The elasticities mentioned above are varied for all member states of the EU-15, for the NMS including Malta and Cyprus, and for Turkey. However, for the purpose of clarity the results of the sensitivity analysis are only presented and described for the aggregated EU-15 as well as for Germany and France. The latter countries have been selected for this analysis as they represent member states, whose decoupling strategies are directly opposed, so that differences in decoupling effects under varying sets of elasticities can possibly also be distinguished among various decoupling regimes.

The sensitivity scenarios performed and their justifications are the following:

1. PASTURE: Pasture area allocation elasticities are increased to values between 0.26 and 0.4. More specifically, elasticites of 0.065 have been multiplied by 4, elasticities of 0.09 have been multiplied by 3, and higher values of elasticities have been doubled. Other area elasticities are adjusted to meet homogeneity and symmetry for the area allocation matrix. As discussed above the pasture area allocation elasticities are relatively low in all member states of the EU (between 0.065 and 0.2) in the standard elasticity set. Especially in the long run, conversion from cropland to pasture land is an option and this is why these crucial elasticities, which restrict this conversion, are raised.
2. RUMINANT: All ruminant supply elasticities (with respect to own prices, cross prices, feed cost, and other inputs) are multiplied by 2. No adjustment of other elasticities is necessary, as the ruminant supply matrix in ESIM-2007 contains no cross price elasticities with respect to other products. Ruminant supply is often modelled as relatively inelastic in behavioural partial equilibrium models because of its linkage to area. This linkage, however, is explicitly modelled in ESIM-2007 through the feed demand matrix. Therefore, higher supply elasticities may be suitable.
3. FEED: All feed demand elasticities (own and cross price elasticities) for arable fodder, grass, and silage maize are divided by 5. Again, all feed demand elasticities are adjusted to meet the micro-economic conditions. This adjustment decreases the substitution possibilities between roughages and other feed components as well as the substitutability among roughages.
4. COMBINED: This set of elasticities consists of the combined elasticity sets from the sensitivity scenarios PASTURE, RUMINANT, and FEED.

These sensitivity scenarios are run for the COUPLED scenario and the ACTUAL IMPLEMENTATION scenario, whereby the latter scenario is run for the three well-known assumptions on the production effectiveness of decoupled payments. In Figures 11 to 19, results for major variables under the above mentioned sensitivity scenarios and the standard elasticity set are shown as percentage changes under the ACTUAL IMPLEMENTATION scenario relative to the COUPLED scenario.

A first observation is that under all sensitivity scenarios the direction of deviations from the scenario COUPLED is the same as under the STANDARD elasticity set, although considerable deviations exist in some cases. This is true for all assumptions on the production effectiveness of decoupled payments and for all regions looked at. At first, a closer look is taken at the results under the assumption of a coupling coefficient that amounts to 1. It follows a short analysis dealing with the question as to what extent a reduction of the assumed production impact of decoupled payments influences the results of the sensitivity analysis.

Under the PASTURE elasticity set, which implies a higher price responsiveness of pasture area, roughage area is increasing much stronger than under the STANDARD elasticity set when direct payments are (partially) decoupled under the MTR reform. Thereby, the differences in the effects between both sensitivity scenarios are more pronounced on the EU-15 aggregate than in Germany and France. This is due to relatively low increases in the price responsiveness of pasture under the PASTURE elasticity set in Germany and France. Here, the area allocation elasticity of pasture with respect to prices has been doubled. In other countries of the EU-15 like Ireland and Austria, where initial elasticity values for pasture are lower, values have been tripled and quadrupled, respectively. On EU-15 level, roughage area increases by 11.4 % under the STANDARD and by 20.3 % under the PASTURE elasticity set. In contrast, increases in Germany (France) amount to 8.6 % (10.7 %) and 14.3 % (15.7 %), respectively. In the overall area allocation process roughages are more strongly substituted for grandes cultures than under the STANDARD elasticity set so that in all regions decreases in grandes cultures area are more pronounced under the PASTURE elasticity set. Due to the stronger increasing roughage area prices of major feed components also fall stronger and grandes cultures are more strongly run out of feed rations. Accordingly, the FCI decreases somewhat stronger under the PASTURE than under STANDARD sensitivity scenario. As a result, ruminant production under the PASTURE scenario is slightly less decreasing in the EU-15 and in Germany and somewhat more increasing in France than under the STANDARD elasticity set. Compared to a situation under coupled direct payments decoupling leads to a lower voluntary set-aside area under the PASTURE than under the STANDARD elasticity set. In case of the EU-15, roughage area under the PASTURE scenario is substituted for voluntary set-aside area to such a large extend that decoupling is even projected to lead to a (small) decrease in voluntary set-aside area in absolute terms.

Under the RUMINANT elasticity set, changes in ruminant supply in France and Germany are more pronounced than under the STANDARD elasticity set. Stronger additional increases and decreases on member state level under the RUMINANT scenario equalise each other so that the effect of decoupling under both sensitivity scenarios is more or less the same on aggregated EU-15 level. According to the higher increase in ruminant production in France, the increase in feed demand is more pronounced and the FCI declines less dramatically. This, in turn thwarts the increase in ruminant production to some extent. In contrast, a stronger decreasing ruminant production in Germany leads to a slightly more pronounced decrease in the FCI, which compensates the overall supply decreasing effect to some extent. Effects on area and feed composition compared to the STANDARD elasticity set are relatively small.

In case of the FEED elasticity set, which includes decreasing substitution possibilities between roughages and other feed components as well as a lower substitutability among roughages, feed composition changes less strongly in the direction of fodder and grass in ruminant rations than under the STANDARD elasticity set. In other words, the decrease in the share of grandes cultures in the feed rations of ruminants is not as strong as under the PASTURE elasticity set. The reduced substitution elasticities in feed demand lead to a higher price flexibility and thus a stronger decreasing FCI compared to the STANDARD elasticity set. That is, though cheaper feed components can not be substituted for the more expensive ones as easily as under the STANDARD elasticity set, the FCI is decreasing stronger under the FEED scenario than under the STANDARD elasticity set. This can be traced back to the fact that the more restricted substitutability of feed components has a negative impact on ruminant supply and feed demand by ruminant producers. This, in turn, overcompensates the FCI increasing effect of the lower substitutability of components within the feed ration of ruminants. Due to the decrease in feed demand under the FEED scenario roughage area is slightly less increasing compared to the STANDARD elasticity set and is substituted by voluntary set-aside area to some extend. However, total effects on area allocation compared to the STANDARD elasticity set are relatively small in all regions considered.

Figure 11: Effects of the ACTUAL IMPLEMENTATION scenario compared to the COUPLED scenario (in %) under various elasticity sets for a coupling coefficient of 1 in the EU-15

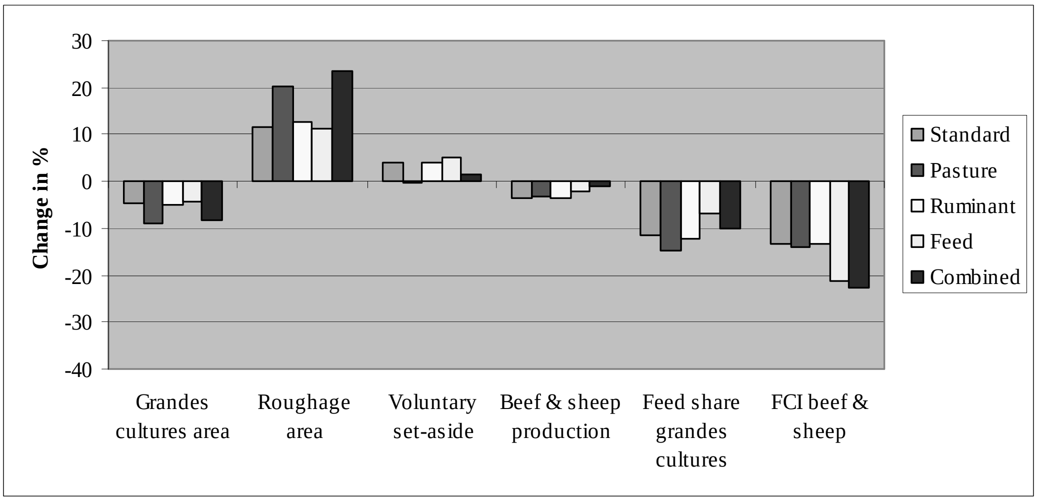


Figure 12: Effects of the Actual Implementation scenario compared to the Coupled scenario (in %) under various elasticity sets for a coupling coefficient of 1 in Germany

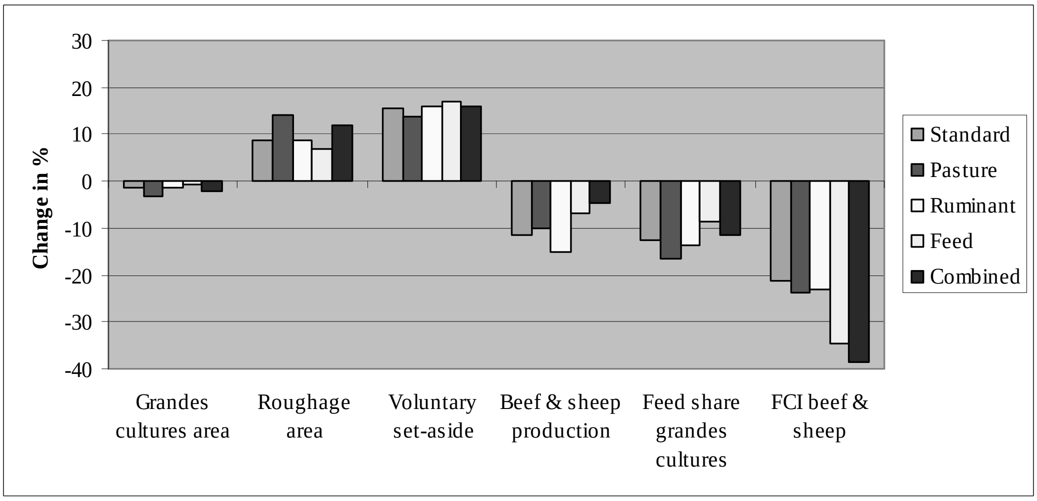


Figure 13: Effects of the Actual Implementation scenario compared to the Coupled scenario (in %) under various elasticity sets for a coupling coefficient of 1 in France

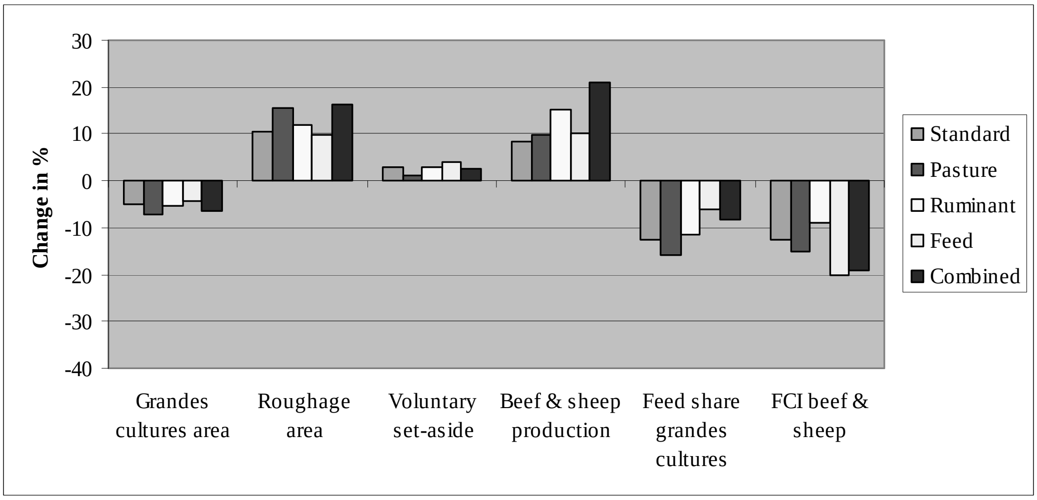


Figure 14: Effects of the Actual Implementation scenario compared to the Coupled scenario (in %) under various elasticity sets for a coupling coefficient of 0.5 in the EU-15

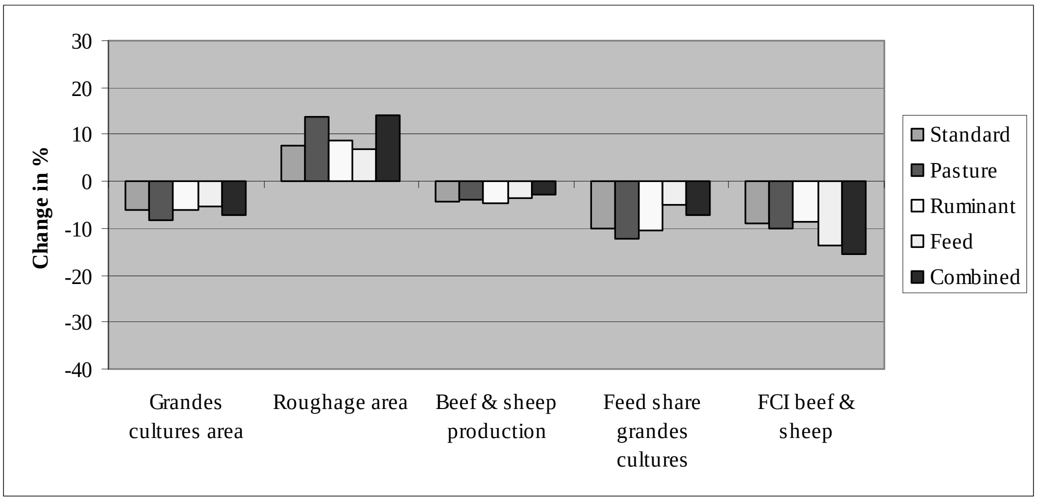


Figure 15: Effects of the Actual Implementation scenario compared to the Coupled scenario (in %) under various elasticity sets for a coupling coefficient of 0.5 in Germany

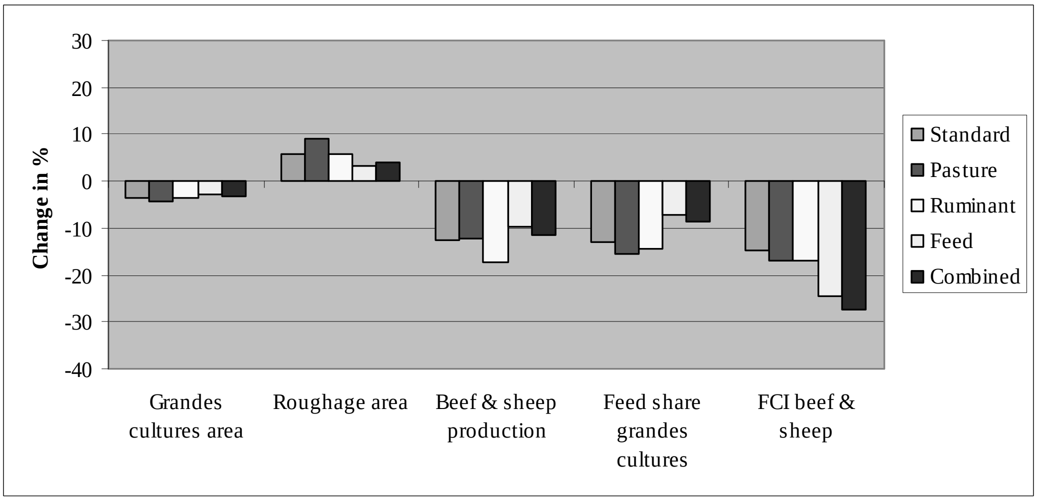


Figure 16: Effects of the Actual Implementation scenario compared to the Coupled scenario (in %) under various elasticity sets for a coupling coefficient of 0.5 in France

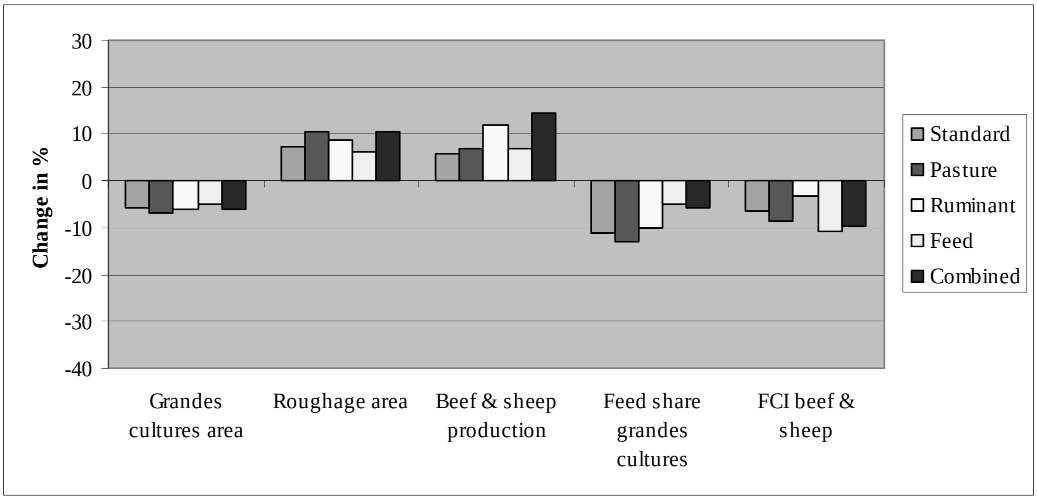


Figure 17: Effects of the Actual Implementation scenario compared to the Coupled scenario (in %) under various elasticity sets for a coupling coefficient of 0 in the EU-15

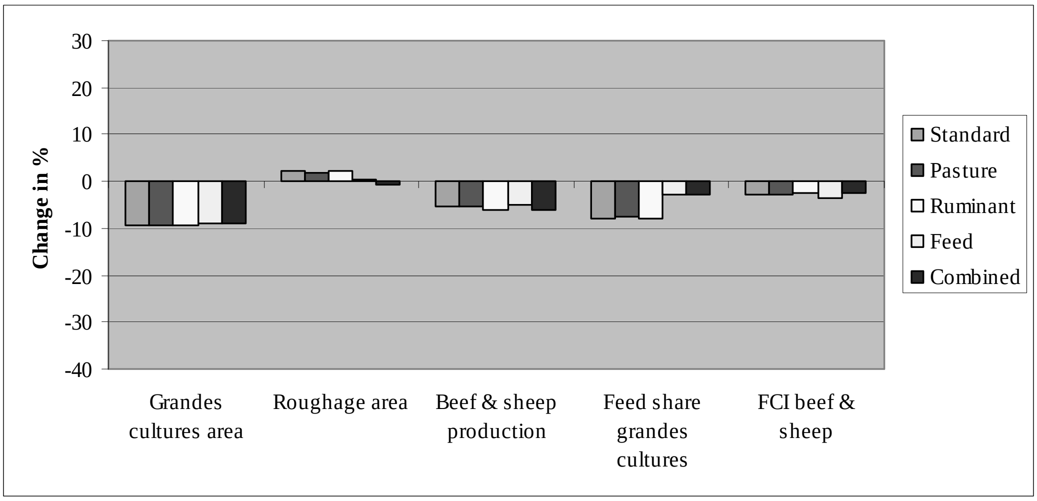


Figure 18: Effects of the Actual Implementation scenario compared to the Coupled scenario (in %) under various elasticity sets for a coupling coefficient of 0 in Germany

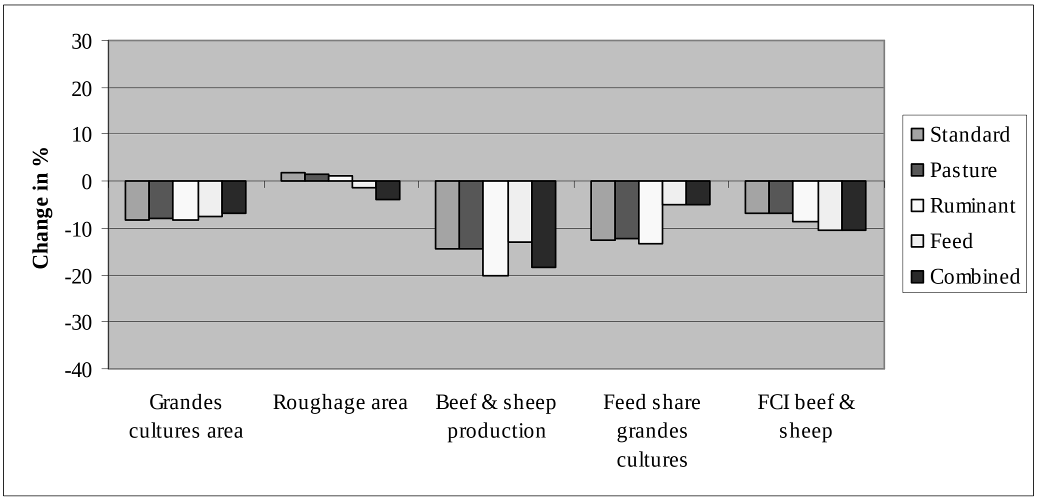
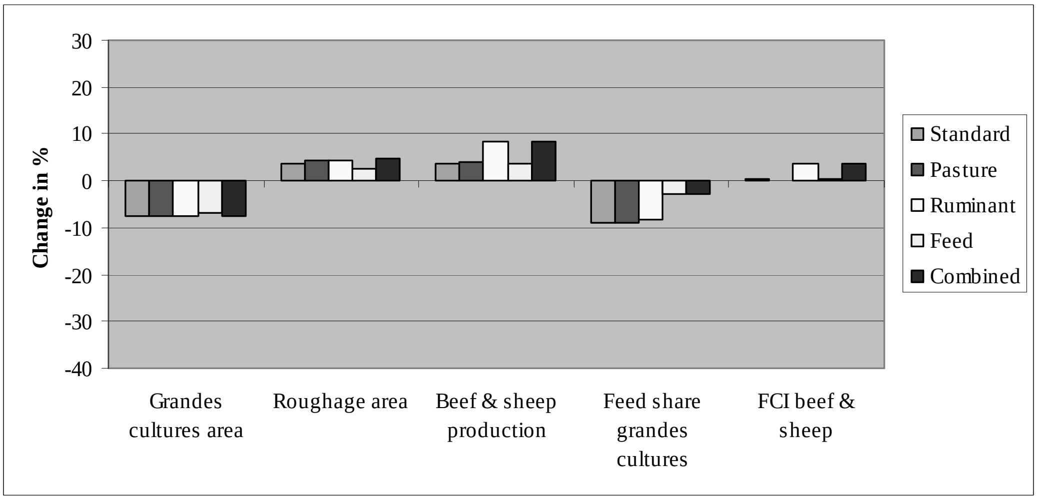


Figure 19: Effects of the Actual Implementation scenario compared to the Coupled scenario (in %) under various elasticity sets for a coupling coefficient of 0 in France



Under the COMBINED sensitivity scenario grandes cultures area in all countries is almost as strongly decreasing as under the PASTURE elasticity set. The slight difference in decoupling effects between both sensitivity scenarios exists due to the positive effect of reducing the substitutability among feed components on grandes cultures area, which takes place under the COMBINED scenario. However, the dominating effect is clearly the rise in the price responsiveness of pasture area that leads to a substitution of roughage area for grandes cultures area. The changes in parameters under the PASTURE scenario are also the driving force with regard to the effects of the COMBINED elasticity set on roughage area. In the EU-15 and France, the aggregation of the area increasing effects of the PASTURE and the RUMINANT elasticity set make up for the highest increase in roughage area among all sensitivity scenarios. In case of Germany, it is only the PASTURE elasticity set, which positively affects roughage area. Due to the area decreasing effects of the RUMINANT and the FEED elasticity set the increase is roughage area under the COMBINED elasticty set is not as strong as under the PASTURE scenario. However, it is still stronger than in case of the STANDARD elasticity set.

The effects of the application of the COMBINED elasticity set on voluntary set-aside area in Germany and France equal the effects under the STANDARD scenario. On EU-15 level, however, the increase in voluntary set-aside area under the COMBINED scenario is well below the increase under the STANDARD scenario. Here, the impact of the PASTURE scenario dominates the overall effects so that roughage area is still substituted for voluntary set-aside area to some extent.

In case of ruminant supply the deviation from the results under the STANDARD elasticity set is the strongest in all regions. Under the aggregated assumptions of the PASTURE, RUMINANT, and FEED scenario ruminant supply in the EU-15 and Germany is less decreasing than under all other scenarios and, in case of the EU-15, even only slightly decreasing in absolute terms. In France, the positive effects of these scenarios add up to an increase in ruminant production under the COMBINED scenario that exceeds the increases under all alternative elasticity sets. These results can mainly be traced back to the decrease in the FCI, which is projected to be the most significant among all elasticity sets.

The choice of the production effectiveness of decoupled payments has a significant impact on the results of this sensitivity analysis. For most variables the magnitude of results under the sensitivity scenarios as well as the relation of projected decoupling effects among various sets of elasticities change under variation of the coupling coefficient. However, the direction of simulation results does mostly not depend on the production effectiveness of decoupled payments.

The lower the coupling coefficient, the more equalise the simulated decoupling effects among sensitivity scenarios. The impact of decoupling on grandes cultures still differs slightly among sensitivity scenarios, if a coupling coefficient of 0.5 is applied. Under an exclusion of decoupled payments from production decisions of farmers, however, effects are more or less the same. Thereby, projected area decreases in all countries become stronger the more the coupling coefficient is reduced. The magnitude of this decrease depends on each country's share of the decoupled payment in the incentive price. This share is high in Germany. Here, direct payments are fully decoupled and even increase in the course of the MTR reform compared to a situation under coupled payments. Accordingly, the projected decrease in grandes cultures area lies between 0.7 % and 3.3 % under a coupling coefficient of 1 and between 7 % and 8.1 % when the coupling coeffcient is reduced to 0.

The most significant is the impact of the assumed coupling coefficient in case of roughages. A strong area increase as under the assumption of a full production effectiveness of decoupled payments does not exist in case of a coupling coefficient that amounts to 0. In France, roughage area increases by 2.7 % to 4.6 % only under the latter assumption, whereby this increase can largely be traced back to increases in feed demand, which result from higher ruminant supply. Here, the influence of keeping ruminant payments highly coupled to production becomes obvious. In case of an elimination of ruminant payments under the MTR reform, ruminant supply would not be projected to increase and increases in roughage area would at most be as high as in Germany or on EU-15 level. In these regions, pasture and arable fodder area are projected to remain almost constant under most sensitivity scenarios when a coupling coefficient of 0 is assumed. This is no surprise for two reasons: First, roughages are not eligible to receive direct payments under the regime of coupled payments and do not receive direct payments that influence production decisions of farmers under the MTR reform either. Consequently, changes in incentive prices are induced via cross effects and can be expected to be lower than under coupling coefficients larger than 0. Secondly, direct payments for ruminants are relatively low (EU-15 average) or completely abolished (Germany) so that ruminant production decreases under all scenarios and an increase in feed demand does not exist. Under the FEED and most of all under the COMBINED elasticity set German roughage area is even expected to fall in absolute terms. This result requires some detailed explanation: As mentioned above, roughage area under a coupling coefficient of 0 is only indirectly affected by decoupling. Thus, it rather remains almost constant instead of increasing as strong as under a coupling coefficient of 1. As a result, feed prices as well as the FCI decrease more moderately than under a higher production effectiveness of decoupled payments. This, in turn, leads to stronger decreases in ruminant production and less demand for the non-tradable products grass and arable fodder, which finally results in an absolute decrease in roughage area.

6.3 Summary

In order to contribute to the permanent discussion on the correct assumption on the production effectiveness of decoupled payments in model applications the basic simulation scenarios have been rerun for a production effectiveness of 50 % and 0 %. As expected, area of grandes cultures and roughages and ceteris paribus also total area used for agricultural production decreases with a reduced impact of decoupled payments. Supply of beef and sheep is only indirectly affected by varying assumptions on the production effectiveness of direct payments, i.e via changing production and price levels of feed components. Due to lower production of feed components and a resulting increase in prices ruminant production is also the lower, the less decoupled payments are assumed to affect farmers' production decisions.

In general, the direction of decoupling effects does not vary among different assumptions on the production effectiveness of decoupled payments. It is rather the magnitude of decoupling effects on area allocation, which varies relatively strongly. The effects of various decoupling strategies on beef and sheep supply are obvious under each level of production effectiveness of decoupled payments. That is, even if decoupled payments are assumed to have no impact on production at all, ruminant production increases the most in those member states, which couple their payments to production to the highest degree possible.

As a major finding of the sensitivity analysis conducted for various sets of elasticities it has to be concluded that under almost all elasticity sets the direction of deviations from the reference scenario is the same as under the standard elasticity set. With regard to the influence of various parameters on model results it has turned out that the level of area allocation elasticities for pasture has by far the most significant impact on area allocation among the parameters looked at. This is true for all assumptions on the production effectiveness of decoupled payments and for all regions looked at. More specifically, roughage area is increasing and grandes cultures area is decreasing stronger than under all other elasticity sets.

In case of the RUMINANT elasticity set, changes in ruminant supply are mostly pronounced among all elasticity sets in France and Germany. The application of the FEED elasticity set has strongly decreasing impact on the FCI and, thus, a significantly increasing impact on ruminant production. Total effects on area allocation compared to the STANDARD elasticity set are relatively small in all regions considered. The COMBINED elasticity set is largely dominated by the effects of the PASTURE elasticity set. The effects on roughage area, ruminant production, and the FCI are stronger pronounced than under all other elasticity sets. In case of ruminant production, it is the combination of the PASTURE and the FEED elasticity set, which leads to the comparatively low decrease in production in the EU-15 and Germany, and to the strong supply increase in France.

The choice of the underlying production effectiveness of decoupled payments has a clear impact on the results of this sensitivity analysis. For most variables the magnitude of results under the sensitivity scenarios as well as the relation of projected decoupling effects between various sets of elasticities change under variation of the coupling coefficient. The lower the coupling coefficient, the more equalize the simulated decoupling effects among sensitivity scenarios. However, the direction of simulation results does mostly not depend on the production effectiveness of decoupled payments. The assumption on the production effectiveness of direct payments mostly affects the simulated effects of decoupling on roughage area. While this area is strongly increasing under all elasticity sets when a high impact of decoupled payments on production is assumed, roughage area remains almost constant under a coupling coefficient of 0.

7 Summary and conclusions

Decoupling has probably been one of the most discussed issues in the agricultural environment within the last years. This is true for farmers, politicians, and also economists. With respect to the last group of people strong efforts have been undertaken in order understand and define the economics behind the concept of decoupling without being able to agree upon a common definition and to identify the production response to more or less decoupled policies clearly. This shows how complex the issue of cutting the link between agricultural support and production really is.

Regarding the EU's new payment system, which has been established under the MTR reform, several groups of modellers have simulated the effects of decoupling in the last years. All studies covered by the literature review in chapter 3 uniformly project a decline in the cereal and silage maize area as well as ruminant production in the EU-15, while model results are heterogeneous with respect to the direction of the decoupling effects on oilseed and pasture as well as voluntary set-aside area. It turned out that model results can be expected to be heavily influenced by assumptions on behavioural parameters and the production effectiveness of direct payments, which differ among model applications. A common feature is that all results of simulations studies refer to the EU-15 average so that also assumptions on political and behavioural parameters are average values. The effects resulting from individual decoupling strategies followed under the MTR review can therefore not be observed.

Against this background the purpose of this work is to analyse the sectoral effects of decoupling on area allocation and production for all member states of the enlarged EU individually so that the effects of country-specific decoupling policies can be measured. Actually, significant differences in the design of payments exist. With respect to the EU-15 France and Spain use the possibility of keeping direct payments (partly) coupled to production for all product categories. In contrast, Germany, Ireland, Greece, Italy, and the United Kingdom decided to decouple all payments (almost) completely. Austria, Belgium/Luxembourg, Denmark, Finland, the Netherlands, Portugal, and Sweden put a heavier weight on the ruminant sector and opted for partially coupled payments in this area. Within the group of the NMS most countries opted for coupled top-ups for ruminants and are assumed to apply rather moderately coupled top-ups in the field of grandes cultures. Only Poland goes without subsidies for the ruminant sector. In contrast, beef payments are high in

Slovenia, which opted for an earlier implementation of the SFP than other NMS, Estonia, and the Czech Republic.

The analysis is conducted on the basis of ESIM-2007, which is a multi-country, multi-commodity, recursive dynamic, partial equilibrium model. Compared to previous model versions the underlying model version has been extended in terms of country coverage in order to include individual member states of the EU-15 and in terms of the structural features of the model by including a land market module. From the literature review in chapter 3 it turned out that ESIM is well suited for the analysis of decoupling effects, since it includes detailed modelled links between the livestock sector and the fodder/crop sector on the one hand and covers all products and activities, which are considered being most affected by decoupling, on the other hand. However, it shall be mentioned that ESIM-2007 is not a suitable tool to conduct a farm level assessment. Decoupling impacts on structural change, income distribution and efficiency can be well analysed by agent-based and purely linear programming models.

ESIM results show that decoupling has a clear impact on agricultural markets. Decoupling in EU-15 members and the shift from partially coupled subsidies to fully decoupled subsidies in the NMS lead to an area shift from grandes cultures towards roughages. More generally, the more decoupled direct payments, the stronger is the substitution of roughages for grandes cultures. However, decrease rates for grandes cultures differ strongly between partial and full decoupling only in case of silage maize. In other words, most cereal and oilseed producers in France, Spain, and the NMS do not benefit heavily from the decisions of their governments to keep COP payments partly coupled to production. Strongly increasing prices for land, which result from the significant increase in roughage and overall agricultural area, might contribute to this situation. Of course, also roughages are affected by the negative impact of higher land prices on production under decoupled payments. However, the positive effect of the newly introduced payments clearly prevails in case of arable fodder and grass production. Voluntary set-aside area increases in almost all countries of the EU-15 mainly resulting from the abolishment of the limit for voluntary set-aside area.

On EU-15 level, beef as well as sheep meat supply is projected to decrease. On individual member state level, however, ruminant supply develops quite different among member states. In contrast to the grandes cultures area, ruminant supply crucially depends on the decoupling option chosen under the MTR reform. This may be mainly due to the fact that the degree of coupledness of payments is allowed to be higher for ruminant payments. The policy option of keeping beef and/or sheep payments (partly) coupled to production under the MTR reform can even lead to an increase in beef and/or sheep production compared to a situation under Coupled payments. Thus, beef producers in Begium and Luxembourg, Denmark, Finland, France, the Netherlands, Spain, and Sweden as well as sheep producers in Denmark, Finland, and France seem to benefit from the decoupling options chosen by their governments. However, in the case that all countries had to abolish direct payments for ruminants, producers in highly coupling countries would suffer compared to their situation under the MTR reform. Producers, whose countries opted for low subsidy levels or forgo direct payments for ruminants completely would benefit from further increasing producer prices on the Single European market. Whether or not such a scenario of prohibiting partially coupled payments while further granting uniform payments per hectare is realistic for arable crops can of course be discussed. However, ruminant payments will surely be abolished completely any time in the future so that this scenario turns out to be highly relevant.

If top-ups were abolished, ruminant production in most NMS would decrease moderately. Poland, however, would not be affected at all due to its decision to forgo subsidies for ruminants completely. More generally and provocative, out of the group of the NMS Poland can be expected to be the country, which would benefit most from a future change in the direct subsidy system for ruminants towards more liberalisation. The effects of the abolishment of top-ups for grandes cultures and roughages are neglectable. This is also true for an extension of spendings for top-ups under a fully decoupled payment system, since the allowed coupling degrees for grandes cultures as well as the share of top-up values in the overall incentive prices are low.

In the course of decoupling changes in the net trade position of the EU result as a logical consequence. As a result of the overall decreasing effect of decoupling on production activities in the area of grandes cultures and ruminants export positions are weakened and import situation strenghtend. If the EU will generally continue to grant export subsidies in order sell products on the world market, decoupling could provide a decrease in expenditures. However, this implies i) that current high world market prices for cereals would have to decrease strongly, ii) that the intervention price system will be maintained despite current discussions on their abolishment, and iii) that there will be no agreement on the elimination of export subsidies in multi-lateral trade negotiations, if there will be any in the next time. Thus a projection of the change in expenditures for trade measures resulting from decoupling is highly hypothetical given the frequently change in the political and market-related environment.

The simulation results of ESIM-2007 confirm most results of most model applications presented in chapter 3. More specifically, ESIM-2007 results for the EU-15 average are in line with the decrease in cereal, oilseed, and silage maize area as well as with the decrease in ruminant supply and the increase in arable fodder area projected in other studies. With respect to pasture and voluntary set-aside area the projected increase by ESIM-2007 does not correspond to the results of other simulations.

In the recent literature the effect of so-called decoupled payments on agricultural production has been discussed intensively. Many studies tried to measure the effects on production compared to other policy measures. Though results differ significantly depending on the the study design and underlying assumptions, the studies uniformly conclude that there is clearly a production effect of so-called decoupled payments resulting from relative price changes and risk-related as well as dynamic effects. However, this effect is said to be smaller than the effect of price support.

In the underlying work a very pragmatical approach is used, assuming that even payments under the MTR reform have the same production effectiveness like market prices, though payments are, of course treated as having the same level per hectare across all eligible types of land use. However, in order to contribute to the permanent discussion on the correct assumption on the production effectiveness of decoupled payments in model applications the basic simulation scenarios have been rerun for a production effectiveness of 50 % and an extreme value of 0 %. As expected, area of grandes cultures and roughages and ceteris paribus also the total area used for agricultural production decreases with a reduced impact of decoupled payments. In this context, a major distortion of results under a low production effectiveness of decoupled payments, which could result from land prices that lie below the expected level under decoupling in reality, does not exist. Due to lower production of feed components and a resulting increase in prices ruminant production is also the lower, the less decoupled payments are assumed to affect farmers' production decisions.

In general, the direction of decoupling effects does not vary among different assumptions on the production effectiveness of decoupled payments. It is rather the magnitude of decoupling effects on area allocation, which varies relatively strongly. However, given the realistic assumption that the production effectiveness of so-called decoupled payments is higher than 0 % and that the production effectiveness of the area payments under the Agenda 2000 is lower than 100 %, the magnitude of decoupling effects under the extreme scenario including no production effect of decoupled payments at all would be too large to meet reality.

The effects of various decoupling strategies on beef and sheep supply are obvious under each level of production effectiveness of decoupled payments. That is, even if decoupled payments are not assumed to have any effect on production, ruminant production increases the most in those member states, which couple their payments to production to the highest degree possible. However, this is self-evident to some extent, since ruminant production is affected by decoupled payments via cross effects, i.e. via prices for feed components, only. The situation is somewhat different with respect to roughage area. Many doubt that the introduction of direct payments for pasture area leads to an increase in pasture area given the expected decrease in ruminant supply. This is also confirmed by the simulations conducted with CAPRI and GOAL as shown in chapter 3. According to these model applications ruminant supply as well as pasture area is decreasing in the course of decoupling. Under a coupling coefficient that amounts to 0 roughage area in ESIM-2007 would not be affected by the payments newly introduced but to a large extent by changes in beef production. Accordingly, one could argue that the influence of the decoupling option chosen for the ruminant sector on roughage area becomes more obvious, if decoupled payments are assumed to have no impact on production at all.

As a major finding of the sensitivity analysis conducted for various sets of elasticities it has to be concluded that under each elasticity set the direction of deviations from the reference scenario is the same as under the standard elasticity set. With regard to the influence of various parameters on model results it has been turned out that the level of area allocation elasticities for pasture has by far the most significant impact on overall area allocation and that the price elasticity of ruminant production has the largest impact on ruminant supply among the elasticities considered. This is true for all assumptions on the production effectiveness of decoupled payments and for all regions looked at.

As mentioned above, ESIM is a well suited tool to conduct an analysis of the effects of decoupling. However, it depends on certain parameters, for which empirical foundation is still weak. Though much effort has been put in the generation of own price elasticities of roughage products and voluntary set-aside, which have become more important under the MTR reform in terms of modelling, they are not based on empirical information. Further research in this area could therefore contribute to a further improved reliability of model results. In addition, assumptions on the production effectiveness of coupled as well as decoupled direct payments have to be put on a more solid foundation. As shown in section 2.2, several studies have already tried to quantify the impact of various types of direct payments on production. However, first, the majority of these studies refers to US payments under recent reforms, which all are designed differently from current CAP payments. Secondly, these studies also rely on model applications, which in turn, rely on assumptions and features, which drive results to a large extent. The most reliable information on farmers' response to decoupled payments might be obtained from surveys. So far, surveys on that issue that have been found in the literature (see OECD, 2004b) relate to US payments only. However, forthcoming studies on the impacts of decoupled payments in Slovakia and Lithuania include, among other things, also the results of surveys, which could provide more reliable information (STONKUTE ET AL., forthcoming, and BLAAS ET AL., forthcoming).

Currently the scope of ESIM is widened in several projects at LEI in the Netherlands, for example, in terms of a depiction of the market for biofuels as well as in terms of establishing links with CGEs and linear programming models. With respect to the present ESIM version used in this work further research efforts could be put in the development of the existing land market module. For example, the area allocation elasticity with respect to land prices could be depicted product-specific following the approach applied for other inputs. For reasons of simplification the underlying market module contains a uniform elasticity among all products per country. In addition the characteristics of the land supply curve are based on rather ad hoc assumption so far. The bend as well as the dilation of the supply curve could be depicted specifically for each country. However, empirical information on the parameters determining the run of the curve are not available so far and their estimation may turn out difficult.

For the reason of data availability it is very common in applied agricultural sector models to assume land as a homogeneous factor. However, this is not very realistic and embodies strong assumptions on price and elasticity of supply. In ESIM the heterogeneity of land has so far been taken into account to some extent by imposing certain restrictions on the substitutability of different types of land use in the area allocation matrices. However, it might also be imaginable to combine the newly introduced land market module with a mechanism, according to which land is allocated according to a nested CET function expressing the constrained mobility of land.

The decoupling of direct payments has provided new challenges for farmers in the enlarged EU and also to economists and, more specifically, to modellers. It remains to be seen, how agricultural markets will adjust in the next years before another reform of the CAP leads to new conditions and challenges.

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Annex A: Parameters in ESIM-2007

Table A-1: Price elasticities of area allocation and animal supply, Austria

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Set-aside	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Arable fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.55	-0.00	-0.11	-0.02	-0.02	-0.06		-0.01	-0.00	-0.00	-0.01	-0.00	-0.00							-0.00	-0.02	-0.00	-0.00	-0.04	-0.03	-0.09		-0.14
Durum	-0.07	0.41	-0.03	-0.02	-0.01	-0.03		-0.01	-0.00	-0.00	-0.01	-0.00	-0.00							-0.01	-0.01	-0.00	-0.00	-0.04	-0.02	-0.07		-0.09
Barley	-0.17	-0.00	0.45	-0.00	-0.00			-0.00	-0.00	-0.00	-0.00	-0.00	-0.00							-0.00	-0.01	-0.00	-0.00	-0.04	-0.03	-0.06		-0.12
Corn	-0.02	-0.00	-0.00	0.35	-0.00	-0.00			-0.03	-0.01	-0.03	-0.01	-0.00							-0.00	-0.00	-0.05	-0.00	-0.04	-0.02	-0.06		-0.08
Rye	-0.12	-0.00	-0.02	-0.01	0.40	-0.02		-0.00	-0.00	-0.00	-0.00	-0.00	-0.00							-0.00	-0.02	-0.00	-0.00	-0.04	-0.02	-0.05		-0.09
O. grains	-0.16	-0.00		-0.01	-0.01	0.40		-0.00	-0.00	-0.00	-0.00	-0.00	-0.00							-0.00	-0.01	-0.00	-0.00	-0.04	-0.02	-0.05		-0.09
Rice																												
Sugar	-0.02	-0.00	-0.00		-0.00	-0.00		0.62	-0.13	-0.01	-0.07	-0.01	-0.00								-0.01	-0.02	-0.00	-0.04	-0.07	-0.07		-0.18
Potato	-0.01	-0.00	-0.01	-0.15	-0.00	-0.00		-0.30	0.99	-0.01	-0.02	-0.01	-0.00							-0.00	-0.01	-0.03	-0.01	-0.04	-0.10	-0.10		-0.20
Soybeans	-0.02	-0.00	-0.01	-0.15	-0.00	-0.01		-0.05	-0.03	0.68	-0.03	-0.01	-0.00							-0.01	-0.02	-0.03	-0.01	-0.04	-0.04	-0.07		-0.18
Rapeseed	-0.06	-0.00	-0.01	-0.18	-0.00	-0.00		-0.17	-0.02	-0.01	0.99	-0.01	-0.00							-0.00	-0.01	-0.03	-0.01	-0.04	-0.06	-0.07		-0.28
Sunseed	-0.02	-0.00	-0.01	-0.11	-0.00	-0.01		-0.04	-0.02	-0.01	-0.03	0.58	-0.00							-0.01	-0.02	-0.03	-0.01	-0.04	-0.03	-0.07		-0.14
Set-aside	-0.01	-0.00	-0.01	-0.01	-0.00	-0.01		-0.00	-0.00	-0.00	-0.00	-0.00	0.17							-0.00	-0.00	-0.00	-0.00	-0.04	-0.01	-0.02		-0.06
Milk														1.07	0.10	-0.01									-0.18	-0.04	-0.44	-0.07
Beef														0.15	1.39	-0.01									-0.10	-0.17	-0.54	-0.08
Sheep														-0.18	-0.13	1.46									-0.10	-0.18	-0.38	-0.09
Pork																	2.66	-0.03	-0.02						-0.03	-0.21	-1.38	-0.16
Poultry																	-0.13	1.87	-0.03						-0.04	-0.42	-0.78	-0.11
Eggs																	-0.13	-0.06	1.86						-0.07	-0.13	-0.96	-0.11
Grass	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00		-0.00	-0.00		-0.00	-0.00	-0.00							0.07	-0.00	-0.00	-0.00	-0.04	-0.00	-0.01		-0.02
Fodder	-0.15	-0.00	-0.02	-0.03	-0.02	-0.03		-0.02	-0.02	-0.01	-0.02	-0.01	-0.00							-0.00	0.68	-0.02	-0.00	-0.04	-0.04	-0.07		-0.18
Sil. maize	-0.02	-0.00	-0.01	-0.22	-0.00	-0.01		-0.03	-0.02	-0.01	-0.02	-0.01	-0.00								-0.01	0.81	-0.00	-0.04	-0.05	-0.11		-0.24

Table A-2: Price elasticities of area allocation and animal supply, Belgium/Luxembourg

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Set-aside	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Arable fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.55		-0.04	-0.01	-0.00	-0.01		-0.06	-0.01		-0.00		-0.00							-0.01	-0.06	-0.04	-0.00	-0.05	-0.03	-0.09		-0.14
Durum																												
Barley	-0.18		0.45	-0.00	-0.00	0.00		-0.00	-0.00		-0.00		-0.00							-0.00	0.00	-0.00	-0.00	-0.05	-0.03	-0.06		-0.12
Corn	-0.03		-0.00	0.35	-0.00	-0.00		0.00	-0.05		-0.00		-0.00							-0.00	-0.00	-0.05	-0.00	-0.05	-0.02	-0.06		-0.08
Rye	-0.10		-0.02	-0.00	0.40	-0.01		-0.01	-0.01		-0.00		-0.00							-0.01	-0.02	-0.01	-0.00	-0.05	-0.02	-0.05		-0.09
O. grains	-0.16		0.00	-0.00	-0.00	0.40		-0.01	-0.01		-0.00		-0.00							-0.01	-0.01	-0.01	-0.00	-0.05	-0.02	-0.05		-0.09
Rice																												
Sugar	-0.07		-0.00	0.00	-0.00	-0.00		0.62	-0.13		-0.01		-0.00								0.00	-0.04	-0.00	-0.05	-0.07	-0.07		-0.18
Potato	-0.02		-0.00	-0.02	-0.00	-0.00		-0.16	0.66		-0.00		-0.00							-0.00		-0.15	-0.00	-0.05	-0.06	-0.07		-0.13
Soybeans																												
Rapeseed	-0.05		-0.00	-0.02	-0.00	-0.00		-0.29	-0.08		0.99		-0.00							-0.01	-0.01	-0.06	-0.00	-0.05	-0.06	-0.07		-0.28
Sunseed																												
Set-aside	-0.00		-0.00	-0.00	-0.00	-0.00		-0.00	-0.00		-0.00		0.17							-0.00	-0.00	-0.00	-0.00	-0.05	-0.01	-0.02		-0.06
Milk														1.07	0.09	-0.00									-0.18	-0.04	-0.35	-0.07
Beef														0.10	1.39	-0.00									-0.10	-0.17	-0.42	-0.08
Sheep														-0.12	-0.11	1.46									-0.10	-0.18	-0.32	-0.09
Pork																	2.66	-0.07	-0.02						-0.03	-0.21	-1.07	-0.16
Poultry																	-0.17	1.87	-0.05						-0.04	-0.42	-0.66	-0.11
Eggs																	-0.17	-0.14	1.86						-0.07	-0.13	-0.81	-0.11
Grass	-0.03		-0.00	-0.00	-0.00	-0.00			-0.00		-0.00		-0.00							0.16	-0.00	-0.00	-0.00	-0.05	-0.01	-0.01		-0.05
Fodder	-0.33		0.00	-0.00	-0.00	-0.00		-0.00			-0.00		-0.00							-0.00	0.68	-0.00	-0.00	-0.05	-0.04	-0.07		-0.18
Sil. maize	-0.06		-0.00	-0.03	-0.00	-0.00		-0.06	-0.20		-0.00		-0.00							-0.00		0.81	-0.00	-0.05	-0.05	-0.11		-0.24

Table A-3: Price elasticities of area allocation and animal supply, Denmark

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Set-aside	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Arable fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.55		-0.13		-0.00	-0.01			-0.00		-0.02									-0.00	-0.06	-0.00	-0.00	-0.07	-0.03	-0.09		-0.14
Durum																												
Barley	-0.15		0.45		-0.00	-0.00		-0.00	-0.00		-0.01									-0.00	-0.00	-0.00	-0.00	-0.07	-0.03	-0.06		-0.12
Corn																												
Rye	-0.06		-0.04		0.40	-0.02		-0.00	-0.00		-0.00		-0.00							-0.00	-0.05	-0.00	-0.00	-0.07	-0.02	-0.05		-0.09
O. grains	-0.08		-0.02		-0.01	0.40		-0.00	-0.00		-0.00		-0.00							-0.00	-0.05	-0.00	-0.00	-0.07	-0.02	-0.05		-0.09
Rice																												
Sugar			-0.00		-0.00	-0.00		0.62	-0.18		-0.05		-0.00							-0.00		-0.01		-0.07	-0.07	-0.07		-0.18
Potato	-0.02		-0.02		-0.00	-0.00		-0.20	0.99		-0.03		-0.00							-0.00	-0.18	-0.02	-0.03	-0.07	-0.10	-0.10		-0.20
Soybeans																												
Rapeseed	-0.16		-0.04		-0.00	-0.00		-0.07	-0.05		0.99		-0.00							-0.00	-0.14	-0.02	-0.03	-0.07	-0.06	-0.07		-0.28
Sunseed																												
Set-aside					-0.00	-0.00		-0.00	-0.00		-0.00		0.17							-0.00		-0.00	-0.00	-0.07	-0.01	-0.02		-0.06
Milk														1.07	0.04	-0.00									-0.18	-0.04	-0.35	-0.07
Beef														0.12	1.39	-0.00									-0.10	-0.17	-0.53	-0.08
Sheep														-0.15	-0.05	1.46									-0.10	-0.18	-0.44	-0.09
Pork																	2.11	-0.04	-0.01						-0.02	-0.17	-1.19	-0.12
Poultry																	-0.25	1.87	-0.02						-0.04	-0.42	-0.85	-0.11
Eggs																	-0.25	-0.07	1.86						-0.07	-0.13	-1.05	-0.11
Grass	-0.01		-0.00		-0.00	-0.00		-0.00	-0.00		-0.00		-0.00							0.20	-0.01	-0.00	-0.00	-0.07	-0.01	-0.02		-0.07
Fodder	-0.15		-0.00		-0.01	-0.01			-0.07		-0.04									-0.00	0.68	-0.03	-0.01	-0.07	-0.04	-0.07		-0.18
Sil. maize	-0.05		-0.04		-0.00	-0.00		-0.03	-0.04		-0.03		-0.00							-0.00	-0.13	0.81	-0.02	-0.07	-0.05	-0.11		-0.24

Table A-4: Price elasticities of area allocation and animal supply, Finland

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Set-aside	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Arable fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.55		-0.07		-0.00	-0.06		-0.00	-0.00		-0.01		-0.00							-0.00	-0.08		-0.00	-0.06	-0.03	-0.09		-0.14
Durum																												
Barley	-0.02		0.45		-0.00	-0.04		-0.00	-0.00		-0.00		-0.00							-0.00	-0.11		-0.00	-0.06	-0.03	-0.06		-0.12
Corn																												
Rye	-0.03		-0.05		0.40	-0.05		-0.00	-0.00		-0.00		-0.00							-0.00	-0.05		-0.00	-0.06	-0.02	-0.05		-0.09
O. grains	-0.02		-0.05		-0.00	0.40		-0.00	-0.00		-0.00		-0.00							-0.00	-0.10		-0.00	-0.06	-0.02	-0.05		-0.09
Rice																												
Sugar	-0.01		-0.01		-0.00	-0.01		0.89	-0.20		-0.05		-0.00							-0.00	-0.11		-0.00	-0.06	-0.10	-0.09		-0.28
Potato	-0.00		-0.01		-0.00	-0.01		-0.13	0.99		-0.02		-0.00							-0.00	-0.35		-0.00	-0.06	-0.10	-0.10		-0.20
Soybeans																												
Rapeseed	-0.02		-0.03		-0.00	-0.02		-0.06	-0.03		0.99		-0.00							-0.00	-0.37		-0.00	-0.06	-0.06	-0.07		-0.28
Sunseed																				-0.00								
Set-aside	-0.00		-0.00		-0.00	-0.01		-0.00	-0.00		-0.00		0.17							-0.00	-0.00		-0.00	-0.06	-0.01	-0.02		-0.06
Milk														1.07	0.08	-0.00									-0.18	-0.04	-0.45	-0.07
Beef														0.20	1.10	-0.00									-0.08	-0.14	-0.62	-0.07
Sheep														-0.26	-0.10	1.46									-0.10	-0.18	-0.66	-0.09
Pork																	2.66	-0.04	-0.02						-0.03	-0.21	-1.60	-0.16
Poultry																	-0.08	1.87	-0.04						-0.04	-0.42	-1.12	-0.11
Eggs																	-0.08	-0.08	1.86						-0.07	-0.13	-1.11	-0.11
Grass	-0.00		-0.01		-0.00	-0.01		-0.00	-0.00		-0.00	-0.00	-0.00							0.20	-0.01		-0.00	-0.06	-0.01	-0.02		-0.07
Fodder	-0.03		-0.10		-0.00	-0.08		-0.01	-0.07		-0.04		-0.00							-0.00	0.68		-0.00	-0.06	-0.04	-0.07		-0.18
Sil. maize																												

Table A-5: Price elasticities of area allocation and animal supply, France

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Set-aside	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Arable fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.55	-0.01	-0.05	-0.03	-0.00	-0.01		-0.01	-0.00	-0.00	-0.05	-0.01	-0.00							-0.01	-0.06	-0.02	-0.00	-0.03	-0.03	-0.09		-0.14
Durum	-0.15	0.41		-0.01	-0.00	-0.01		-0.00	-0.00	-0.00	-0.01	-0.00	-0.00							-0.01		-0.01	-0.00	-0.03	-0.02	-0.07		-0.09
Barley	-0.19		0.45		-0.00			-0.00	-0.00	-0.00	-0.00	-0.00	-0.00									-0.00	-0.00	-0.03	-0.03	-0.06		-0.12
Corn	-0.06	-0.00		0.35	-0.00	-0.00	-0.00	-0.00	-0.02	-0.00	-0.02	-0.01	-0.00							0.00		-0.05	-0.00	-0.03	-0.02	-0.06		-0.08
Rye	-0.07	-0.01	-0.04	-0.01	0.40	-0.02		-0.00	-0.00	-0.00	-0.00	-0.00	-0.00							-0.01	-0.04	-0.01	-0.00	-0.03	-0.02	-0.05		-0.09
O. grains	-0.18	-0.01		-0.01	-0.00	0.40		-0.00	-0.00	-0.00	-0.00	-0.00	-0.00							-0.01		-0.00	-0.00	-0.03	-0.02	-0.05		-0.09
Rice				-0.02			0.25																-0.12	-0.03	-0.01	-0.02		-0.04
Sugar	-0.04	-0.00	-0.00		-0.00	-0.00		0.62	-0.10	-0.00	-0.07	-0.02	-0.00							-0.00		-0.03	-0.01	-0.03	-0.07	-0.07		-0.18
Potato	-0.02	-0.00	-0.00	-0.11	-0.00	-0.00		-0.24	0.99	-0.00	-0.04	-0.03	-0.00							-0.01	-0.03	-0.05	-0.01	-0.03	-0.10	-0.10		-0.20
Soybeans	-0.03	-0.00	-0.01	-0.09	-0.00	-0.00		-0.03	-0.02	0.68	-0.05	-0.04	-0.00							-0.01	-0.04	-0.04	-0.01	-0.03	-0.04	-0.07		-0.18
Rapeseed	-0.25	-0.00	-0.01	-0.05	-0.00	-0.00		-0.07	-0.02	-0.00	0.99	-0.05	-0.00							-0.01	-0.01	-0.06	-0.01	-0.03	-0.06	-0.07		-0.28
Sunseed	-0.05	-0.00	-0.01	-0.03	-0.00	-0.00		-0.03	-0.02	-0.00	-0.08	0.58	-0.00							-0.01	-0.01	-0.05	-0.01	-0.03	-0.03	-0.07		-0.14
Set-aside	-0.01	-0.00	-0.01	-0.01	-0.00	-0.00		-0.00	-0.00	-0.00	-0.00	-0.00	0.17							-0.01	-0.00	-0.00	-0.00	-0.03	-0.01	-0.02		-0.06
Milk														1.07	0.10	-0.02									-0.18	-0.04	-0.43	-0.07
Beef														0.14	1.39	-0.02									-0.10	-0.17	-0.65	-0.08
Sheep														-0.18	-0.12	1.46									-0.10	-0.18	-0.52	-0.09
Pork																	2.66	-0.08	-0.02						-0.03	-0.21	-1.60	-0.16
Poultry																	-0.08	1.87	-0.05						-0.04	-0.42	-1.12	-0.11
Eggs																	-0.08	-0.16	1.86						-0.07	-0.13	-1.11	-0.11
Grass	-0.03	-0.00		0.00	-0.00	-0.00		-0.00	-0.00	-0.00	-0.00	-0.00	-0.00							0.16	-0.00	-0.00	-0.00	-0.03	-0.01	-0.01		-0.05
Fodder	-0.31				-0.00				-0.01	-0.00	-0.01	-0.01	-0.00							-0.00	0.68	-0.01	-0.00	-0.03	-0.04	-0.07		-0.18
Sil. maize	-0.08	-0.00	-0.01	-0.12	-0.00	-0.00		-0.03	-0.02	-0.00	-0.06	-0.03	-0.00							-0.01	-0.01	0.81	-0.01	-0.03	-0.05	-0.11		-0.24

Table A-6: Price elasticities of area allocation and animal supply, Germany

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Set-aside	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Arable fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.55	-0.00	-0.09	-0.00	-0.02	-0.03		-0.00	-0.00		-0.06	-0.00	-0.00							-0.00	-0.03	-0.01	-0.00	-0.05	-0.03	-0.09		-0.14
Durum	-0.05	0.41	-0.04	-0.00	-0.02	-0.02		-0.01	-0.00		-0.01	-0.00	-0.00							-0.01	-0.02	-0.01	-0.00	-0.05	-0.02	-0.07		-0.09
Barley	-0.17	-0.00	0.45	-0.00	0.00	0.00		-0.00	-0.00		-0.01	-0.00	-0.00							-0.00	0.00	-0.01	-0.00	-0.05	-0.03	-0.06		-0.12
Corn	-0.01	-0.00	-0.01	0.35	-0.00	-0.00		0.00	-0.02		-0.03	-0.00	-0.00							-0.00	-0.01	-0.06	-0.00	-0.05	-0.02	-0.06		-0.08
Rye	-0.10	-0.00	-0.00	-0.00	0.32	-0.00		-0.00	-0.00		-0.01	-0.00	-0.00							-0.01	-0.01	-0.01	-0.00	-0.05	-0.01	-0.03		-0.09
O. grains	-0.16	-0.00	0.00	-0.00	-0.00	0.40		-0.00	-0.00		-0.01	-0.00	-0.00							-0.01	-0.01	-0.01	-0.00	-0.05	-0.02	-0.05		-0.09
Rice																												
Sugar	-0.01	-0.00	-0.00	0.00	-0.00	-0.00		0.62	-0.08		-0.13	-0.00	-0.00							-0.00	-0.00	-0.03	-0.00	-0.05	-0.07	-0.07		-0.18
Potato	-0.01	-0.00	-0.01	-0.01	-0.00	-0.00		-0.10	0.66		-0.11	-0.00	-0.00							-0.01	-0.02	-0.07	-0.01	-0.05	-0.06	-0.07		-0.13
Soybeans																												
Rapeseed	-0.16	-0.00	-0.01	-0.02	-0.00	-0.00		-0.11	-0.08		0.99	-0.00	-0.00							-0.01	-0.02	-0.09	-0.01	-0.05	-0.06	-0.07		-0.28
Sunseed	-0.02	-0.00	-0.01	-0.02	-0.00	-0.00		-0.04	-0.04		-0.08	0.58	-0.00							-0.01	-0.02	-0.04	-0.01	-0.05	-0.03	-0.07		-0.14
Set-aside	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00		-0.00	-0.00		-0.00	-0.00	0.17							-0.00	-0.00	-0.00	-0.00	-0.05	-0.01	-0.02		-0.06
Milk														1.07	0.08	-0.01									-0.18	-0.04	-0.36	-0.07
Beef														0.16	1.39	-0.01									-0.10	-0.17	-0.56	-0.08
Sheep														-0.20	-0.11	1.46									-0.10	-0.18	-0.42	-0.09
Pork																	2.11	-0.03	-0.02						-0.02	-0.17	-1.24	-0.12
Poultry																	-0.13	1.87	-0.04						-0.04	-0.42	-0.89	-0.11
Eggs																	-0.13	-0.06	1.86						-0.07	-0.13	-1.10	-0.11
Grass	-0.01	-0.00	-0.00	-0.00	-0.00	-0.00		-0.00	-0.01		-0.01	-0.00	-0.00							0.16	-0.00	-0.00	-0.00	-0.05	-0.01	-0.01		-0.05
Fodder	-0.17	-0.00	-0.00	-0.01	-0.01	-0.02		-0.01	-0.03		-0.05	-0.00	-0.00							-0.01	0.68	-0.03	-0.01	-0.05	-0.04	-0.07		-0.18
Sil. maize	-0.04	-0.00	-0.01	-0.04	-0.00	-0.00		-0.03	-0.07		-0.13	-0.00	-0.00							-0.01	-0.02	0.81	-0.01	-0.05	-0.05	-0.11		-0.24

Table A-7: Price elasticities of area allocation and animal supply, Greece

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Set-aside	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Arable fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.35		-0.01	-0.01	-0.00	-0.00		-0.00	-0.00	-0.00		-0.00	-0.00							-0.00	-0.03	-0.00	-0.00	-0.11	-0.02	-0.05		-0.11
Durum		0.29	-0.00		-0.00	-0.00		-0.00	-0.00	-0.00		-0.00	-0.00							-0.00	-0.02	-0.00	-0.00	-0.11	-0.02	-0.05		-0.09
Barley	-0.01	-0.02	0.45	-0.01	-0.00	-0.00		-0.00	-0.00	-0.00		-0.00	-0.00							-0.00	-0.05	-0.00	-0.00	-0.11	-0.03	-0.07		-0.12
Corn	-0.00		-0.00	0.35	-0.00	-0.00	-0.00	-0.01	-0.03	-0.00		-0.00	-0.00							-0.00	-0.03	-0.00	0.00	-0.11	-0.02	-0.06		-0.08
Rye	-0.01	-0.03	-0.01	-0.01	0.40	-0.00		-0.00	-0.00	-0.00		-0.00	-0.00							-0.00	-0.03	-0.00	-0.00	-0.11	-0.03	-0.07		-0.09
O. grains	-0.01	-0.02	-0.01	-0.01	-0.00	0.40		-0.00	-0.00	-0.00		-0.00	-0.00							-0.00	-0.04	-0.00	-0.00	-0.11	-0.03	-0.07		-0.09
Rice				-0.01			0.25																-0.06	-0.11	-0.02	-0.01		-0.04
Sugar	-0.00	-0.02	-0.00	-0.05	-0.00	-0.00		0.89	-0.13	-0.00		-0.00	-0.00							-0.00	-0.03	-0.00	-0.05	-0.11	-0.12	-0.10		-0.29
Potato	-0.00	-0.01	-0.00	-0.12	-0.00	-0.00		-0.16	0.99	-0.00		-0.00	-0.00							-0.00	-0.05	-0.00	-0.10	-0.11	-0.12	-0.11		-0.21
Soybeans	-0.00	-0.03	-0.00	-0.10	-0.00	-0.00		-0.02	-0.02	0.68		-0.00	-0.00							-0.00	-0.04	-0.00	-0.06	-0.11	-0.05	-0.07		-0.18
Rapeseed																												
Sunseed	-0.00	-0.02	-0.00	-0.08	-0.00	-0.00		-0.02	-0.01	-0.00		0.58	-0.00							-0.00	-0.04	-0.00	-0.05	-0.11	-0.04	-0.06		-0.15
Set-aside	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00		-0.00	-0.00	-0.00		-0.00	0.17							-0.00	-0.00	-0.00	-0.00	-0.11	-0.01	-0.01		-0.03
Milk														0.57	0.05	-0.20									-0.13	-0.07	-0.33	-0.04
Beef														0.06	0.52	-0.20									-0.08	-0.09	-0.28	-0.03
Sheep														-0.07	-0.06	0.62									-0.09	-0.11	-0.23	-0.04
Pork																	2.35	-0.07	-0.04						-0.19	-0.23	-1.23	-0.14
Poultry																	-0.06	1.65	-0.07						-0.08	-0.66	-0.68	-0.10
Eggs																	-0.06	-0.14	1.64						-0.09	-0.16	-0.84	-0.10
Grass	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00		-0.00	-0.00	-0.00		-0.00	-0.00							0.20	-0.00	-0.00	-0.00	-0.11	-0.01	-0.01		-0.05
Fodder	-0.01	-0.06	-0.01	-0.05	-0.00	-0.00		-0.02	-0.02	-0.00		-0.00	-0.00							-0.00	0.68	-0.00	-0.06	-0.11	-0.05	-0.10		-0.18
Sil. maize	-0.00	-0.02	-0.00	-0.10	-0.00	-0.00		-0.01	-0.01	-0.00		-0.00	-0.00							-0.00	-0.02	0.63	-0.02	-0.11	-0.05	-0.09		-0.18

Table A-8: Price elasticities of area allocation and animal supply, Ireland

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Set-aside	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Arable fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.55		-0.19			-0.01		-0.00	-0.00		-0.00		-0.00							-0.00	-0.04	-0.00		-0.03	-0.03	-0.09		-0.14
Durum																												
Barley	-0.14		0.45			-0.01		-0.00	-0.00		-0.00		-0.00								-0.05	-0.00		-0.03	-0.03	-0.06		-0.12
Corn																												
Rye																												
O. grains	-0.08		-0.07			0.40		-0.00	-0.00		-0.00		-0.00							-0.00	-0.06	-0.00		-0.03	-0.02	-0.05		-0.09
Rice																												
Sugar	-0.00		-0.01			-0.00		0.62	-0.25		-0.01		-0.00									-0.01		-0.03	-0.07	-0.07		-0.18
Potato	-0.01		-0.02			-0.00		-0.38	0.99		-0.00		-0.00							-0.02	-0.10	-0.02		-0.03	-0.10	-0.10		-0.20
Soybeans																												
Rapeseed	-0.06		-0.04			-0.00		-0.22	-0.03		0.85		-0.00							-0.03	-0.06	-0.01		-0.03	-0.05	-0.06		-0.25
Sunseed																												
Set-aside	-0.01		-0.01			-0.00		-0.01	-0.01		-0.00		0.17							-0.00	-0.01	-0.00		-0.03	-0.01	-0.02		-0.06
Milk														1.07	0.16	-0.05									-0.18	-0.04	-0.30	-0.07
Beef														0.15	0.99	-0.05									-0.07	-0.12	-0.35	-0.06
Sheep														-0.18	-0.20	1.46									-0.10	-0.18	-0.34	-0.09
Pork																	2.66	-0.02	-0.00						-0.03	-0.21	-0.79	-0.16
Poultry																	-0.04	1.87	-0.01						-0.04	-0.42	-0.60	-0.11
Eggs																	-0.04	-0.05	1.86						-0.07	-0.13	-0.74	-0.11
Grass	-0.00		-0.00						-0.00				-0.00							0.07	-0.00	-0.00		-0.03	-0.00	-0.01		-0.02
Fodder	-0.10		-0.16			-0.02			-0.06		-0.00		-0.00								0.68	-0.01		-0.03	-0.04	-0.07		-0.18
Sil. maize	-0.02		-0.03			-0.00		-0.02	-0.04		-0.00		-0.00							-0.01	-0.04	0.38		-0.03	-0.02	-0.05		-0.11

Table A-9: Price elasticities of area allocation and animal supply, Italy

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Set-aside	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Arable fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.40		-0.01	-0.01	-0.00	-0.00		-0.00	-0.00	-0.00	-0.00	-0.00	-0.00							-0.00	-0.06	-0.00	-0.00	-0.10	-0.02	-0.06		-0.12
Durum		0.29	-0.00		-0.00	-0.00		-0.00	-0.00	-0.00	-0.00	-0.00	-0.00							-0.00	-0.02	-0.00	-0.00	-0.10	-0.01	-0.05		-0.10
Barley	-0.02	-0.00	0.45	-0.01	-0.00	-0.01		-0.00	-0.00	-0.00	-0.00	-0.00	-0.00							-0.00	-0.07	-0.00	-0.00	-0.10	-0.03	-0.07		-0.13
Corn	-0.00		-0.00	0.35	-0.00	-0.00	-0.00	-0.00	-0.01	-0.01	-0.00	-0.01	-0.00							-0.00	-0.02	-0.02		-0.10	-0.02	-0.06		-0.09
Rye	-0.02	-0.03	-0.01	-0.01	0.40	-0.01		-0.00	-0.00	-0.00	-0.00	-0.00	-0.00							-0.00	-0.03	-0.00	-0.00	-0.10	-0.03	-0.07		-0.10
O. grains	-0.02	-0.01	-0.01	-0.01	-0.00	0.40		-0.00	-0.00	-0.00	-0.00	-0.00	-0.00							-0.00	-0.05	-0.00	-0.00	-0.10	-0.03	-0.07		-0.10
Rice				-0.01			0.25																-0.06	-0.10	-0.02	-0.01		-0.05
Sugar	-0.00	-0.01	-0.00	-0.01	-0.00	-0.00		0.62	-0.06	-0.01	-0.00	-0.01	-0.00							-0.00	-0.05	-0.01	-0.02	-0.10	-0.08	-0.07		-0.19
Potato	-0.00	-0.00	-0.00	-0.14	-0.00	-0.00		-0.15	0.99	-0.02	-0.00	-0.01	-0.00							-0.00	-0.07	-0.01	-0.04	-0.10	-0.13	-0.11		-0.22
Soybeans	-0.00	-0.01	-0.00	-0.09	-0.00	-0.00		-0.02	-0.01	0.68	-0.00	-0.01	-0.00							-0.00	-0.08	-0.01	-0.03	-0.10	-0.05	-0.07		-0.19
Rapeseed	-0.01	-0.01	-0.00	-0.00	-0.00	-0.00		-0.01	-0.00	-0.01	0.37	-0.01	-0.00							-0.00	-0.01	-0.01	-0.01	-0.10	-0.01	-0.04		-0.13
Sunseed	-0.00	-0.01	-0.00	-0.07	-0.00	-0.00		-0.02	-0.01	-0.02	-0.00	0.58	-0.00							-0.00	-0.06	-0.01	-0.02	-0.10	-0.04	-0.06		-0.15
Set-aside	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00		-0.00	-0.00	-0.00	-0.00	-0.00	0.17							-0.00	-0.00	-0.00	-0.00	-0.10	-0.01	-0.01		-0.03
Milk														0.92	0.12	-0.02									-0.21	-0.12	-0.32	-0.06
Beef														0.11	1.01	-0.02									-0.15	-0.18	-0.41	-0.06
Sheep														-0.14	-0.16	1.06									-0.16	-0.19	-0.32	-0.06
Pork																	2.48	-0.07	-0.03						-0.20	-0.25	-1.45	-0.15
Poultry																	-0.09	1.74	-0.07						-0.09	-0.70	-0.84	-0.10
Eggs																	-0.09	-0.14	1.73						-0.10	-0.16	-1.03	-0.10
Grass	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00		-0.00	-0.00	-0.00	-0.00	-0.00	-0.00							0.16	-0.00	-0.00	-0.00	-0.10	-0.00	-0.01		-0.03
Fodder	-0.04	-0.04	-0.02	-0.04	-0.00	-0.01		-0.02	-0.01	-0.02	-0.00	-0.01	-0.00							-0.00	0.68	-0.01	-0.04	-0.10	-0.05	-0.09		-0.19
Sil. maize	-0.00	-0.01	-0.00	-0.15	-0.00	-0.00		-0.01	-0.01	-0.01	-0.00	-0.01	-0.00							-0.00	-0.05	0.81	-0.02	-0.10	-0.06	-0.12		-0.24

Table A-10: Price elasticities of area allocation and animal supply, Netherlands

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Set-aside	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Arable fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.55		-0.04	-0.00	-0.00	-0.01		-0.04	-0.04		-0.00		-0.00							-0.00	-0.04	-0.03	-0.00	-0.08	-0.03	-0.09		-0.14
Durum																												
Barley	-0.15		0.45	-0.00	-0.00	-0.00		-0.00	-0.00		-0.00		-0.00									-0.00	-0.00	-0.08	-0.03	-0.06		-0.12
Corn	-0.01		-0.00	0.35	-0.00	-0.00		-0.03			-0.00		-0.00							-0.00	-0.01	-0.06	-0.01	-0.08	-0.02	-0.06		-0.08
Rye	-0.09		-0.02	-0.00	0.40	-0.01		-0.00	-0.01		-0.00		-0.00							-0.01	-0.01	-0.01	-0.00	-0.08	-0.02	-0.05		-0.09
O. grains	-0.12		-0.01	-0.00	-0.00	0.40		-0.00	-0.01		-0.00		-0.00							-0.00	-0.01	-0.01	-0.00	-0.08	-0.02	-0.05		-0.09
Rice																												
Sugar	-0.03		-0.00	-0.01	-0.00	-0.00		0.62	-0.10		-0.00		-0.00								-0.01	-0.07	-0.01	-0.08	-0.07	-0.07		-0.18
Potato	-0.01		-0.00		-0.00	-0.00		-0.04	0.33		-0.00										-0.00	-0.06	-0.00	-0.08	-0.02	-0.03		-0.07
Soybeans																												
Rapeseed	-0.02		-0.00	-0.01	-0.00	-0.00		-0.16	-0.16		0.85		-0.00							-0.00	-0.01	-0.04	-0.01	-0.08	-0.05	-0.06		-0.25
Sunseed																												
Set-aside	-0.00		-0.00	-0.00	-0.00	-0.00		-0.00			-0.00		0.17							-0.00	-0.00	-0.00	-0.00	-0.08	-0.01	-0.01		-0.05
Milk														1.07	0.06	-0.01									-0.18	-0.04	-0.33	-0.07
Beef														0.15	1.39	-0.01									-0.10	-0.17	-0.57	-0.08
Sheep														-0.19	-0.08	1.46									-0.10	-0.18	-0.42	-0.09
Pork																	2.11	-0.07	-0.04						-0.02	-0.17	-0.88	-0.12
Poultry																	-0.12	1.87	-0.07						-0.04	-0.42	-0.71	-0.11
Eggs																	-0.12	-0.14	1.58						-0.04	-0.11	-0.75	-0.09
Grass	-0.00			-0.00	-0.00	-0.00			-0.00		-0.00		-0.00							0.09	-0.00		-0.00	-0.08	-0.00	-0.00		-0.00
Fodder	-0.20			-0.01	-0.00	-0.01		-0.03	-0.02		-0.00		-0.00							-0.00	0.68	-0.03	-0.01	-0.08	-0.04	-0.07		-0.18
Sil. maize	-0.03		-0.00	-0.02	-0.00	-0.00		-0.08	-0.18		-0.00		-0.00								-0.01	0.81	-0.01	-0.08	-0.05	-0.11		-0.24

Table A-11: Price elasticities of area allocation and animal supply, Portugal

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Set-aside	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Arable fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.40	-0.01	-0.00	-0.01	-0.01	-0.03		-0.00	-0.00			-0.00	-0.00							-0.00	-0.01	-0.01	-0.00	-0.11	-0.02	-0.06		-0.13
Durum	-0.00	0.29	-0.00		-0.00	-0.00		-0.00	-0.00			-0.00	-0.00							-0.00	-0.00	-0.01	-0.00	-0.11	-0.01	-0.04		-0.10
Barley	-0.01	-0.02	0.45	-0.01	-0.01	-0.02		-0.00	-0.00			-0.00	-0.00							-0.00	-0.01	-0.01	-0.00	-0.11	-0.03	-0.07		-0.13
Corn	-0.00		-0.00	0.35	-0.00	-0.00	-0.00	0.00	-0.04			-0.00									-0.00	-0.02		-0.11	-0.02	-0.06		-0.09
Rye	-0.02	-0.01	-0.00	-0.01	0.40	-0.03		-0.00	-0.00			-0.00	-0.00							-0.00	-0.01	-0.01	-0.00	-0.11	-0.03	-0.07		-0.10
O. grains	-0.02	-0.01	-0.00	-0.01	-0.01	0.40		-0.00	-0.00			-0.00	-0.00							-0.00	-0.01	-0.01	-0.00	-0.11	-0.03	-0.07		-0.10
Rice				-0.00			0.25																-0.05	-0.11	-0.02	-0.01		-0.06
Sugar	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00		0.89	-0.21			-0.01	-0.00							-0.00	-0.00	-0.04	-0.01	-0.11	-0.12	-0.09		-0.29
Potato	-0.00	-0.00	-0.00	-0.10	-0.00	-0.00		-0.07	0.99			-0.02	-0.00							-0.00	-0.01	-0.20	-0.03	-0.11	-0.12	-0.11		-0.22
Soybeans																												
Rapeseed																												
Sunseed	-0.00	-0.01	-0.00	-0.02	-0.00	-0.00		-0.01	-0.06			0.58	-0.00							-0.00	-0.01	-0.09	-0.01	-0.11	-0.04	-0.06		-0.16
Set-aside	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00		-0.00	-0.00			-0.00	0.17							-0.00	-0.00	-0.00	-0.00	-0.11	-0.01	-0.01		-0.02
Milk														0.82	0.06	-0.03									-0.19	-0.11	-0.35	-0.05
Beef														0.12	0.89	-0.03									-0.13	-0.16	-0.44	-0.05
Sheep														-0.15	-0.08	0.93									-0.14	-0.17	-0.38	-0.05
Pork																	2.35	-0.10	-0.03						-0.19	-0.23	-1.02	-0.14
Poultry																	-0.11	1.65	-0.05						-0.08	-0.66	-0.59	-0.10
Eggs																	-0.11	-0.20	1.64						-0.09	-0.16	-0.73	-0.10
Grass	-0.00	-0.00	-0.00		-0.00	-0.00		-0.00	-0.00			-0.00	-0.00							0.20	-0.00	-0.00	-0.00	-0.11	-0.01	-0.01		-0.05
Fodder	-0.02	-0.03	-0.00	-0.03	-0.01	-0.03		-0.01	-0.04			-0.01	-0.00							-0.00	0.68	-0.05	-0.01	-0.11	-0.05	-0.09		-0.19
Sil. maize	-0.00	-0.01	-0.00	-0.03	-0.00	-0.00		-0.01	-0.16			-0.02	-0.00							-0.00	-0.01	0.81	-0.02	-0.11	-0.06	-0.12		-0.25

Table A-12: Price elasticities of area allocation and animal supply, Spain

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Set-aside	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Arable fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.55	-0.02	-0.10	-0.00	-0.00	-0.01		-0.00	-0.00	-0.00	-0.00	-0.01	-0.00							-0.00	-0.02	-0.00	-0.00	-0.11	-0.04	-0.09		-0.16
Durum	-0.02	0.37	-0.02	-0.00	-0.00	-0.01		-0.00	-0.00	-0.00	-0.00	-0.01	-0.00							-0.00	-0.01	-0.00	-0.00	-0.11	-0.02	-0.06		-0.11
Barley	-0.06	-0.01	0.45			-0.00		-0.00	-0.00	-0.00	-0.00	-0.01									-0.02	-0.00	-0.00	-0.11	-0.03	-0.07		-0.13
Corn	-0.00	-0.00		0.35	-0.00	-0.00	-0.01		-0.02	-0.00	-0.00	-0.02	-0.00							-0.00		-0.01	-0.00	-0.11	-0.02	-0.06		-0.09
Rye	-0.02	-0.02		-0.01	0.40	-0.01		-0.00	-0.00	-0.00	-0.00	-0.00	-0.00							-0.00	-0.02	-0.00	-0.00	-0.11	-0.03	-0.07		-0.10
O. grains	-0.03	-0.02	-0.01	-0.00	-0.00	0.40		-0.00	-0.00	-0.00	-0.00	-0.00	-0.00							-0.00	-0.02	-0.00	-0.00	-0.11	-0.03	-0.07		-0.10
Rice				-0.01			0.25																-0.04	-0.11	-0.01	-0.01		-0.06
Sugar	-0.01	-0.01	-0.00		-0.00	-0.00		0.89	-0.19	-0.00	-0.00	-0.04	-0.00							-0.00	-0.02	-0.00	-0.00	-0.11	-0.12	-0.09		-0.29
Potato	-0.00	-0.00	-0.01	-0.07	-0.00	-0.00		-0.22	0.99	-0.00	-0.00	-0.07	-0.00							-0.00	-0.04	-0.00	-0.00	-0.11	-0.12	-0.11		-0.22
Soybeans	-0.01	-0.01	-0.02	-0.07	-0.00	-0.00		-0.02	-0.02	0.68	-0.00	-0.07	-0.00							-0.00	-0.03	-0.00	-0.00	-0.11	-0.05	-0.07		-0.20
Rapeseed	-0.01	-0.01	-0.01	-0.01	-0.00	-0.00		-0.01	-0.01	-0.00	0.37	-0.01	-0.00							-0.00	-0.01	-0.00	-0.00	-0.11	-0.01	-0.04		-0.13
Sunseed	-0.01	-0.01	-0.02	-0.03	-0.00	-0.00		-0.03	-0.04	-0.00	-0.00	0.58	-0.00							-0.00	-0.05	-0.00	-0.00	-0.11	-0.04	-0.06		-0.16
Set-aside	-0.00	-0.00		-0.00	-0.00	-0.00		-0.00	-0.00	-0.00	-0.00	-0.00	0.17							-0.00	-0.00	-0.00	-0.00	-0.11	-0.01	-0.01		-0.03
Milk														0.92	0.07	-0.06									-0.21	-0.12	-0.43	-0.06
Beef														0.06	1.01	-0.06									-0.15	-0.18	-0.51	-0.06
Sheep														-0.08	-0.09	0.96									-0.14	-0.17	-0.32	-0.06
Pork																	2.48	-0.07	-0.03						-0.20	-0.25	-1.39	-0.15
Poultry																	-0.17	1.74	-0.07						-0.09	-0.70	-0.76	-0.10
Eggs																	-0.17	-0.13	1.73						-0.10	-0.16	-0.94	-0.10
Grass	-0.00	-0.00		-0.00	-0.00	-0.00		-0.00	-0.00	-0.00	-0.00	-0.00	-0.00							0.16	-0.00	-0.00	-0.00	-0.11	-0.00	-0.00		-0.02
Fodder	-0.03	-0.02	-0.07		-0.00	-0.01		-0.01	-0.02	-0.00	-0.00	-0.05	-0.00							-0.00	0.68	-0.00	-0.00	-0.11	-0.05	-0.09		-0.19
Sil. maize	-0.01	-0.01	-0.01	-0.15	-0.00	-0.00		-0.01	-0.01	-0.00	-0.00	-0.03	-0.00							-0.00	-0.02	0.81	-0.00	-0.11	-0.06	-0.12		-0.25

Table A-13: Price elasticities of area allocation and animal supply, Sweden

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Set-aside	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Arable fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.55		-0.09		-0.00	-0.08		-0.00	-0.00		-0.01		-0.00							-0.00	-0.06		-0.00	-0.04	-0.03	-0.09		-0.14
Durum																												
Barley	-0.12		0.45		-0.00	-0.02		-0.00	-0.00		-0.00		-0.00							-0.00	-0.04		-0.00	-0.04	-0.03	-0.06		-0.12
Corn																												
Rye	-0.05		-0.05		0.40	-0.04		-0.00	-0.00		-0.00		-0.00							-0.00	-0.05		-0.00	-0.04	-0.02	-0.05		-0.09
O. grains	-0.12		-0.02		-0.00	0.40		-0.00	-0.00		-0.00		-0.00							-0.00	-0.04		-0.00	-0.04	-0.02	-0.05		-0.09
Rice																												
Sugar	-0.01		-0.01		-0.00	-0.00		0.89	-0.25		-0.09		-0.00							-0.00	-0.01		-0.00	-0.04	-0.10	-0.09		-0.28
Potato	-0.01		-0.01		-0.00	-0.01		-0.38	0.99		-0.02		-0.00							-0.00	-0.10		-0.00	-0.04	-0.10	-0.10		-0.20
Soybeans																												
Rapeseed	-0.11		-0.02		-0.00	-0.01		-0.22	-0.04		0.99		-0.00							-0.00	-0.11		-0.00	-0.04	-0.06	-0.07		-0.28
Sunseed																												
Set-aside	-0.01		-0.01		-0.00	-0.01		-0.00	-0.00		-0.00		0.17							-0.00	-0.01		-0.00	-0.04	-0.01	-0.02		-0.06
Milk														1.07	0.09	-0.01									-0.18	-0.04	-0.32	-0.07
Beef														0.18	1.10	-0.01									-0.08	-0.14	-0.47	-0.07
Sheep														-0.23	-0.11	1.46									-0.10	-0.18	-0.44	-0.09
Pork																	2.66	-0.04	-0.02						-0.03	-0.21	-1.50	-0.16
Poultry																	-0.09	1.87	-0.05						-0.04	-0.42	-0.84	-0.11
Eggs																	-0.09	-0.07	1.86						-0.07	-0.13	-1.03	-0.11
Grass	-0.01		-0.01		-0.00	-0.01		-0.00	-0.00		-0.00		-0.00							0.20	-0.01		-0.00	-0.04	-0.01	-0.02		-0.07
Fodder	-0.13		-0.06		-0.01	-0.06		-0.01	-0.04		-0.03		-0.00							-0.00	0.68		-0.00	-0.04	-0.04	-0.07		-0.18
Sil. maize																												

Table A-14: Price elasticities of area allocation and animal supply, United Kingdom

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Set-aside	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Arable fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.55	-0.00	-0.08		-0.00	-0.01		-0.00	-0.04	-0.00	-0.07	-0.00	-0.00							-0.00	-0.04	-0.00	-0.00	-0.05	-0.03	-0.09		-0.14
Durum	-0.09	0.41	-0.04		-0.00	-0.01		-0.00	-0.00	-0.00	-0.01	-0.00	-0.00							-0.00	-0.02	-0.00	-0.00	-0.05	-0.02	-0.07		-0.09
Barley	-0.19	-0.00	0.45						-0.00	-0.00		-0.00											-0.00	-0.05	-0.03	-0.06		-0.12
Corn																												
Rye	-0.15	-0.00			0.40	-0.01		-0.00	-0.00	-0.00	-0.01	-0.00	-0.00							-0.00	-0.02	-0.00	-0.00	-0.05	-0.02	-0.05		-0.09
O. grains	-0.19	-0.00			-0.00	0.40		-0.00	-0.00	-0.00		-0.00	-0.00							-0.00		-0.00	-0.00	-0.05	-0.02	-0.05		-0.09
Rice																												
Sugar	-0.02	-0.00			-0.00	-0.00		0.62	-0.24	-0.00		-0.00	-0.00										-0.00	-0.05	-0.07	-0.07		-0.18
Potato	-0.19	-0.00	-0.01		-0.00	-0.00		-0.17	0.99	-0.00	-0.12	-0.00	-0.00							-0.00	-0.04	-0.01	-0.00	-0.05	-0.10	-0.10		-0.20
Soybeans	-0.06	-0.00	-0.02		-0.00	-0.00		-0.04	-0.09	0.68	-0.09	-0.00	-0.00							-0.00	-0.04	-0.01	-0.00	-0.05	-0.04	-0.07		-0.18
Rapeseed	-0.39	-0.00			-0.00				-0.13	-0.00	0.99	-0.00	-0.00										-0.00	-0.05	-0.06	-0.07		-0.28
Sunseed	-0.05	-0.00	-0.02		-0.00	-0.00		-0.04	-0.06	-0.00	-0.07	0.58	-0.00							-0.00	-0.04	-0.01	-0.00	-0.05	-0.03	-0.07		-0.14
Set-aside	-0.02	-0.00			-0.00	-0.00		-0.00	-0.01	-0.00	-0.00	-0.00	0.17							-0.00		-0.00	-0.00	-0.05	-0.01	-0.02		-0.06
Milk														1.07	0.07	-0.07									-0.18	-0.04	-0.30	-0.07
Beef														0.14	1.39	-0.07									-0.10	-0.17	-0.51	-0.08
Sheep														-0.17	-0.09	1.18									-0.08	-0.15	-0.29	-0.07
Pork																	2.11	-0.09	-0.03						-0.02	-0.17	-0.83	-0.12
Poultry																	-0.05	1.87	-0.05						-0.04	-0.42	-0.61	-0.11
Eggs																	-0.05	-0.19	1.86						-0.07	-0.13	-0.75	-0.11
Grass	-0.00	-0.00			-0.00	-0.00			-0.01	-0.00		-0.00	-0.00							0.09	-0.00	-0.00	-0.00	-0.05	-0.00	-0.01		-0.02
Fodder	-0.29	-0.00			-0.00				-0.05	-0.00		-0.00								-0.00	0.68	-0.00	-0.00	-0.05	-0.04	-0.07		-0.18
Sil. maize	-0.07	-0.00			-0.00	-0.00			-0.08	-0.00		-0.00	-0.00							-0.00	-0.00	0.38	-0.00	-0.05	-0.02	-0.05		-0.11

Table A-15: Price elasticities of area allocation and animal supply, Poland

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.42		-0.03	-0.00	-0.03	-0.06			-0.03			-0.00									-0.00	-0.00	-0.07	-0.04	-0.09		-0.08
Durum																											
Barley	-0.08		0.39	-0.00	-0.02	-0.00		-0.00	-0.03		-0.00	-0.00									-0.00	-0.00	-0.07	-0.03	-0.08		-0.07
Corn	-0.00		-0.00	0.21	-0.00	-0.00			-0.06			-0.00							-0.00				-0.07	-0.01	-0.05		-0.02
Rye	-0.09		-0.02	-0.00	0.42	-0.01		-0.00	-0.03		-0.00	-0.00									-0.00	-0.00	-0.07	-0.04	-0.09		-0.08
O. grains	-0.09		-0.00	-0.00	-0.01	0.42		-0.00	-0.04		-0.00	-0.00									-0.00	-0.00	-0.07	-0.04	-0.09		-0.08
Rice																											
Sugar			-0.00		-0.00	-0.00		0.57	-0.13			-0.00											-0.07	-0.11	-0.07		-0.18
Potato	-0.02		-0.01	-0.00	-0.01	-0.02		-0.04	0.68		-0.04	-0.00								-0.02	-0.01	-0.08	-0.07	-0.13	-0.09		-0.15
Soybeans																											
Rapeseed			-0.00		-0.00	-0.00			-0.30		0.80	-0.00							-0.00		-0.00		-0.07	-0.08	-0.15		-0.19
Sunseed	-0.01		-0.00	-0.01	-0.00	-0.01		-0.03	-0.11		-0.01	0.46							-0.00	-0.01	-0.00	-0.01	-0.07	-0.04	-0.07		-0.08
Milk													0.95	0.02	-0.00									-0.29	-0.25	-0.57	-0.06
Beef													0.14	0.79	-0.00									-0.24	-0.21	-0.47	-0.05
Sheep													-0.18	-0.03	0.95									-0.29	-0.25	-0.57	-0.06
Pork																1.01	-0.06	-0.03						-0.16	-0.12	-0.61	-0.06
Poultry																-0.21	1.44	-0.06						-0.12	-0.91	-0.68	-0.09
Eggs																-0.21	-0.12	1.84						-0.15	-0.25	-1.04	-0.11
Grass				-0.00							-0.00	-0.00							0.17	-0.00	-0.00	-0.00	-0.07	-0.02	-0.03		-0.06
Fodder									-0.26			-0.00							-0.00	0.72	-0.00	-0.00	-0.07	-0.07	-0.13		-0.18
Sil. maize	-0.01		-0.00		-0.00	-0.00			-0.16		-0.00	-0.00							-0.00	-0.00	0.54	-0.00	-0.07	-0.05	-0.10		-0.13

Table A-16: Price elasticities of area allocation and animal supply, Latvia

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.48		-0.04		-0.02	-0.02			-0.13												-0.00	-0.00	-0.03	-0.04	-0.10		-0.09
Durum																											
Barley	-0.09		0.42		-0.00	-0.00			-0.09		-0.00									-0.00	-0.00	-0.00	-0.03	-0.04	-0.09		-0.08
Corn																											
Rye	-0.10		-0.00		0.35	-0.00		-0.00	-0.05		-0.00									-0.00	-0.00	-0.00	-0.03	-0.03	-0.07		-0.07
O. grains	-0.09		-0.00		-0.00	0.35		-0.00	-0.05		-0.00									-0.00	-0.00	-0.00	-0.03	-0.03	-0.07		-0.07
Rice																											
Sugar					-0.00	-0.00		0.57	-0.21		-0.00									-0.00	-0.00		-0.03	-0.10	-0.07		-0.15
Potato	-0.11		-0.04		-0.01	-0.01		-0.03	0.68		-0.03								-0.05	-0.02	-0.00	-0.05	-0.03	-0.10	-0.09		-0.11
Soybeans																											
Rapeseed			-0.00		-0.00	-0.00		-0.00	-0.43		0.99									-0.00	-0.00	-0.00	-0.03	-0.10	-0.19		-0.24
Sunseed																											
Milk													0.85	0.04	-0.00									-0.26	-0.22	-0.51	-0.05
Beef													0.22	0.83	-0.00									-0.26	-0.22	-0.50	-0.05
Sheep													-0.28	-0.05	1.00									-0.31	-0.26	-0.60	-0.06
Pork																1.33	-0.02	-0.05						-0.24	-0.17	-0.80	-0.08
Poultry																-0.09	1.75	-0.10						-0.15	-1.10	-0.75	-0.10
Eggs																-0.09	-0.05	1.74						-0.13	-0.23	-0.90	-0.10
Grass									-0.06										0.19		-0.00	-0.00	-0.03	-0.02	-0.03		-0.04
Fodder			-0.00		-0.00	-0.00		-0.00	-0.24		-0.00									0.60	-0.00	-0.00	-0.03	-0.06	-0.11		-0.15
Sil. maize	-0.02		-0.01		-0.00	-0.00		-0.01	-0.15		-0.01								-0.01	-0.01	0.54	-0.00	-0.03	-0.05	-0.10		-0.13

Table A-17: Price elasticities of area allocation and animal supply, Romania

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.49	-0.00	-0.02	-0.09	-0.00	-0.00		-0.00	-0.02	-0.00	-0.00	-0.01							-0.01	-0.05	-0.00	-0.00	-0.05	-0.04	-0.10		-0.09
Durum	-0.08	0.39	-0.02	-0.03	-0.00	-0.00		-0.00	-0.01	-0.00	-0.00	-0.01							-0.01	-0.02	-0.00	-0.00	-0.05	-0.03	-0.08		-0.06
Barley	-0.11	-0.00	0.35	-0.00	-0.00	-0.00		-0.00	-0.01	-0.00	-0.00	-0.00							-0.01		-0.00	-0.00	-0.05	-0.03	-0.07		-0.07
Corn	-0.04	-0.00	-0.00	0.28	-0.00	-0.00	-0.00	-0.00	-0.08	-0.00	-0.00								-0.00		-0.00		-0.05	-0.02	-0.07		-0.02
Rye	-0.07	-0.00	-0.02	-0.03	0.42	-0.01		-0.00	-0.01	-0.00	-0.00	-0.00							-0.01	-0.03	-0.00	-0.00	-0.05	-0.04	-0.09		-0.08
O. grains	-0.09	-0.00	-0.02	-0.02	-0.00	0.42		-0.00	-0.01	-0.00	-0.00	-0.00							-0.01	-0.02	-0.00	-0.00	-0.05	-0.04	-0.09		-0.08
Rice				-0.19			1.28															-0.59	-0.05	-0.12	-0.02		-0.30
Sugar	-0.01	-0.00	-0.00	-0.06	-0.00	-0.00		0.57	-0.06	-0.00	-0.00	-0.03							-0.01	-0.02	-0.00	-0.01	-0.05	-0.10	-0.07		-0.15
Potato	-0.01	-0.00	-0.00	-0.13	-0.00	-0.00		-0.00	0.68	-0.00	-0.00	-0.12							-0.02	-0.01	-0.00	-0.03	-0.05	-0.10	-0.09		-0.11
Soybeans	-0.01	-0.00	-0.00	-0.09	-0.00	-0.00		-0.00	-0.13	0.70	-0.00	-0.05							-0.01	-0.02	-0.00	-0.01	-0.05	-0.07	-0.09		-0.17
Rapeseed	-0.03	-0.00	-0.00	-0.19	-0.00	-0.00		-0.00	-0.12	-0.00	1.00	-0.05							-0.01	-0.02	-0.00	-0.01	-0.05	-0.10	-0.19		-0.24
Sunseed	-0.03	-0.00	-0.00		-0.00	-0.00		-0.00	-0.42	-0.00	-0.00	0.94							-0.01	-0.01	-0.00	-0.01	-0.05	-0.09	-0.08		-0.22
Milk													0.86	0.03	-0.01									-0.26	-0.22	-0.51	-0.05
Beef													0.16	0.84	-0.01									-0.26	-0.22	-0.50	-0.05
Sheep													-0.21	-0.04	1.01									-0.31	-0.26	-0.60	-0.06
Pork																1.30	-0.06	-0.05						-0.23	-0.17	-0.78	-0.08
Poultry																-0.13	1.41	-0.11						-0.12	-0.88	-0.84	-0.08
Eggs																-0.13	-0.12	1.75						-0.13	-0.23	-1.05	-0.10
Grass	-0.02	-0.00	-0.00	-0.00	-0.00	-0.00		-0.00	-0.04	-0.00	-0.00	-0.01							0.19	-0.00	-0.00	-0.00	-0.05	-0.02	-0.01		-0.04
Fodder	-0.20	-0.00			-0.00	-0.00		-0.00	-0.04	-0.00	-0.00	-0.02							-0.01	0.72	-0.00	-0.01	-0.05	-0.07	-0.14		-0.18
Sil. maize	-0.01	-0.00	-0.00	-0.12	-0.00	-0.00		-0.00	-0.08	-0.00	-0.00	-0.03							-0.01	-0.02	0.70	-0.01	-0.05	-0.07	-0.13		-0.17

Table A-18: Price elasticities of area allocation and animal supply, Slovenia

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.48		-0.04	-0.04	-0.00	-0.01		-0.00	-0.01	-0.00	-0.00	-0.00							-0.04	-0.07	-0.01	-0.00	-0.02	-0.04	-0.10		-0.09
Durum																											
Barley	-0.15		0.42	-0.01	-0.00	-0.00		-0.00	-0.01	-0.00	-0.00	-0.00							-0.02		-0.01	-0.00	-0.02	-0.04	-0.09		-0.08
Corn	-0.03		-0.00	0.22	-0.00	-0.00			-0.06	-0.00	-0.00	-0.00							-0.01		-0.00		-0.02	-0.01	-0.05		-0.02
Rye	-0.05		-0.02	-0.01	0.35	-0.01		-0.00	-0.01	-0.00	-0.00	-0.00							-0.02	-0.03	-0.01	-0.00	-0.02	-0.03	-0.07		-0.07
O. grains	-0.07		-0.02	-0.01	-0.00	0.35		-0.00	-0.01	-0.00	-0.00	-0.00							-0.02	-0.02	-0.01	-0.00	-0.02	-0.03	-0.07		-0.07
Rice																											
Sugar	-0.01		-0.00		-0.00	-0.00		0.57	-0.14	-0.00	-0.00	-0.00							-0.01	-0.01	-0.03	-0.02	-0.02	-0.10	-0.07		-0.15
Potato	-0.01		-0.00	-0.10	-0.00	-0.00		-0.03	0.68	-0.00	-0.00	-0.00							-0.04	-0.01	-0.06	-0.09	-0.02	-0.10	-0.09		-0.11
Soybeans	-0.01		-0.00	-0.11	-0.00	-0.00		-0.02	-0.08	0.64	-0.00	-0.00							-0.02	-0.03	-0.04	-0.04	-0.02	-0.06	-0.08		-0.13
Rapeseed	-0.03		-0.00	-0.16	-0.00	-0.00		-0.04	-0.08	-0.00	1.00	-0.00							-0.02	-0.02	-0.04	-0.06	-0.02	-0.10	-0.19		-0.24
Sunseed	-0.01		-0.00	-0.22	-0.00	-0.00		-0.02	-0.11	-0.00	-0.00	0.97							-0.02	-0.03	-0.05	-0.07	-0.02	-0.09	-0.08		-0.23
Milk													1.15	0.09	-0.00									-0.35	-0.30	-0.64	-0.07
Beef													0.15	1.14	-0.00									-0.35	-0.30	-0.69	-0.07
Sheep													-0.18	-0.12	1.37									-0.42	-0.36	-0.82	-0.08
Pork																1.60	-0.07	-0.03						-0.28	-0.20	-0.75	-0.09
Poultry																-0.09	1.87	-0.06						-0.16	-1.17	-0.89	-0.11
Eggs																-0.09	-0.13	1.74						-0.13	-0.23	-0.49	-0.10
Grass	-0.03		-0.00	-0.01	-0.00	-0.00		-0.00	-0.02	-0.00	-0.00	-0.00							0.19	-0.00	-0.01	-0.00	-0.02	-0.02	-0.03		-0.04
Fodder	-0.19				-0.00	-0.00		-0.01	-0.02	-0.00	-0.00	-0.00							-0.01	0.60	-0.02		-0.02	-0.06	-0.11		-0.15
Sil. maize	-0.02		-0.00	-0.01	-0.00	-0.00		-0.01	-0.11	-0.00	-0.00	-0.00							-0.02	-0.01	0.54	-0.04	-0.02	-0.05	-0.10		-0.13

Table A-19: Price elasticities of area allocation and animal supply, Lithuania

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.48		-0.11	-0.00	-0.02	-0.02		-0.00	-0.03		-0.01								-0.00	-0.02	-0.00	-0.00	-0.04	-0.04	-0.10		-0.09
Durum																											
Barley	-0.16		0.42	-0.00	-0.00				-0.01		-0.00								-0.00		-0.00	-0.00	-0.04	-0.04	-0.09		-0.08
Corn	-0.01		-0.01	0.22	-0.00	-0.00		-0.02	-0.02		-0.01								-0.00	-0.02	-0.00	-0.00	-0.04	-0.01	-0.05		-0.02
Rye	-0.13		-0.00	-0.00	0.35	-0.00		-0.00	-0.01		-0.00								-0.00		-0.00	-0.00	-0.04	-0.03	-0.07		-0.07
O. grains	-0.13			-0.00	-0.00	0.35		-0.00	-0.01		-0.00								-0.00	-0.00	-0.00	-0.00	-0.04	-0.03	-0.07		-0.07
Rice																											
Sugar	-0.01			-0.00	-0.00	-0.00		0.57	-0.19		-0.00								-0.00		-0.00		-0.04	-0.10	-0.07		-0.15
Potato	-0.03		-0.01	-0.00	-0.00	-0.00		-0.06	0.68		-0.04								-0.01	-0.14	-0.00	-0.05	-0.04	-0.10	-0.09		-0.11
Soybeans																											
Rapeseed	-0.07		-0.01	-0.00	-0.00	-0.00		-0.00	-0.34		0.99								-0.00		-0.00	-0.01	-0.04	-0.10	-0.19		-0.24
Sunseed																											
Milk													0.85	0.05	-0.00									-0.26	-0.22	-0.51	-0.05
Beef													0.19	0.83	-0.00									-0.26	-0.22	-0.50	-0.05
Sheep													-0.24	-0.07	1.00									-0.31	-0.26	-0.60	-0.06
Pork																1.33	-0.04	-0.04						-0.24	-0.17	-0.80	-0.08
Poultry																-0.12	1.75	-0.07						-0.15	-1.10	-0.76	-0.10
Eggs																-0.12	-0.07	1.74						-0.13	-0.23	-0.98	-0.10
Grass	-0.02		-0.00	-0.00	-0.00	-0.00		-0.00	-0.03		-0.00								0.19	-0.00	-0.00	-0.00	-0.04	-0.02	-0.03		-0.04
Fodder	-0.03			-0.00		-0.00			-0.22										-0.00	0.60	-0.00		-0.04	-0.06	-0.11		-0.15
Sil. maize	-0.01		-0.01	-0.00	-0.00	-0.00		-0.02	-0.11		-0.01								-0.00	-0.04	0.54	-0.01	-0.04	-0.05	-0.10		-0.13

Table A-20: Price elasticities of area allocation and animal supply, Bulgaria

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.49	-0.00	-0.03	-0.03	-0.00	-0.00		-0.00	-0.01	-0.00	-0.00	-0.08							-0.01	-0.01	-0.00	-0.03	-0.06	-0.04	-0.10		-0.09
Durum	-0.12	0.39		-0.01	-0.00	-0.01		-0.00	-0.00	-0.00	-0.00	-0.01							-0.00	-0.00	-0.00	-0.00	-0.06	-0.03	-0.08		-0.06
Barley	-0.12		0.35		-0.00			-0.00	-0.00	-0.00	-0.00										-0.00		-0.06	-0.03	-0.07		-0.07
Corn	-0.11	-0.00		0.28	-0.00	-0.00	-0.00	-0.00		-0.00	-0.00										-0.00		-0.06	-0.02	-0.07		-0.02
Rye	-0.09	-0.00	-0.02	-0.01	0.42	-0.01		-0.00	-0.00	-0.00	-0.00	-0.01							-0.01	-0.01	-0.00	-0.00	-0.06	-0.04	-0.09		-0.08
O. grains	-0.12	-0.00		-0.01	-0.00	0.42		-0.00	-0.00	-0.00	-0.00	-0.01							-0.01	-0.01	-0.00	-0.00	-0.06	-0.04	-0.09		-0.08
Rice				-0.01			1.28															-0.76	-0.06	-0.12	-0.02		-0.30
Sugar	-0.03	-0.00	-0.00	-0.03	-0.00	-0.00		0.57	-0.05	-0.00	-0.00	-0.04							-0.01	-0.00	-0.00	-0.02	-0.06	-0.10	-0.07		-0.15
Potato	-0.03	-0.00	-0.00		-0.00	-0.00		-0.00	0.68	-0.00	-0.00	-0.13							-0.00	-0.00	-0.00	-0.14	-0.06	-0.10	-0.09		-0.11
Soybeans	-0.04	-0.00	-0.01	-0.05	-0.00	-0.00		-0.00	-0.04	0.70	-0.00	-0.10							-0.01	-0.00	-0.00	-0.06	-0.06	-0.07	-0.09		-0.17
Rapeseed	-0.11	-0.00	-0.01	-0.05	-0.00	-0.00		-0.00	-0.03	-0.00	1.00	-0.12							-0.01	-0.00	-0.00	-0.09	-0.06	-0.10	-0.19		-0.24
Sunseed	-0.27	-0.00			-0.00	-0.00		-0.00	-0.07	-0.00	-0.00	0.94							-0.00	-0.00	-0.00	-0.14	-0.06	-0.09	-0.08		-0.22
Milk													0.86	0.04	-0.04									-0.26	-0.22	-0.51	-0.05
Beef													0.10	0.84	-0.04									-0.26	-0.22	-0.50	-0.05
Sheep													-0.12	-0.05	1.01									-0.31	-0.26	-0.60	-0.06
Pork																1.30	-0.07	-0.03						-0.23	-0.17	-0.60	-0.08
Poultry																-0.18	1.41	-0.07						-0.12	-0.88	-0.84	-0.08
Eggs																-0.18	-0.15	1.75						-0.13	-0.23	-1.05	-0.10
Grass	-0.05	-0.00			-0.00	-0.00		-0.00	-0.00	-0.00	-0.00	-0.00							0.19	-0.00	-0.00	-0.00	-0.06	-0.02	-0.01		-0.04
Fodder	-0.23	-0.00			-0.00	-0.01		-0.00	-0.02	-0.00	-0.00	-0.01							-0.01	0.72	-0.00		-0.06	-0.07	-0.14		-0.18
Sil. maize	-0.05	-0.00	-0.01	-0.05	-0.00	-0.00		-0.00	-0.03	-0.00	-0.00	-0.07							-0.01	-0.00	0.70	-0.06	-0.06	-0.07	-0.13		-0.17

Table A-21: Price elasticities of area allocation and animal supply, Hungary

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.49	-0.00	-0.02	-0.05	-0.00	-0.01		-0.00	-0.00	-0.00	-0.01	-0.02							-0.00	-0.03	-0.00	-0.00	-0.11	-0.04	-0.10		-0.09
Durum	-0.05	0.39	-0.01	-0.02	-0.00	-0.01		-0.00	-0.00	-0.00	-0.00	-0.01							-0.00	-0.01	-0.00	-0.00	-0.11	-0.03	-0.08		-0.06
Barley	-0.06	-0.00	0.35		-0.00			-0.00	-0.00	-0.00	-0.00	-0.00							-0.00		-0.00	-0.00	-0.11	-0.03	-0.07		-0.07
Corn	-0.04	-0.00		0.28	-0.00		-0.00			-0.00	-0.00	-0.03									-0.00		-0.11	-0.02	-0.07		-0.02
Rye	-0.05	-0.00	-0.01	-0.01	0.42	-0.01		-0.00	-0.00	-0.00	-0.00	-0.00							-0.00	-0.01	-0.00	-0.00	-0.11	-0.04	-0.09		-0.08
O. grains	-0.10	-0.00			-0.00	0.42		-0.00	-0.00	-0.00	-0.00	-0.01							-0.00		-0.00	-0.00	-0.11	-0.04	-0.09		-0.08
Rice				-0.09			1.28															-0.64	-0.11	-0.12	-0.02		-0.30
Sugar	-0.02	-0.00	-0.00		-0.00	-0.00		0.57	-0.04	-0.00	-0.02	-0.05							-0.00	-0.00	-0.00	0.00	-0.11	-0.10	-0.07		-0.15
Potato	-0.01	-0.00	-0.00	-0.00	-0.00	-0.00		-0.03	0.68	-0.00	-0.01	-0.17							-0.00	-0.01	-0.01	-0.03	-0.11	-0.10	-0.09		-0.11
Soybeans	-0.02	-0.00	-0.00	-0.08	-0.00	-0.00		-0.02	-0.03	0.70	-0.01	-0.07							-0.00	-0.01	-0.00	-0.01	-0.11	-0.07	-0.09		-0.17
Rapeseed	-0.08	-0.00	-0.00	-0.03	-0.00	-0.00		-0.04	-0.03	-0.00	1.00	-0.14							-0.00	-0.01	-0.00	-0.02	-0.11	-0.10	-0.19		-0.24
Sunseed	-0.07	-0.00	-0.00	-0.10	-0.00	-0.00		-0.03	-0.13	-0.00	-0.04	0.94							-0.00	-0.01	-0.01	-0.05	-0.11	-0.09	-0.08		-0.22
Milk													0.86	0.01	-0.00									-0.26	-0.22	-0.42	-0.05
Beef													0.13	0.84	-0.00									-0.26	-0.22	-0.50	-0.05
Sheep													-0.16	-0.02	1.01									-0.31	-0.26	-0.60	-0.06
Pork																1.43	-0.12	-0.04						-0.23	-0.17	-0.86	-0.08
Poultry																-0.15	1.41	-0.09						-0.12	-0.88	-0.84	-0.08
Eggs																-0.15	-0.25	1.75						-0.13	-0.23	-1.05	-0.10
Grass	-0.00	-0.00	-0.00		-0.00	-0.00		-0.00	-0.00	-0.00	-0.00	-0.00							0.19	-0.00	-0.00	-0.00	-0.11	-0.02	-0.01		-0.04
Fodder	-0.17	-0.00			-0.00	0.00			-0.01	-0.00	-0.01	-0.03							-0.00	0.72	-0.00		-0.11	-0.07	-0.14		-0.18
Sil. maize	-0.02	-0.00	-0.00	-0.06	-0.00	-0.00		-0.02	-0.03	-0.00	-0.01	-0.06							-0.00	-0.01	0.70	-0.01	-0.11	-0.07	-0.13		-0.17

Table A-22: Price elasticities of area allocation and animal supply, Czech Republic

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.49		-0.06	-0.00	-0.00	-0.01		-0.00	-0.00	-0.00	-0.05	-0.00							-0.00	-0.05	-0.00	-0.00	-0.06	-0.04	-0.10		-0.09
Durum																											
Barley	-0.14		0.42	-0.00	-0.00	0.00		-0.00	-0.00	-0.00	-0.01	-0.00							-0.00	-0.00	-0.00	-0.00	-0.06	-0.04	-0.09		-0.08
Corn	-0.01		-0.01	0.22	-0.00	-0.00		-0.00	-0.02	-0.00	-0.02	-0.00							-0.00	-0.00	-0.00	-0.00	-0.06	-0.01	-0.05		-0.02
Rye	-0.06		-0.02	-0.00	0.35	-0.01		-0.00	-0.00	-0.00	-0.01	-0.00							-0.00	-0.02	-0.00	-0.00	-0.06	-0.03	-0.07		-0.07
O. grains	-0.10		0.00	-0.00	-0.00	0.35		-0.00	-0.00	-0.00	-0.01	-0.00							-0.00	0.00	-0.00	-0.00	-0.06	-0.03	-0.07		-0.07
Rice																											
Sugar	-0.02		-0.00	-0.00	-0.00	-0.00		0.57	-0.09	-0.00	-0.06	-0.01							-0.00	0.00	-0.01		-0.06	-0.10	-0.07		-0.15
Potato	-0.01		-0.00	-0.01	-0.00	-0.00		-0.07	0.68	-0.00	-0.11	-0.01							-0.00	-0.03	-0.02	-0.05	-0.06	-0.10	-0.09		-0.11
Soybeans	-0.02		-0.01	-0.01	-0.00	-0.00		-0.04	-0.06	0.64	-0.08	-0.01							-0.00	-0.05	-0.02	-0.03	-0.06	-0.06	-0.08		-0.13
Rapeseed	-0.14		-0.01	-0.01	-0.00	-0.00		-0.04	-0.10	-0.00	1.00	-0.01							-0.00	-0.03	-0.02	-0.06	-0.06	-0.10	-0.19		-0.24
Sunseed	-0.03		-0.01	-0.02	-0.00	-0.00		-0.05	-0.09	-0.00	-0.15	0.96							-0.00	-0.08	-0.02	-0.05	-0.06	-0.09	-0.08		-0.23
Milk													1.02	0.06	-0.00									-0.32	-0.27	-0.42	-0.06
Beef													0.13	0.83	-0.00									-0.25	-0.22	-0.42	-0.05
Sheep													-0.16	-0.07	0.99									-0.31	-0.26	-0.59	-0.06
Pork																1.94	-0.06	-0.03						-0.32	-0.23	-1.17	-0.11
Poultry																-0.17	2.29	-0.07						-0.20	-1.43	-1.37	-0.14
Eggs																-0.17	-0.12	1.72						-0.13	-0.22	-1.03	-0.10
Grass	-0.01		-0.00	-0.00	-0.00	-0.00		-0.00	-0.01	-0.00	-0.00	-0.00							0.19	-0.00	-0.00	-0.00	-0.06	-0.02	-0.03		-0.04
Fodder	-0.14		-0.00	-0.00	-0.00	-0.00		-0.00	-0.03	-0.00	-0.03	-0.01							-0.00	0.60	-0.01		-0.06	-0.06	-0.11		-0.15
Sil. maize	-0.02		-0.01	-0.00	-0.00	-0.00		-0.02	-0.05	-0.00	-0.05	-0.00							-0.00	-0.02	0.54	-0.02	-0.06	-0.05	-0.10		-0.13

Table A-23: Price elasticities of area allocation and animal supply, Slovakia

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.49	-0.00	-0.02		-0.00			-0.00		-0.00	-0.05	-0.06								-0.00	-0.01		-0.10	-0.04	-0.10		-0.09
Durum	-0.02	0.39	-0.03					-0.00	-0.00	-0.04	-0.01												-0.10	-0.03	-0.08		-0.06
Barley	-0.06	-0.00	0.42	-0.01		-0.00		-0.00	-0.00	-0.00	-0.00	-0.00								-0.03	-0.00		-0.10	-0.04	-0.09		-0.08
Corn			-0.01	0.22	-0.00	-0.00			-0.01	-0.00										-0.01			-0.10	-0.01	-0.05		-0.02
Rye	-0.03			-0.01	0.35	-0.01		-0.00	-0.00	-0.00	-0.00	-0.00							-0.00	-0.03	-0.00		-0.10	-0.03	-0.07		-0.07
O. grains			-0.03	-0.01	-0.01	0.35		-0.00	-0.00	-0.00	-0.00	-0.00							-0.00	-0.03	-0.00		-0.10	-0.03	-0.07		-0.07
Rice																											
Sugar	-0.02	-0.00	-0.00		-0.00	-0.00		0.57	-0.02	-0.00	-0.07	-0.01								-0.01	-0.01		-0.10	-0.10	-0.07		-0.15
Potato		-0.00	-0.00	-0.03	-0.00	-0.00		-0.03	0.68	-0.00	-0.18	-0.01								-0.01	-0.01		-0.10	-0.10	-0.09		-0.11
Soybeans	-0.02	-0.09	-0.01	-0.03	-0.00	-0.00		-0.02	-0.01	0.64	-0.03	-0.02								-0.02	-0.01		-0.10	-0.06	-0.08		-0.13
Rapeseed	-0.18	-0.00	-0.01		-0.00	-0.00		-0.05	-0.10	-0.00	1.00	-0.02								-0.01			-0.10	-0.10	-0.19		-0.24
Sunseed	-0.36		-0.01		-0.00	-0.00		-0.02	-0.01	-0.00	-0.03	0.96								-0.02	-0.01		-0.10	-0.09	-0.08		-0.23
Milk													1.02	0.04	-0.00									-0.32	-0.27	-0.45	-0.06
Beef													0.13	0.83	-0.00									-0.25	-0.22	-0.44	-0.05
Sheep													-0.17	-0.06	0.99									-0.31	-0.26	-0.59	-0.06
Pork																1.94	-0.08	-0.04						-0.32	-0.23	-1.09	-0.11
Poultry																-0.16	2.29	-0.08						-0.20	-1.43	-1.12	-0.14
Eggs																-0.16	-0.15	1.72						-0.13	-0.22	-1.03	-0.10
Grass					-0.00	-0.00													0.19				-0.10	-0.02	-0.03		-0.04
Fodder	-0.02		-0.05	-0.02	-0.01	-0.01		-0.01	-0.01	-0.00	-0.02	-0.01								0.60	-0.01		-0.10	-0.06	-0.11		-0.15
Sil. maize	-0.09		-0.01		-0.00	-0.00		-0.02	-0.01	-0.00		-0.01								-0.01	0.54		-0.10	-0.05	-0.10		-0.13

Table A-24: Price elasticities of area allocation and animal supply, Estonia

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybeans	Rapeseed	Sunseed	Milk	Beef	Sheep	Pork	Poultry	Eggs	Grass	Fodder	Silage maize	Other products	Land	Labor	Capital	Feeding	Intermediates
C. wheat	0.48		-0.02		-0.03	-0.04			-0.12										-0.00		-0.00	-0.00	-0.04	-0.04	-0.10		-0.09
Durum																											
Barley	-0.01		0.42						-0.17												-0.00	-0.00	-0.04	-0.04	-0.09		-0.08
Corn																											
Rye	-0.10				0.35	-0.00			-0.05										-0.00	-0.00	-0.00	-0.00	-0.04	-0.03	-0.07		-0.07
O. grains	-0.07				-0.00	0.35			-0.07											-0.00	-0.00	-0.00	-0.04	-0.03	-0.07		-0.07
Rice																											
Sugar																											
Potato	-0.03		-0.08		-0.00	-0.01			0.68		-0.07								-0.01	-0.10	-0.00	-0.04	-0.04	-0.10	-0.09		-0.11
Soybeans																											
Rapeseed									-0.44		0.99										-0.00		-0.04	-0.10	-0.19		-0.24
Sunseed																											
Milk													0.85	0.04	-0.00									-0.26	-0.22	-0.51	-0.05
Beef													0.24	0.83	-0.00									-0.26	-0.22	-0.50	-0.05
Sheep													-0.31	-0.05	1.00									-0.31	-0.26	-0.60	-0.06
Pork																1.46	-0.02	-0.03						-0.24	-0.17	-0.87	-0.09
Poultry																-0.09	1.75	-0.06						-0.15	-1.10	-1.03	-0.10
Eggs																-0.09	-0.05	1.74						-0.13	-0.23	-1.05	-0.10
Grass	-0.00				-0.00				-0.06										0.19		-0.00	-0.00	-0.04	-0.02	-0.03		-0.04
Fodder					-0.00	-0.00			-0.24											0.60	-0.00		-0.04	-0.06	-0.11		-0.15
Sil. maize	-0.01		-0.01		-0.00	-0.00			-0.13		-0.02								-0.00	-0.04	0.54	-0.00	-0.04	-0.05	-0.10		-0.13

Table A-25: Price elasticities of human demand, Austria

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybean	Sunseed	Milk	Powder	Butter	Cheese	Other dairy	Beef	Sheep	Pork	Poultry	Eggs	Soyoil	Rapoil	Sunoil	Other products
C. wheat	-0.06	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Durum	0.02	-0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Barley	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Corn	0.01	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rye	0.01	0.00	0.00	0.01	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
O. grains	0.01	0.00	0.00	0.01	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rice	0.01	0.00	0.00	0.01	0.00	0.00	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Sugar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Potato	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Soybean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00
Sunseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Milk	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	-0.29	0.00	0.01	0.06	0.09	0.02	0.00	0.04	0.01	0.01	0.00	0.00	0.00	-0.06
Powder	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.02	-0.18	0.00	0.04	0.05	0.01	0.00	0.02	0.00	0.01	-0.00	-0.00	-0.00	-0.10
Butter	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.02	0.00	-0.25	0.07	0.07	0.02	0.00	0.03	0.01	0.01	0.00	0.00	0.00	-0.08
Cheese	0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.03	0.00	0.01	-0.25	0.13	0.02	0.00	0.03	0.01	0.01	0.00	0.00	0.00	-0.08
O. dairy	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.04	0.00	0.01	0.16	-0.30	0.02	0.00	0.03	0.00	0.01	0.00	0.00	0.00	-0.07
Beef	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	0.01	0.00	0.00	0.03	0.02	-0.32	0.01	0.15	0.03	0.01	-0.00	-0.00	-0.00	-0.14
Sheep	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	0.01	0.00	0.00	0.03	0.02	0.15	-0.38	0.13	0.03	0.01	-0.00	-0.00	-0.00	-0.18
Pork	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	0.01	0.00	0.00	0.03	0.02	0.09	0.01	-0.28	0.04	0.01	-0.00	-0.00	-0.00	-0.13
Poultry	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	0.01	0.00	0.00	0.03	0.02	0.09	0.01	0.21	-0.38	0.01	-0.00	-0.00	-0.00	-0.18
Eggs	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.03	0.06	0.03	0.00	0.04	0.01	-0.21	0.00	0.00	0.00	-0.09
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	0.00	-0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	-0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	-0.00
O. products	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.01	-0.00	-0.00	-0.00	-0.00	-0.00	-1.00

Table A-26: Price elasticities of human demand, Belgium/Luxembourg

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybean	Sunseed	Milk	Powder	Butter	Cheese	Other dairy	Beef	Sheep	Pork	Poultry	Eggs	Soyoil	Rapoil	Sunoil	Other products
C. wheat	**-0.06**	**0.01**	0.00	0.00	0.00	0.00	0.00	**0.01**	**0.01**	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Durum	**0.05**	**-0.09**	0.00	0.00	0.00	0.00	0.00	**0.01**	**0.01**	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Barley	**0.01**	0.00	**-0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Corn	**0.02**	0.00	0.00	**-0.05**	0.00	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rye	**0.01**	0.00	0.00	0.00	**-0.02**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
O. grains	**0.01**	0.00	0.00	0.00	0.00	**-0.02**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rice	**0.03**	**0.01**	0.00	0.00	0.00	0.00	**-0.05**	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Sugar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.01**	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Potato	**0.02**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.03**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Soybean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00
Sunseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00
Milk	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**-0.27**	**0.01**	**0.01**	**0.09**	**0.04**	**0.02**	0.00	**0.02**	**0.01**	**0.02**	0.00	0.00	0.00	**-0.06**
Powder	**0.01**	0.00	-0.00	0.00	0.00	-0.00	0.00	**0.01**	0.00	-0.00	-0.00	**0.04**	**-0.19**	0.00	**0.05**	**0.03**	**0.01**	0.00	**0.01**	**0.01**	**0.02**	-0.00	-0.00	-0.00	**-0.10**
Butter	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**0.04**	0.00	**-0.26**	**0.09**	**0.03**	**0.01**	0.00	**0.01**	**0.01**	**0.02**	0.00	0.00	0.00	**-0.08**
Cheese	0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**0.05**	**0.01**	**0.02**	**-0.22**	**0.06**	**0.02**	0.00	**0.02**	**0.01**	**0.01**	0.00	0.00	0.00	**-0.06**
O. dairy	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**0.07**	**0.01**	**0.02**	**0.20**	**-0.37**	**0.01**	0.00	**0.01**	**0.01**	**0.02**	0.00	0.00	0.00	**-0.08**
Beef	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	**0.02**	0.00	**0.01**	**0.04**	**0.01**	**-0.31**	**0.01**	**0.07**	**0.05**	**0.01**	-0.00	-0.00	-0.00	**-0.11**
Sheep	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	**0.02**	0.00	**0.01**	**0.04**	**0.01**	**0.11**	**-0.36**	**0.07**	**0.04**	**0.01**	-0.00	-0.00	-0.00	**-0.15**
Pork	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	**0.02**	0.00	**0.01**	**0.04**	**0.01**	**0.06**	**0.01**	**-0.29**	**0.07**	**0.01**	-0.00	-0.00	-0.00	**-0.13**
Poultry	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	**0.02**	0.00	**0.01**	**0.04**	**0.01**	**0.06**	**0.01**	**0.12**	**-0.35**	**0.02**	-0.00	-0.00	-0.00	**-0.14**
Eggs	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.04**	**0.01**	**0.01**	**0.05**	**0.03**	**0.02**	0.00	**0.02**	**0.02**	**-0.22**	0.00	0.00	0.00	**-0.09**
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	**0.01**	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.03**	0.00	0.00	-0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	**0.01**	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.04**	0.00	-0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	**0.01**	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.04**	-0.00
O. products	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	**-0.00**	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	**-1.00**

Table A-27: Price elasticities of human demand, Denmark

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybean	Sunseed	Milk	Powder	Butter	Cheese	Other dairy	Beef	Sheep	Pork	Poultry	Eggs	Soyoil	Rapoil	Sunoil	Other products
C. wheat	**-0.04**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Durum	**0.03**	**-0.07**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Barley	0.00	0.00	**-0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Corn	**0.02**	0.00	0.00	**-0.03**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rye	**0.02**	0.00	0.00	0.00	**-0.02**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
O. grains	**0.01**	0.00	0.00	0.00	0.00	**-0.02**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rice	**0.02**	0.00	0.00	0.00	0.00	0.00	**-0.04**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Sugar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Potato	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.02**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Soybean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00
Sunseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Milk	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**-0.27**	**0.01**	**0.01**	**0.06**	**0.09**	**0.02**	0.00	**0.03**	**0.01**	**0.01**	0.00	0.00	0.00	**-0.07**
Powder	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**0.03**	**-0.18**	0.00	**0.04**	**0.05**	**0.02**	0.00	**0.02**	**0.01**	**0.01**	-0.00	-0.00	-0.00	**-0.10**
Butter	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**0.03**	0.00	**-0.25**	**0.06**	**0.07**	**0.02**	0.00	**0.03**	**0.01**	**0.01**	0.00	0.00	0.00	**-0.08**
Cheese	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**0.03**	0.00	**0.01**	**-0.26**	**0.13**	**0.02**	0.00	**0.03**	**0.01**	**0.01**	0.00	0.00	0.00	**-0.08**
O. dairy	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**0.06**	**0.01**	**0.01**	**0.14**	**-0.30**	**0.02**	0.00	**0.02**	**0.01**	**0.01**	0.00	0.00	0.00	**-0.07**
Beef	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	**0.01**	0.00	0.00	**0.03**	**0.02**	**-0.32**	**0.01**	**0.14**	**0.03**	**0.01**	-0.00	-0.00	-0.00	**-0.13**
Sheep	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	**0.01**	0.00	0.00	**0.03**	**0.02**	**0.16**	**-0.38**	**0.12**	**0.03**	**0.01**	-0.00	-0.00	-0.00	**-0.19**
Pork	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	**0.01**	0.00	0.00	**0.03**	**0.02**	**0.10**	**0.01**	**-0.28**	**0.05**	**0.01**	-0.00	-0.00	-0.00	**-0.14**
Poultry	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	**0.01**	0.00	0.00	**0.03**	**0.02**	**0.09**	**0.01**	**0.19**	**-0.38**	**0.01**	-0.00	-0.00	-0.00	**-0.18**
Eggs	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.03**	**0.01**	**0.01**	**0.03**	**0.06**	**0.03**	0.00	**0.04**	**0.01**	**-0.22**	0.00	0.00	0.00	**-0.09**
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.02**	0.00	0.00	-0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	**0.01**	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.03**	0.00	-0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	**0.01**	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.03**	-0.00
O. products	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	**-0.00**	**-0.00**	-0.00	-0.00	**-0.01**	-0.00	-0.00	-0.00	-0.00	-0.00	**-1.00**

Table A-28: Price elasticities of human demand, Finland

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybean	Sunseed	Milk	Powder	Butter	Cheese	Other dairy	Beef	Sheep	Pork	Poultry	Eggs	Soyoil	Rapoil	Sunoil	Other products
C. wheat	**-0.02**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	-0.00
Durum	**0.01**	**-0.03**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	-0.00
Barley	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Corn	0.00	0.00	0.00	**-0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rye	**0.01**	0.00	0.00	0.00	**-0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
O. grains	0.00	0.00	0.00	0.00	0.00	**-0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rice	**0.01**	0.00	0.00	0.00	0.00	0.00	**-0.02**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Sugar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Potato	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Soybean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	-0.00
Sunseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Milk	0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	0.00	-0.00	-0.00	0.00	**-0.18**	0.00	0.00	**0.02**	**0.01**	**0.01**	0.00	**0.01**	**0.08**	0.00	0.00	0.00	0.00	**-0.05**
Powder	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	-0.00	-0.00	-0.00	**0.02**	**-0.14**	0.00	**0.02**	**0.01**	0.00	0.00	0.00	**0.05**	0.00	-0.00	-0.00	-0.00	**-0.07**
Butter	0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	0.00	-0.00	-0.00	0.00	**0.02**	0.00	**-0.18**	**0.02**	**0.01**	**0.01**	0.00	**0.01**	**0.06**	0.00	0.00	0.00	0.00	**-0.05**
Cheese	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	**0.02**	0.00	0.00	**-0.18**	**0.02**	**0.01**	0.00	**0.01**	**0.07**	0.00	-0.00	-0.00	-0.00	**-0.05**
O. dairy	0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	0.00	-0.00	-0.00	-0.00	**0.03**	0.00	0.00	**0.05**	**-0.21**	0.00	0.00	0.00	**0.05**	0.00	0.00	0.00	0.00	**-0.05**
Beef	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	**0.01**	0.00	0.00	**0.01**	0.00	**-0.35**	0.00	**0.03**	**0.29**	0.00	-0.00	-0.00	-0.00	**-0.18**
Sheep	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	**0.01**	0.00	0.00	**0.01**	0.00	**0.05**	**-0.37**	**0.03**	**0.26**	0.00	-0.00	-0.00	-0.00	**-0.19**
Pork	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	**0.01**	0.00	0.00	**0.01**	0.00	**0.03**	0.00	**-0.34**	**0.28**	0.00	-0.00	-0.00	-0.00	**-0.19**
Poultry	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	**0.01**	0.00	0.00	**0.01**	0.00	**0.03**	0.00	**0.03**	**-0.23**	0.00	-0.00	-0.00	-0.00	**-0.06**
Eggs	0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	**0.02**	0.00	0.00	**0.01**	**0.01**	**0.01**	0.00	**0.01**	**0.12**	**-0.19**	0.00	0.00	0.00	**-0.08**
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.01**	0.00	0.00	-0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.01**	0.00	-0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.01**	-0.00
O. products	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	**-0.00**	-0.00	-0.00	**-0.00**	-0.00	-0.00	-0.00	-0.00	**-0.03**	-0.00	-0.00	-0.00	-0.00	**-1.00**

Table A-29: Price elasticities of human demand, France

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybean	Sunseed	Milk	Powder	Butter	Cheese	Other dairy	Beef	Sheep	Pork	Poultry	Eggs	Soyoil	Rapoil	Sunoil	Other products
C. wheat	**-0.04**	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Durum	**0.03**	**-0.06**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Barley	0.00	0.00	**-0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Corn	**0.02**	0.00	0.00	**-0.03**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rye	**0.01**	0.00	0.00	0.00	**-0.02**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
O. grains	**0.01**	0.00	0.00	0.00	0.00	**-0.02**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rice	**0.02**	0.00	0.00	0.00	0.00	0.00	**-0.04**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Sugar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Potato	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.02**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Soybean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00
Sunseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Milk	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	0.00	**-0.26**	0.00	**0.01**	**0.08**	**0.05**	**0.03**	**0.01**	**0.02**	**0.01**	**0.01**	0.00	0.00	0.00	**-0.07**
Powder	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**0.02**	**-0.18**	0.00	**0.05**	**0.03**	**0.02**	**0.01**	**0.01**	**0.01**	**0.01**	-0.00	-0.00	-0.00	**-0.10**
Butter	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**0.02**	0.00	**-0.24**	**0.09**	**0.04**	**0.02**	**0.01**	**0.02**	**0.01**	**0.01**	0.00	0.00	0.00	**-0.08**
Cheese	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**0.02**	0.00	**0.02**	**-0.22**	**0.08**	**0.03**	**0.01**	**0.02**	**0.01**	**0.01**	0.00	0.00	0.00	**-0.07**
O. dairy	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**0.04**	0.00	**0.02**	**0.20**	**-0.34**	**0.02**	**0.01**	**0.01**	**0.01**	**0.02**	0.00	0.00	0.00	**-0.08**
Beef	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	**0.01**	0.00	**0.01**	**0.04**	**0.01**	**-0.32**	**0.05**	**0.08**	**0.06**	**0.01**	-0.00	-0.00	-0.00	**-0.14**
Sheep	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	**0.01**	0.00	**0.01**	**0.03**	**0.01**	**0.18**	**-0.38**	**0.07**	**0.05**	**0.01**	-0.00	-0.00	-0.00	**-0.19**
Pork	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	**0.01**	0.00	**0.01**	**0.04**	**0.01**	**0.11**	**0.03**	**-0.31**	**0.09**	**0.01**	-0.00	-0.00	-0.00	**-0.18**
Poultry	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	**0.01**	0.00	**0.01**	**0.04**	**0.01**	**0.11**	**0.03**	**0.12**	**-0.36**	**0.01**	-0.00	-0.00	-0.00	**-0.17**
Eggs	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.02**	0.00	**0.01**	**0.04**	**0.03**	**0.03**	**0.01**	**0.03**	**0.02**	**-0.21**	0.00	0.00	0.00	**-0.09**
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.03**	0.00	0.00	-0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.03**	0.00	-0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.03**	-0.00
O. products	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	**-0.01**	-0.00	**-0.01**	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	**-1.00**

Table A-30: Price elasticities of human demand, Germany

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybean	Sunseed	Milk	Powder	Butter	Cheese	Other dairy	Beef	Sheep	Pork	Poultry	Eggs	Soyoil	Rapoil	Sunoil	Other products
C. wheat	-0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Durum	0.03	-0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Barley	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Corn	0.01	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rye	0.01	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
O. grains	0.01	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rice	0.02	0.00	0.00	0.00	0.00	0.00	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Sugar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Potato	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Soybean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00
Sunseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	-0.00
Milk	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	-0.27	0.00	0.01	0.08	0.05	0.02	0.00	0.04	0.00	0.01	0.00	0.00	0.00	-0.06
Powder	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.03	-0.18	0.00	0.05	0.03	0.01	0.00	0.02	0.00	0.02	-0.00	-0.00	-0.00	-0.10
Butter	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.03	0.00	-0.25	0.09	0.04	0.01	0.00	0.03	0.00	0.01	0.00	0.00	0.00	-0.08
Cheese	0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.03	0.00	0.02	-0.22	0.08	0.02	0.00	0.04	0.00	0.01	0.00	0.00	0.00	-0.06
O. dairy	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.05	0.00	0.02	0.20	-0.35	0.01	0.00	0.03	0.00	0.02	0.00	0.00	0.00	-0.08
Beef	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	0.01	0.00	0.01	0.04	0.01	-0.33	0.02	0.16	0.01	0.01	-0.00	-0.00	-0.00	-0.14
Sheep	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	0.01	0.00	0.01	0.04	0.01	0.11	-0.37	0.14	0.01	0.01	-0.00	-0.00	-0.00	-0.17
Pork	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	0.01	0.00	0.01	0.04	0.01	0.07	0.01	-0.26	0.01	0.01	-0.00	-0.00	-0.00	-0.11
Poultry	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	0.01	0.00	0.01	0.04	0.01	0.06	0.01	0.22	-0.39	0.01	-0.00	-0.00	-0.00	-0.18
Eggs	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.01	0.04	0.04	0.02	0.00	0.05	0.00	-0.21	0.00	0.00	0.00	-0.09
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	0.00	-0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	-0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	-0.00
O. products	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.01	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-1.00

Table A-31: Price elasticities of human demand, Greece

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybean	Sunseed	Milk	Powder	Butter	Cheese	Other dairy	Beef	Sheep	Pork	Poultry	Eggs	Soyoil	Rapoil	Sunoil	Other products
C. wheat	-0.08	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
Durum	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
Barley	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
Corn	0.01	0.02	0.00	-0.05	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
Rye	0.01	0.01	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
O. grains	0.01	0.01	0.00	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
Rice	0.02	0.02	0.00	0.00	0.00	0.00	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
Sugar	0.00	0.00	-0.00	0.00	-0.00	0.00	0.00	-0.11	-0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	0.00	0.00	0.00	-0.08
Potato	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	-0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
Soybean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
Sunseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
Milk	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	0.00	-0.28	0.00	0.00	0.12	0.01	0.03	0.03	0.02	0.01	0.01	0.00	0.00	0.00	-0.06
Powder	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.02	-0.20	0.00	0.08	0.01	0.02	0.02	0.02	0.01	0.01	-0.00	-0.00	-0.00	-0.09
Butter	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	-0.20	0.08	0.01	0.02	0.02	0.02	0.01	0.01	0.00	0.00	0.00	-0.09
Cheese	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	0.02	0.00	0.00	-0.18	0.02	0.03	0.02	0.02	0.01	0.01	-0.00	-0.00	-0.00	-0.04
O. dairy	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.03	0.00	0.00	0.29	-0.42	0.02	0.02	0.02	0.01	0.02	0.00	0.00	0.00	-0.08
Beef	0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.01	0.00	0.00	0.05	0.00	-0.39	0.08	0.09	0.04	0.01	-0.00	-0.00	-0.00	-0.18
Sheep	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.05	0.00	0.07	-0.25	0.06	0.03	0.01	0.00	0.00	0.00	0.02
Pork	0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.01	0.00	0.00	0.05	0.00	0.10	0.07	-0.37	0.06	0.01	-0.00	-0.00	-0.00	-0.23
Poultry	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.01	0.00	0.00	0.05	0.00	0.10	0.10	0.15	-0.45	0.01	-0.00	-0.00	-0.00	-0.16
Eggs	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.06	0.01	0.03	0.04	0.03	0.01	-0.24	0.00	0.00	0.00	-0.08
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	-0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	-0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	-0.02	-0.00
O. products	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.01	-0.00	-0.01	-0.01	-0.01	-0.00	-0.00	-0.00	-0.00	-0.00	-1.00

Table A-32: Price elasticities of human demand, Ireland

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybean	Sunseed	Milk	Powder	Butter	Cheese	Other dairy	Beef	Sheep	Pork	Poultry	Eggs	Soyoil	Rapoil	Sunoil	Other products
C. wheat	**-0.03**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	-0.00
Durum	**0.01**	**-0.03**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	-0.00
Barley	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Corn	0.00	0.00	0.00	**-0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rye	**0.01**	0.00	0.00	0.00	**-0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
O. grains	0.00	0.00	0.00	0.00	0.00	**-0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rice	**0.01**	0.00	0.00	0.00	0.00	0.00	**-0.02**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Sugar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Potato	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Soybean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	-0.00
Sunseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Milk	0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	0.00	-0.00	-0.00	0.00	**-0.25**	0.00	0.00	**0.01**	**0.12**	**0.01**	0.00	**0.01**	**0.06**	0.00	0.00	0.00	0.00	**-0.06**
Powder	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**0.02**	**-0.15**	0.00	**0.01**	**0.07**	0.00	0.00	**0.01**	**0.04**	0.00	-0.00	-0.00	-0.00	**-0.09**
Butter	0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	0.00	-0.00	-0.00	0.00	**0.02**	0.00	**-0.21**	**0.01**	**0.09**	0.00	0.00	**0.01**	**0.05**	0.00	0.00	0.00	0.00	**-0.07**
Cheese	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	**0.02**	0.00	0.00	**-0.25**	**0.15**	**0.01**	0.00	**0.01**	**0.06**	0.00	-0.00	-0.00	-0.00	**-0.09**
O. dairy	0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	0.00	-0.00	-0.00	-0.00	**0.03**	0.00	0.00	**0.02**	**-0.18**	0.00	0.00	**0.01**	**0.05**	0.00	0.00	0.00	0.00	**-0.04**
Beef	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	**0.01**	0.00	0.00	0.00	**0.02**	**-0.35**	**0.02**	**0.03**	**0.25**	0.00	-0.00	-0.00	-0.00	**-0.18**
Sheep	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	**0.01**	0.00	0.00	0.00	**0.02**	**0.05**	**-0.36**	**0.03**	**0.24**	0.00	-0.00	-0.00	-0.00	**-0.18**
Pork	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	**0.01**	0.00	0.00	0.00	**0.02**	**0.02**	**0.01**	**-0.35**	**0.27**	0.00	-0.00	-0.00	-0.00	**-0.19**
Poultry	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	**0.01**	0.00	0.00	0.00	**0.02**	**0.03**	**0.01**	**0.03**	**-0.25**	0.00	-0.00	-0.00	-0.00	**-0.07**
Eggs	0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	**0.02**	0.00	0.00	0.00	**0.07**	**0.01**	0.00	**0.01**	**0.09**	**-0.21**	0.00	0.00	0.00	**-0.09**
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	**-0.02**	0.00	0.00	-0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	**-0.02**	0.00	-0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.02**	-0.00
O. products	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	**-0.00**	-0.00	-0.00	-0.00	**-0.01**	-0.00	-0.00	-0.00	**-0.03**	-0.00	-0.00	-0.00	-0.00	**-0.99**

Table A-33: Price elasticities of human demand, Italy

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybean	Sunseed	Milk	Powder	Butter	Cheese	Other dairy	Beef	Sheep	Pork	Poultry	Eggs	Soyoil	Rapoil	Sunoil	Other products
C. wheat	-0.07	0.03	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Durum	0.05	-0.08	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Barley	0.01	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Corn	0.02	0.01	0.00	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rye	0.01	0.01	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
O. grains	0.01	0.01	0.00	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rice	0.03	0.02	0.00	0.00	0.00	0.00	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Sugar	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	0.00	0.00	0.00	-0.10
Potato	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Soybean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00
Sunseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00
Milk	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	0.00	-0.29	0.00	0.01	0.12	0.02	0.04	0.00	0.03	0.01	0.02	0.00	0.00	0.00	-0.06
Powder	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.02	-0.20	0.00	0.07	0.01	0.02	0.00	0.02	0.00	0.02	-0.00	-0.00	-0.00	-0.10
Butter	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.02	0.00	-0.19	0.07	0.02	0.03	0.00	0.02	0.00	0.01	0.00	0.00	0.00	-0.09
Cheese	0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.03	0.00	0.00	-0.20	0.03	0.04	0.00	0.03	0.01	0.01	0.00	0.00	0.00	-0.05
O. dairy	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.04	0.00	0.01	0.27	-0.41	0.03	0.00	0.02	0.00	0.02	0.00	0.00	0.00	-0.08
Beef	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.01	0.00	0.00	0.05	0.00	-0.37	0.02	0.13	0.02	0.01	-0.00	-0.00	-0.00	-0.18
Sheep	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	0.01	0.00	0.00	0.05	0.00	0.23	-0.47	0.11	0.02	0.01	-0.00	-0.00	-0.00	-0.17
Pork	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.01	0.00	0.00	0.05	0.00	0.15	0.01	-0.35	0.03	0.01	-0.00	-0.00	-0.00	-0.23
Poultry	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	0.01	0.00	0.00	0.05	0.00	0.14	0.01	0.18	-0.45	0.01	-0.00	-0.00	-0.00	-0.17
Eggs	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.01	0.06	0.02	0.05	0.00	0.04	0.01	-0.23	0.00	0.00	0.00	-0.08
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	0.00	-0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.01	-0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	-0.03	-0.00
O. products	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.01	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-1.00

Table A-34: Price elasticities of human demand, Netherlands

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybean	Sunseed	Milk	Powder	Butter	Cheese	Other dairy	Beef	Sheep	Pork	Poultry	Eggs	Soyoil	Rapoil	Sunoil	Other products
C. wheat	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Durum	0.03	-0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Barley	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Corn	0.01	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rye	0.01	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
O. grains	0.01	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rice	0.02	0.00	0.00	0.00	0.00	0.00	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Sugar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Potato	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Soybean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00
Sunseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Milk	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	-0.33	0.00	0.01	0.05	0.18	0.02	0.00	0.02	0.01	0.01	0.00	0.00	0.00	-0.08
Powder	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.01	-0.18	0.00	0.04	0.08	0.01	0.00	0.01	0.01	0.01	-0.00	-0.00	-0.00	-0.10
Butter	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.01	0.00	-0.27	0.06	0.13	0.01	0.00	0.02	0.01	0.01	0.00	0.00	0.00	-0.09
Cheese	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	0.01	0.00	0.01	-0.30	0.22	0.02	0.00	0.02	0.01	0.01	-0.00	-0.00	-0.00	-0.09
O. dairy	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.01	0.00	0.01	0.12	-0.23	0.01	0.00	0.02	0.01	0.01	0.00	0.00	0.00	-0.06
Beef	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	0.00	0.00	0.03	0.04	-0.31	0.02	0.09	0.05	0.01	-0.00	-0.00	-0.00	-0.13
Sheep	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	0.00	0.00	0.03	0.03	0.13	-0.36	0.09	0.05	0.01	-0.00	-0.00	-0.00	-0.17
Pork	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	0.00	0.00	0.03	0.04	0.07	0.01	-0.29	0.08	0.01	-0.00	-0.00	-0.00	-0.15
Poultry	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	0.00	0.00	0.03	0.04	0.07	0.01	0.15	-0.35	0.01	-0.00	-0.00	-0.00	-0.16
Eggs	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.03	0.11	0.02	0.00	0.03	0.02	-0.23	0.00	0.00	0.00	-0.09
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	-0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	-0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	-0.00
O. products	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.01	-0.01	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-1.00

Table A-35: Price elasticities of human demand, Portugal

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybean	Sunseed	Milk	Powder	Butter	Cheese	Other dairy	Beef	Sheep	Pork	Poultry	Eggs	Soyoil	Rapoil	Sunoil	Other products
C. wheat	-0.08	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.13
Durum	0.02	-0.10	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.12
Barley	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
Corn	0.01	0.00	0.00	-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
Rye	0.01	0.00	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
O. grains	0.01	0.00	0.00	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
Rice	0.02	0.00	0.00	0.00	0.00	0.00	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.10
Sugar	0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.11	-0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.00	0.00	0.00	0.00	-0.08
Potato	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15
Soybean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
Sunseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
Milk	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.22	0.00	0.00	0.03	0.01	0.02	0.01	0.02	0.08	0.01	0.00	0.00	0.00	-0.05
Powder	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.03	-0.18	0.00	0.02	0.01	0.01	0.00	0.02	0.05	0.01	-0.00	-0.00	-0.00	-0.07
Butter	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.02	0.00	-0.17	0.03	0.01	0.01	0.00	0.02	0.05	0.01	0.00	0.00	0.00	-0.09
Cheese	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.03	0.00	0.00	-0.22	0.02	0.02	0.01	0.02	0.08	0.00	-0.00	-0.00	-0.00	-0.06
O. dairy	0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	0.00	-0.00	-0.00	-0.00	0.05	0.00	0.00	0.08	-0.26	0.01	0.00	0.02	0.05	0.01	0.00	0.00	0.00	-0.06
Beef	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.01	0.00	0.00	0.01	0.00	-0.46	0.04	0.08	0.30	0.00	-0.00	-0.00	-0.00	-0.28
Sheep	0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.01	0.00	0.00	0.01	0.00	0.11	-0.50	0.08	0.26	0.00	-0.00	-0.00	-0.00	-0.18
Pork	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.01	0.00	0.00	0.01	0.00	0.06	0.02	-0.46	0.34	0.00	-0.00	-0.00	-0.00	-0.28
Poultry	0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.01	0.00	0.00	0.01	0.00	0.07	0.02	0.11	-0.33	0.01	-0.00	-0.00	-0.00	-0.10
Eggs	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.03	0.00	0.00	0.02	0.01	0.02	0.01	0.03	0.12	-0.25	0.00	0.00	0.00	-0.08
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	-0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	-0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	-0.00
O. products	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.01	-0.00	-0.01	-0.00	-0.01	-0.03	-0.00	-0.00	-0.00	-0.00	-0.99

Table A-36: Price elasticities of human demand, Spain

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybean	Sunseed	Milk	Powder	Butter	Cheese	Other dairy	Beef	Sheep	Pork	Poultry	Eggs	Soyoil	Rapoil	Sunoil	Other products
C. wheat	**-0.05**	**0.01**	0.00	**0.01**	0.00	0.00	**0.01**	0.00	**0.01**	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Durum	**0.04**	**-0.08**	0.00	**0.01**	0.00	0.00	**0.01**	0.00	**0.01**	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Barley	**0.01**	0.00	**-0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Corn	**0.02**	0.00	0.00	**-0.04**	0.00	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rye	**0.02**	0.00	0.00	0.00	**-0.03**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
O. grains	**0.01**	0.00	0.00	0.00	0.00	**-0.02**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rice	**0.03**	0.00	0.00	0.00	0.00	0.00	**-0.05**	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Sugar	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	**-0.10**	-0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	0.00	0.00	0.00	**-0.10**
Potato	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.02**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Soybean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00
Sunseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00
Milk	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**-0.24**	0.00	0.00	**0.05**	**0.02**	**0.02**	**0.01**	**0.06**	0.00	**0.02**	0.00	0.00	0.00	**-0.06**
Powder	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**0.04**	**-0.19**	0.00	**0.03**	**0.01**	**0.02**	**0.01**	**0.04**	0.00	**0.03**	-0.00	-0.00	-0.00	**-0.09**
Butter	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	0.00	**0.04**	0.00	**-0.19**	**0.04**	**0.02**	**0.02**	**0.01**	**0.04**	0.00	**0.02**	0.00	0.00	0.00	**-0.09**
Cheese	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**0.05**	0.00	0.00	**-0.23**	**0.03**	**0.02**	**0.01**	**0.05**	0.00	**0.01**	0.00	0.00	0.00	**-0.06**
O. dairy	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	**0.08**	0.00	0.00	**0.12**	**-0.32**	**0.02**	**0.01**	**0.04**	0.00	**0.03**	0.00	0.00	0.00	**-0.07**
Beef	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	**0.02**	0.00	0.00	**0.02**	0.00	**-0.42**	**0.10**	**0.21**	**0.01**	**0.01**	-0.00	-0.00	-0.00	**-0.26**
Sheep	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	**0.02**	0.00	0.00	**0.02**	0.00	**0.15**	**-0.44**	**0.20**	**0.01**	**0.01**	-0.00	-0.00	-0.00	**-0.18**
Pork	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	**0.02**	0.00	0.00	**0.02**	0.00	**0.09**	**0.05**	**-0.33**	**0.01**	**0.01**	-0.00	-0.00	-0.00	**-0.19**
Poultry	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	**0.02**	0.00	0.00	**0.02**	0.00	**0.08**	**0.05**	**0.27**	**-0.48**	**0.02**	-0.00	-0.00	-0.00	**-0.19**
Eggs	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.04**	0.00	0.00	**0.02**	**0.01**	**0.03**	**0.02**	**0.07**	0.00	**-0.23**	0.00	0.00	0.00	**-0.08**
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.03**	0.00	0.00	-0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**-0.03**	**0.01**	-0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**	**-0.03**	-0.00
O. products	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	**-0.00**	-0.00	**-0.01**	-0.00	-0.00	-0.00	-0.00	-0.00	**-1.00**

Table A-37: Price elasticities of human demand, Sweden

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybean	Sunseed	Milk	Powder	Butter	Cheese	Other dairy	Beef	Sheep	Pork	Poultry	Eggs	Soyoil	Rapoil	Sunoil	Other products
C. wheat	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	-0.00
Durum	0.02	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	-0.00
Barley	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Corn	0.01	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rye	0.01	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
O. grains	0.01	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rice	0.01	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Sugar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Potato	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Soybean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	-0.00
Sunseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Milk	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	-0.00	-0.00	0.00	-0.20	0.00	0.00	0.03	0.03	0.01	0.00	0.01	0.07	0.00	0.00	0.00	0.00	-0.05
Powder	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.02	-0.15	0.00	0.02	0.02	0.01	0.00	0.01	0.04	0.01	-0.00	-0.00	-0.00	-0.08
Butter	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	-0.00	-0.00	0.00	0.02	0.00	-0.20	0.03	0.02	0.01	0.00	0.01	0.05	0.00	0.00	0.00	0.00	-0.06
Cheese	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.02	0.00	0.00	-0.20	0.05	0.01	0.00	0.01	0.06	0.00	-0.00	-0.00	-0.00	-0.06
O. dairy	0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	0.00	-0.00	-0.00	-0.00	0.04	0.00	0.00	0.08	-0.23	0.01	0.00	0.01	0.04	0.01	0.00	0.00	0.00	-0.06
Beef	0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.01	0.00	0.00	0.01	0.01	-0.35	0.01	0.04	0.26	0.00	-0.00	-0.00	-0.00	-0.18
Sheep	0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.01	0.00	0.00	0.01	0.01	0.08	-0.38	0.04	0.22	0.00	-0.00	-0.00	-0.00	-0.19
Pork	0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.01	0.00	0.00	0.01	0.01	0.04	0.00	-0.35	0.26	0.00	-0.00	-0.00	-0.00	-0.19
Poultry	0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.01	0.00	0.00	0.01	0.01	0.05	0.00	0.04	-0.26	0.00	-0.00	-0.00	-0.00	-0.08
Eggs	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.02	0.00	0.00	0.02	0.02	0.02	0.00	0.01	0.10	-0.20	0.00	0.00	0.00	-0.09
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	-0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	-0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.00
O. products	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.01	-0.00	-0.00	-0.00	-0.00	-0.02	-0.00	-0.00	-0.00	-0.00	-1.00

Table A-38: Price elasticities of human demand, United Kingdom

	Common wheat	Durum	Barley	Corn	Rye	Other grains	Rice	Sugar	Potato	Soybean	Sunseed	Milk	Powder	Butter	Cheese	Other dairy	Beef	Sheep	Pork	Poultry	Eggs	Soyoil	Rapoil	Sunoil	Other products
C. wheat	-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Durum	0.04	-0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Barley	0.01	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Corn	0.02	0.00	0.00	-0.04	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rye	0.01	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
O. grains	0.01	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Rice	0.02	0.00	0.00	0.00	0.00	0.00	-0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Sugar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Potato	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
Soybean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00
Sunseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00
Milk	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	-0.24	0.00	0.01	0.04	0.06	0.03	0.01	0.02	0.01	0.01	0.00	0.00	0.00	-0.06
Powder	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.04	-0.17	0.00	0.03	0.03	0.02	0.01	0.01	0.01	0.01	-0.00	-0.00	-0.00	-0.10
Butter	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.05	0.00	-0.24	0.04	0.04	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	-0.07
Cheese	0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.05	0.00	0.01	-0.24	0.08	0.02	0.01	0.02	0.01	0.01	0.00	0.00	0.00	-0.07
O. dairy	0.00	0.00	-0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	-0.00	0.09	0.00	0.01	0.10	-0.30	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	-0.07
Beef	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	0.03	0.00	0.00	0.02	0.01	-0.33	0.09	0.07	0.03	0.01	-0.00	-0.00	-0.00	-0.13
Sheep	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	0.02	0.00	0.00	0.02	0.01	0.18	-0.38	0.07	0.03	0.01	-0.00	-0.00	-0.00	-0.16
Pork	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	0.02	0.00	0.00	0.02	0.01	0.10	0.05	-0.31	0.05	0.01	-0.00	-0.00	-0.00	-0.15
Poultry	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	-0.00	0.02	0.00	0.00	0.02	0.01	0.10	0.05	0.11	-0.37	0.01	-0.00	-0.00	-0.00	-0.15
Eggs	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.01	0.02	0.04	0.03	0.02	0.02	0.01	-0.21	0.00	0.00	0.00	-0.09
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	0.00	-0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	-0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	-0.00
O. products	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-1.00

Table A-39: Income elasticities

	Austria	Belgium/Luxemb.	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain	Sweden	United Kingdom	Latvia	Romania	Slovenia	Lithuania	Bulgaria	Poland	Hungary	Czech Republic	Slovakia	Estonia
C. wheat	0.00	0.00	0.00	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	-0.09	-0.08	-0.10	-0.10	-0.08	-0.09	-0.08	-0.08	-0.09
Durum	0.00	0.00	0.00	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	-0.10	-0.08	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Barley	0.00	0.00	0.00	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	-0.10	-0.07	-0.10	-0.10	-0.10	-0.10	-0.10	-0.09	-0.10
Corn	0.00	0.00	0.00	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Rye	0.00	0.00	0.00	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
O. grains	0.00	0.00	0.00	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Rice	0.00	0.00	0.00	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Sugar	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.20	0.00	0.20	0.20	0.00	0.00	0.28	0.45	0.26	0.26	0.50	0.20	0.26	0.26	0.26	0.26
Potato	0.00	0.00	0.00	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	-0.10	-0.08	-0.10	-0.10	-0.10	-0.09	-0.08	-0.08	-0.08
Soybean	0.00	0.00	0.00	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Sunseed	0.00	0.00	0.00	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Milk	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.17	0.25	0.14	0.14	0.25	0.14	0.14	0.14	0.13	0.12
Powder	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.20	0.10	0.10	0.20	0.10	0.10	0.10	0.10	0.10
Butter	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.21	0.10	0.10	0.22	0.10	0.10	0.11	0.11	0.10
Cheese	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.11	0.20	0.11	0.10	0.21	0.11	0.11	0.12	0.10	0.10
O. dairy	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.15	0.21	0.13	0.12	0.24	0.12	0.11	0.13	0.13	0.11
Beef	0.20	0.20	0.20	0.20	0.20	0.20	0.30	0.20	0.30	0.20	0.30	0.30	0.20	0.20	0.36	0.40	0.32	0.33	0.40	0.31	0.30	0.31	0.31	0.32
Sheep	0.20	0.20	0.20	0.20	0.20	0.20	0.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.32	0.42	0.30	0.29	0.40	0.30	0.29	0.30	0.30	0.30
Pork	0.20	0.20	0.20	0.20	0.20	0.20	0.30	0.20	0.30	0.20	0.30	0.30	0.20	0.20	0.32	0.42	0.30	0.33	0.42	0.34	0.31	0.33	0.32	0.32
Poultry	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.30	0.39	0.29	0.29	0.39	0.30	0.30	0.30	0.30	0.30
Eggs	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.20	0.10	0.10	0.20	0.10	0.10	0.10	0.10	0.10
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O. products	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.09	1.19	1.06	1.10	1.18	1.09	1.06	1.08	1.08	1.09

Table A-40: Feed rates in Austria, Belgium/Luxembourg, and Denmark

	Austria						Belgium/Luxembourg						Denmark					
	Milk	Beef	Sheep	Pork	Poultry	Eggs	Milk	Beef	Sheep	Pork	Poultry	Eggs	Milk	Beef	Sheep	Pork	Poultry	Eggs
C. wheat	0.01	0.24	0.17	0.37	0.57	0.48	0.03	0.43	0.38	0.62	1.03	0.87	0.04	0.57	0.46	1.38	2.26	1.91
Barley	0.03	0.53	0.39	0.84	0.32	0.27	0.02	0.24	0.22	0.35	0.15	0.12	0.04	0.55	0.45	1.35	0.55	0.46
Corn	0.04	0.71	0.52	1.12	1.73	1.45	0.01	0.23	0.20	0.33	0.56	0.47	0.00	0.01	0.01	0.02	0.04	0.03
Rye	0.00	0.08	0.06	0.12	0.05	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.05	0.02	0.02
Oth. grains	0.02	0.25	0.19	0.40	0.15	0.13	0.00	0.06	0.05	0.08	0.03	0.03	0.01	0.08	0.06	0.19	0.08	0.07
Soymeal	0.02	0.33	0.24	0.52	0.52	0.44	0.02	0.35	0.31	0.51	0.65	0.55	0.02	0.31	0.25	0.75	0.74	0.62
Rapemeal	0.00	0.06	0.04	0.09	0.09	0.07	0.00	0.05	0.04	0.07	0.09	0.08	0.01	0.08	0.06	0.19	0.19	0.16
Sunmeal	0.00	0.03	0.02	0.05	0.05	0.04	0.00	0.03	0.03	0.04	0.05	0.04	0.00	0.05	0.04	0.12	0.12	0.10
Soybean	0.00	0.01	0.01	0.02									0.00	0.01	0.01	0.03		
Sunseed	0.00	0.01	0.01	0.02														
Potato				0.01						0.20						0.12		
Milk	0.09						0.07						0.03					
Manioc		0.00		0.00	0.00	0.00	0.01	0.20		0.29	0.38	0.32				0.00	0.00	0.00
Corn gl. feed	0.00	0.06		0.10	0.10	0.08	0.00	0.05		0.07	0.08	0.07	0.00	0.05		0.11	0.11	0.09
Oth. energy	0.02	0.39	0.29	0.60			0.04	0.68	0.79	0.79			0.01	0.22	0.18	0.41		
Oth. protein	0.03	0.42	0.31	0.67	0.43	0.36	0.04	0.61	0.55	0.90	0.42	0.36	0.01	0.20	0.16	0.49	0.26	0.22
Silage maize	0.12	1.95	0.72				0.23	3.76	1.67				0.10	1.56	0.63			
Arab. fodder	0.15	2.43	3.58				0.14	2.30	4.09				1.05	16.50	26.71			
Grass	0.79	12.98	19.08				0.45	7.19	12.77				0.15	2.29	3.70			
Milk powder	0.00	0.00					0.00	0.02					0.01	0.08				

Table A-41: Feed rates in Finland, France, Germany

	Finland						France						Germany					
	Milk	Beef	Sheep	Pork	Poultry	Eggs	Milk	Beef	Sheep	Pork	Poultry	Eggs	Milk	Beef	Sheep	Pork	Poultry	Eggs
C. wheat	0.00	0.06	0.05	0.17	0.73	0.61	0.02	0.33	0.26	1.31	2.32	1.96	0.03	0.49	0.40	1.00	1.83	1.54
Barley	0.07	1.00	0.78	2.73	2.99	2.52	0.01	0.19	0.15	0.74	0.33	0.28	0.03	0.55	0.45	1.11	0.51	0.43
Corn	0.00	0.02	0.02	0.06	0.28	0.24	0.01	0.17	0.14	0.69	1.22	1.03	0.01	0.16	0.13	0.33	0.60	0.50
Rye	0.00	0.01	0.01	0.03	0.03	0.02	0.00	0.00	0.00	0.02	0.01	0.01	0.01	0.11	0.09	0.23	0.11	0.09
Other grains	0.04	0.65	0.51	1.78	1.95	1.64	0.01	0.11	0.09	0.44	0.19	0.16	0.02	0.29	0.24	0.58	0.27	0.22
Soymeal	0.01	0.19	0.15	0.51	0.64	0.54	0.01	0.17	0.14	0.69	0.88	0.74	0.02	0.27	0.22	0.55	0.56	0.47
Rapemeal	0.01	0.14	0.11	0.38	0.48	0.40	0.00	0.04	0.03	0.15	0.19	0.16	0.01	0.11	0.09	0.23	0.24	0.20
Sunmeal	0.00	0.01	0.01	0.02	0.02	0.02	0.00	0.03	0.02	0.12	0.15	0.12	0.00	0.02	0.01	0.03	0.03	0.03
Soybean	0.01	0.20	0.16	0.56			0.00	0.03	0.02	0.10								
Sunseed	0.00	0.01	0.01	0.03			0.00	0.01	0.01	0.05			0.00	0.01	0.00	0.01		
Potato				0.05						0.10						0.18		
Milk	0.01						0.04						0.04					
Manioc		0.00		0.00	0.00	0.00	0.00	0.00		0.01	0.01	0.01	0.00	0.00		0.01	0.01	0.01
Corn gl. feed	0.00	0.06		0.16	0.20	0.17	0.00	0.03		0.12	0.15	0.13	0.00	0.06		0.11	0.12	0.10
Other energy	0.04	0.57	0.45	1.52			0.03	0.43	0.34	1.61			0.02	0.41	0.34	0.64		
Other protein	0.04	0.53	0.41	1.45	1.09	0.92	0.02	0.35	0.27	1.38	0.73	0.61	0.02	0.37	0.30	0.75	0.44	0.37
Silage maize							0.29	4.60	1.79				0.25	4.11	1.68			
Arable fodder	0.99	19.60	26.25				0.60	9.50	14.84				0.26	4.37	7.13			
Grass	0.02	0.29	0.46				0.85	13.49	21.06				0.67	11.07	18.06			
Milk powder							0.00	0.06					0.00	0.03				

Table A-42: Feed rates in Greece, Ireland, Italy

	Greece							Ireland							Italy					
	Milk	Beef	Sheep	Pork	Poultry	Eggs		Milk	Beef	Sheep	Pork	Poultry	Eggs		Milk	Beef	Sheep	Pork	Poultry	Eggs
C. wheat	0.00	0.05	0.04	0.02	0.02	0.02		0.03	0.50	0.43	0.24	1.07	0.90		0.01	0.19	0.16	0.27	0.35	0.29
Barley	0.07	0.96	0.94	0.48	0.13	0.11		0.04	0.71	0.62	0.34	0.38	0.32		0.02	0.36	0.30	0.51	0.16	0.14
Corn	0.33	4.66	4.59	2.34	2.62	2.21		0.01	0.14	0.12	0.07	0.29	0.25		0.08	1.28	1.09	1.83	2.35	1.98
Rye	0.00	0.04	0.04	0.02	0.01	0.00									0.00	0.00	0.00	0.01	0.00	0.00
Other grains	0.02	0.23	0.23	0.12	0.03	0.03		0.01	0.09	0.08	0.04	0.05	0.04		0.01	0.12	0.10	0.17	0.05	0.05
Soymeal	0.07	0.98	0.97	0.49	0.47	0.39		0.02	0.26	0.23	0.13	0.33	0.28		0.04	0.53	0.45	0.76	0.79	0.67
Rapemeal								0.01	0.11	0.09	0.05	0.14	0.11		0.00	0.01	0.01	0.02	0.02	0.02
Sunmeal	0.01	0.12	0.12	0.06	0.06	0.05		0.01	0.11	0.10	0.05	0.14	0.12		0.01	0.09	0.07	0.12	0.13	0.11
Soybean								0.00	0.02	0.02	0.01				0.00	0.04	0.03	0.05		
Sunseed															0.00	0.00	0.00	0.00		
Potato											0.02							0.01		
Milk	0.10							0.01							0.03					
Manioc		0.00		0.00	0.00			0.00	0.00		0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00
Corn gl. feed	0.02	0.31		0.15	0.15	0.12		0.00	0.06		0.03	0.07	0.06		0.00	0.07		0.10	0.11	0.09
Other energy	0.08	1.11	1.10	0.56				0.19	2.82	2.46	1.36				0.04	0.55	0.47	0.78		
Other protein	0.08	1.11	1.09	0.56	0.36	0.30		0.23	3.42	2.98	1.67	1.04	0.88		0.04	0.52	0.44	0.74	0.40	0.34
Silage maize	0.02	0.31	0.16					0.01	0.21	0.09					0.13	1.88	0.8			
Arable fodder	0.49	7.06	13.91					0.10	1.47	2.56					0.79	11.69	19.82			
Grass	0.03	0.42	0.82					0.36	5.39	9.40					0.20	3.00	5.09			
Milk powder																				

Table A-43: Feed rates in the Netherlands, Portugal, and Spain

	Netherlands							Portugal							Spain					
	Milk	Beef	Sheep	Pork	Poultry	Eggs		Milk	Beef	Sheep	Pork	Poultry	Eggs		Milk	Beef	Sheep	Pork	Poultry	Eggs
C. wheat	0.04	0.68	0.76	0.35	0.84	0.71		0.06	0.92	1.42	0.40	0.48	0.40		0.05	0.84	0.73	0.58	0.92	0.78
Barley	0.01	0.22	0.25	0.12	0.07	0.06		0.02	0.36	0.55	0.15	0.05	0.04		0.13	2.03	1.76	1.42	0.56	0.47
Corn	0.02	0.39	0.43	0.20	0.48	0.40		0.17	2.65	4.07	1.14	1.37	1.16		0.08	1.18	1.02	0.82	1.30	1.09
Rye	0.00	0.05	0.05	0.02	0.01	0.01		0.00	0.00	0.00	0.00	0.00	0.00		0.01	0.08	0.07	0.05	0.02	0.02
Other grains	0.01	0.10	0.12	0.05	0.03	0.03		0.01	0.22	0.35	0.10	0.03	0.02		0.02	0.25	0.22	0.18	0.07	0.06
Soymeal	0.06	1.00	1.12	0.52	1.00	0.84		0.09	1.46	2.24	0.63	0.68	0.57		0.06	1.00	0.87	0.70	0.66	0.55
Rapemeal	0.01	0.14	0.16	0.07	0.15	0.12		0.00	0.00	0.01	0.00	0.00	0.00		0.00	0.02	0.02	0.01	0.01	0.01
Sunmeal	0.01	0.17	0.19	0.09	0.17	0.14		0.02	0.24	0.37	0.10	0.11	0.09		0.01	0.12	0.10	0.08	0.08	0.06
Soybean	0.00	0.08	0.09	0.04				0.02	0.27	0.41	0.12				0.01	0.11	0.09	0.08		
Sunseed	0.00	0.00	0.00	0.00											0.00	0.03	0.03	0.02		
Potato				0.94							0.02							0.04		
Milk	0.03							0.05							0.06					
Manioc	0.02	0.34		0.18	0.34	0.29		0.02	0.38		0.16	0.18	0.15		0.01	0.22		0.15	0.15	0.12
Corn gl. feed	0.01	0.10		0.05	0.10	0.08		0.01	0.19		0.08	0.09	0.07		0.01	0.16		0.11	0.11	0.09
Other energy	0.18	3.14	3.92	0.69				0.07	1.19	2.42	0.50				0.04	0.64	0.74	0.41		
Other protein	0.16	2.87	3.23	1.49	0.20	0.17		0.08	1.27	1.96	0.55	0.30	0.26		0.04	0.64	0.56	0.45	0.28	0.24
Silage maize	0.13	2.27	1.27					0.30	4.82	3.70					0.06	0.85	0.37			
Arable fodder	0.05	0.81	1.83					0.00	0.05	0.14					0.41	6.35	11.02			
Grass	0.15	2.60	5.84					0.00	0.03	0.10					0.31	4.81	8.34			
Milk powder	0.01	0.11						0.00	0.02						0.00	0.00				

Table A-44: Feed rates in Sweden, the United Kingdom, and Latvia

	Sweden						United Kingdom						Latvia					
	Milk	Beef	Sheep	Pork	Poultry	Eggs	Milk	Beef	Sheep	Pork	Poultry	Eggs	Milk	Beef	Sheep	Pork	Poultry	Eggs
C. wheat	0.05	0.76	0.62	0.78	1.81	1.52	0.08	1.35	1.25	0.82	1.64	1.38	0.08	1.12	0.78	0.66	1.92	1.62
Barley	0.09	1.46	1.19	1.50	0.87	0.73	0.07	1.15	1.06	0.70	0.35	0.29	0.13	1.88	1.31	1.11	0.81	0.68
Corn	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.07	0.06	0.04	0.08	0.07	0.01	0.14	0.10	0.09	0.25	0.21
Rye	0.00	0.03	0.02	0.03	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.41	0.28	0.24	0.17	0.15
Other grains	0.07	1.12	0.92	1.16	0.67	0.56	0.01	0.12	0.11	0.08	0.04	0.03	0.06	0.93	0.64	0.55	0.40	0.33
Soymeal	0.02	0.41	0.33	0.42	0.41	0.34	0.03	0.49	0.45	0.30	0.38	0.32	0.01	0.19	0.13	0.11	0.15	0.13
Rapemeal	0.02	0.25	0.21	0.26	0.25	0.21	0.01	0.20	0.18	0.12	0.16	0.13	0.00	0.02	0.01	0.01	0.01	0.01
Sunmeal	0.00	0.02	0.02	0.02	0.02	0.02	0.01	0.10	0.09	0.06	0.08	0.06	0.01	0.14	0.10	0.08	0.11	0.09
Soybean							0.00	0.05	0.05	0.03			0.00	0.00	0.00	0.00		
Sunseed													0.00	0.01	0.00	0.00		
Potato				0.16						0.57						5.92		
Milk	0.01						0.02						0.19					
Manioc	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00						
Corn gl. feed	0.01	0.11		0.11	0.11	0.09	0.01	0.10		0.06	0.08	0.07						
Other energy	0.04	0.63	0.51	0.49			0.11	1.82	1.69	0.54			0.06	0.84	0.59	0.50		
Other protein	0.04	0.60	0.49	0.61	0.40	0.33	0.10	1.61	1.49	0.98	0.51	0.43	0.04	0.59	0.41	1.39	0.35	0.29
Silage maize							0.04	0.61	0.28				0.01	0.08	0.03			
Arable fodder	0.70	11.71	19.11				0.25	4.21	7.82				0.12	1.79	2.49			
Grass	0.15	2.49	4.07				0.15	2.47	4.58				1.16	17.31	24.09			
Milk powder	0.00	0.00					0.00	0.00										

Table A-45: Feed rates in Romania, Slovenia, Lithuania

	Romania						Slovenia						Lithuania					
	Milk	Beef	Sheep	Pork	Poultry	Eggs	Milk	Beef	Sheep	Pork	Poultry	Eggs	Milk	Beef	Sheep	Pork	Poultry	Eggs
C. wheat	0.04	0.41	0.31	0.38	0.39	0.33	0.02	0.33	0.30	0.23	0.29	0.24	0.09	1.11	0.90	0.88	2.01	1.69
Barley	0.04	0.44	0.33	0.41	0.11	0.09	0.04	0.54	0.48	0.37	0.12	0.10	0.18	2.24	1.81	1.78	1.01	0.85
Corn	0.43	4.79	3.59	4.46	4.59	3.86	0.15	2.28	2.03	1.57	1.97	1.66	0.01	0.10	0.08	0.08	0.18	0.15
Rye	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.03	0.03	0.02	0.01	0.01	0.03	0.43	0.35	0.34	0.19	0.16
Other grains	0.02	0.22	0.16	0.20	0.05	0.04	0.01	0.22	0.20	0.15	0.05	0.04	0.05	0.63	0.51	0.50	0.29	0.24
Soymeal	0.01	0.13	0.10	0.12	0.11	0.10	0.05	0.71	0.63	0.49	0.51	0.43	0.01	0.19	0.15	0.15	0.15	0.13
Rapemeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.02	0.02	0.02	0.00	0.01	0.01	0.01	0.01	0.01
Sunmeal	0.01	0.13	0.10	0.12	0.11	0.10	0.01	0.09	0.08	0.06	0.06	0.05	0.00	0.04	0.03	0.03	0.04	0.03
Soybean							0.00	0.01	0.01	0.00			0.00	0.00	0.00	0.00		
Sunseed							0.00	0.01	0.00	0.00								
Potato				2.07						0.59						3.62		
Milk	0.14						0.13						0.12					
Manioc																		
Corn gl. feed																		
Other energy	0.38	4.33	3.24				0.14	2.13	1.90	0.88			0.06	0.71	0.57	0.57		
Other protein	0.25	2.85	2.14	2.06	1.34	1.13	0.17	2.57	2.30	1.77	0.90	0.76	0.05	0.61	0.49	1.07	0.40	0.34
Silage maize	0.02	0.19	0.07				0.17	2.57	1.15				0.02	0.28	0.11			
Arable fodder	0.40	4.54	6.81				0.13	2.00	3.58				1.02	12.89	20.86			
Grass	1.07	11.98	17.97				0.58	8.84	15.79				0.31	3.87	6.26			
Milk powder	0.00	0.00																

Table A-46: Feed rates in Bulgaria, Poland, and Hungary

	Bulgaria						Poland						Hungary					
	Milk	Beef	Sheep	Pork	Poultry	Eggs	Milk	Beef	Sheep	Pork	Poultry	Eggs	Milk	Beef	Sheep	Pork	Poultry	Eggs
C. wheat	0.14	1.72	1.55	0.74	2.63	2.21	0.08	1.18	1.03	0.43	1.32	1.11	0.05	0.82	0.70	0.90	0.90	0.76
Barley	0.07	0.92	0.83	0.40	0.35	0.30	0.08	1.21	1.06	0.44	0.34	0.29	0.06	0.88	0.75	0.96	0.24	0.20
Corn	0.09	1.07	0.97	0.46	1.64	1.38	0.03	0.47	0.41	0.17	0.53	0.45	0.18	2.91	2.47	3.18	3.19	2.68
Rye	0.00	0.05	0.04	0.02	0.02	0.02	0.07	1.03	0.90	0.37	0.29	0.24	0.01	0.09	0.08	0.10	0.03	0.02
Other grains	0.01	0.18	0.17	0.08	0.07	0.06	0.21	2.93	2.55	1.06	0.82	0.69	0.03	0.50	0.42	0.54	0.14	0.11
Soymeal	0.01	0.09	0.08	0.04	0.11	0.09	0.04	0.51	0.45	0.19	0.25	0.21	0.04	0.68	0.57	0.74	0.58	0.49
Rapemeal	0.00	0.01	0.01	0.00	0.01	0.01	0.01	0.12	0.10	0.04	0.06	0.05	0.00	0.07	0.06	0.08	0.06	0.05
Sunmeal	0.02	0.22	0.20	0.09	0.26	0.22	0.00	0.04	0.04	0.02	0.02	0.02	0.03	0.41	0.35	0.45	0.36	0.30
Soybean	0.00	0.00	0.00	0.00									0.00	0.04	0.03	0.04		
Sunseed							0.00	0.00	0.00	0.00			0.00	0.01	0.01	0.01		
Potato				0.18						4.69						0.23		
Milk	0.07						0.06						0.09					
Manioc																		
Corn gl. feed																		
Other energy	0.71	8.88	8.00	3.62			0.05	0.78	0.68	0.28			0.06	0.99	0.84	0.85		
Other protein	0.81	10.14	9.14	4.34	3.46	2.91	0.13	1.87	1.63	2.25	0.78	0.66	0.04	0.70	0.60	0.77	0.35	0.29
Silage maize	0.09	1.17	0.53				0.12	1.67	0.73				0.24	3.82	1.62			
Arable fodder	0.07	0.83	1.50				0.25	3.50	6.10				0.76	11.95	20.27			
Grass	0.65	8.17	14.73				0.62	8.81	15.33				0.64	10.14	17.20			
Milk powder				0.01														

Table A-47: Feed rates in the Czech Republic, Slovakia, and Estonia

	Czech Republic						Slovakia						Estonia					
	Milk	Beef	Sheep	Pork	Poultry	Eggs	Milk	Beef	Sheep	Pork	Poultry	Eggs	Milk	Beef	Sheep	Pork	Poultry	Eggs
C. wheat	0.03	0.39	0.33	2.24	2.91	2.45	0.04	0.59	0.46	2.05	2.25	1.89	0.09	1.28	1.04	0.93	2.10	1.77
Barley	0.02	0.32	0.27	1.84	0.60	0.50	0.02	0.34	0.27	1.19	0.33	0.28	0.19	2.68	2.17	1.94	1.10	0.93
Corn	0.00	0.07	0.06	0.39	0.51	0.43	0.02	0.31	0.24	1.08	1.19	1.00	0.01	0.21	0.17	0.15	0.34	0.28
Rye	0.00	0.01	0.01	0.05	0.02	0.01	0.00	0.02	0.02	0.07	0.02	0.02	0.01	0.11	0.09	0.08	0.04	0.04
Other grains	0.00	0.07	0.06	0.41	0.13	0.11	0.00	0.07	0.06	0.24	0.07	0.06	0.07	0.98	0.79	0.71	0.40	0.34
Soymeal	0.01	0.10	0.08	0.58	0.49	0.41	0.01	0.17	0.14	0.60	0.50	0.42	0.02	0.23	0.19	0.17	0.18	0.15
Rapemeal	0.00	0.02	0.01	0.09	0.08	0.07	0.00	0.02	0.01	0.05	0.04	0.04	0.00	0.01	0.01	0.01	0.01	0.01
Sunmeal	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.11	0.09	0.08	0.08	0.07
Soybean																		
Sunseed	0.00	0.00	0.00	0.02														
Potato				0.41						0.04						4.48		
Milk	0.07						0.06						0.12					
Manioc																		
Corn gl. feed																		
Other energy	0.02	0.24	0.20	0.98			0.02	0.30	0.23	0.99			0.05	0.76	0.62	0.55		
Other protein	0.01	0.16	0.14	0.94	0.49	0.41	0.02	0.25	0.20	0.87	0.50	0.42	0.04	0.59	0.48	1.13	0.36	0.30
Silage maize	0.38	5.58	2.36				0.34	4.93	1.94				0.00	0.03	0.01			
Arable fodder	1.06	15.44	26.08				0.61	8.70	13.71				0.97	13.89	22.45			
Grass	0.47	6.81	11.50				0.95	13.59	21.43				0.29	4.10	6.62			
Milk powder																		

Annex B: Base data in ESIM-2007

Table B-1: Supply, 2000, in the EU-15 (1000 t)

	AT	BE	DK	FI	FR	GE	GR	IE	IT	NL	PT	ES	SW	UK	EU-15
Barley	854.67	386.91	3979.80	1984.80	9709.33	12105.82	258.00	1309.92	1261.56	287.84	36.34	11063.01	1634.40	6492.00	51364.40
Beef	203.52	283.53	153.91	90.20	1527.54	1303.54	63.32	576.90	1154.12	470.63	100.40	631.78	149.81	706.81	7416.01
Butter	35.90	124.50	79.50	55.20	447.00	425.00	1.50	143.10	132.40	146.00	24.60	38.60	50.30	132.00	1835.60
CGF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cheese	118.50	61.10	305.80	97.90	1612.00	1686.00	24.20	98.50	927.30	662.00	57.60	213.00	126.60	332.00	6322.50
Cons. milk	513.00	817.60	518.00	738.20	3813.43	5424.00	408.00	546.00	2944.00	357.00	876.00	3538.00	1024.00	6969.00	28486.23
Corn	1617.54	399.42	0.00	0.00	16018.35	3324.02	1850.00	0.00	10139.64	223.28	875.35	3991.75	0.00	0.00	38439.34
C. wheat	1269.31	1748.80	4693.42	538.30	35668.41	21578.11	408.00	737.40	3117.33	1142.70	182.20	5354.43	2399.90	16694.00	95532.31
Durum	43.66	0.00	0.00	0.00	1684.98	43.44	1450.00	0.00	4310.33	0.00	172.51	1939.19	0.00	6.00	9650.11
Eggs	83.60	198.87	63.00	58.60	957.80	853.20	114.21	32.00	805.00	602.00	100.00	758.54	100.20	564.46	5291.49
Arab. fodder	916.70	1393.91	8050.10	8009.45	33693.88	14088.90	4109.57	1688.92	25445.42	965.40	269.81	11155.59	4415.43	9464.22	123667.31
Grass	5645.18	3732.06	1044.27	78.20	49530.08	35070.17	246.82	5881.25	6443.90	3272.69	191.75	8949.77	1122.94	5660.41	126869.50
Milk	3233.00	3691.60	4719.00	2523.60	24734.00	28332.00	789.00	5265.00	10773.80	11155.00	2060.00	5900.00	3348.00	14489.00	121013.00
Oth. energy	463.33	1212.67	789.70	414.12	5147.97	3858.12	341.54	3007.90	2243.75	4322.78	489.03	2067.79	354.62	3850.14	28563.46
Oth. protein	586.88	1536.05	1000.29	524.55	6520.76	4886.95	432.62	3810.01	2842.08	5475.53	619.44	2619.20	449.18	4876.85	36180.38
Oth. grains	516.70	122.24	476.98	1458.00	2355.63	4011.72	74.00	126.61	553.31	135.95	152.69	1131.53	1448.70	749.00	13313.06
Pork	502.00	1065.46	1624.47	172.31	2317.96	3981.87	141.37	230.40	1488.45	1622.76	327.10	2912.39	276.98	923.06	17586.59
Potato	694.61	2949.71	1645.24	785.20	6434.05	13192.95	880.00	454.78	2067.54	8126.80	742.59	3078.06	980.10	6649.06	48680.69
Poultry	111.19	421.73	201.70	64.38	2220.80	801.00	154.17	123.28	1088.80	754.00	268.07	987.00	91.85	1513.20	8801.16
Milk powder	13.00	69.50	38.00	23.80	279.10	325.00	100.00	79.00	0.03	68.00	10.80	3.00	41.80	83.00	1134.03
Rapemeal	102.90	423.10	169.60	99.62	725.00	2496.00	0.00	6.27	17.00	77.20	0.29	32.67	134.20	810.70	5094.54
Rapoil	70.40	317.09	116.50	66.41	548.00	1834.90	0.00	2.89	12.00	57.20	0.18	22.80	97.20	615.61	3761.19
Rapeseed	125.35	22.59	291.68	70.90	3476.82	3585.66	0.00	8.59	41.02	2.91	0.00	44.05	121.50	1129.00	8920.07
Rice	0.00	0.00	0.00	0.00	77.00	0.00	98.00	0.00	820.00	0.00	95.00	552.00	0.00	0.00	1642.00
Rye	182.78	8.38	262.47	108.20	145.77	4154.10	22.00	0.00	10.29	29.03	46.45	220.04	187.30	44.00	5420.82
Sheep	8.30	4.61	2.00	0.80	140.30	44.57	123.27	83.00	69.00	19.00	26.00	248.80	4.35	359.40	1133.40
Silage maize	865.11	1926.77	515.82	0.00	14320.83	12743.03	42.46	150.88	3312.09	2347.77	1163.97	935.62	0.00	967.58	39291.95
Soybean	32.84	0.00	0.00	0.00	201.03	0.00	4.00	0.00	903.49	0.00	0.00	6.68	0.00	1.00	1149.04
Soymeal	16.90	667.31	67.60	109.89	285.00	2963.70	191.33	24.73	1196.00	3219.30	415.00	1991.59	5.29	568.20	11721.83
Soyoil	3.80	150.49	15.20	24.73	67.60	698.00	44.15	5.63	244.84	783.00	92.00	441.20	1.19	143.40	2715.24
Sugar	501.00	1092.00	552.00	147.00	4803.00	4401.00	232.00	216.00	1614.00	952.00	63.00	978.00	430.00	1540.00	17521.00
Sunmeal	47.00	57.02	46.95	6.05	743.72	186.00	62.78	0.00	382.00	343.40	158.80	521.73	8.27	0.44	2564.15
Sunoil	52.90	46.52	22.50	3.47	609.00	151.00	37.88	0.00	277.00	289.90	113.60	485.33	4.07	0.36	2093.53
Sunseed	54.96	0.00	0.00	0.10	1833.08	63.86	23.75	0.00	460.71	0.00	28.57	919.00	0.00	1.00	3385.03

Table B-2: Supply, 2001, in the EU-15 (1000 t)

	AT	BE	DK	FI	FR	GE	GR	IE	IT	NL	PT	ES	SW	UK		EU-15
Barley	1012.41	422.24	3966.18	1786.00	9799.11	13494.59	249.00	1277.17	1125.72	386.77	12.59	6249.14	1642.10	6660.00		48083.02
Beef	215.30	296.51	153.42	88.62	1565.67	1361.46	59.85	488.60	1133.04	371.93	93.95	642.03	143.19	651.71		7265.27
Butter	36.00	102.40	80.20	53.80	447.00	420.00	1.50	139.20	121.80	175.00	24.50	31.40	49.00	126.00		1807.80
CGF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Cheese	133.00	65.70	317.90	102.80	1654.00	1765.00	18.60	122.90	948.70	641.00	58.60	224.00	124.90	387.00		6564.10
Cons. milk	530.00	818.10	520.00	732.70	3991.88	5485.00	429.00	556.00	2944.00	357.00	857.00	3715.00	1021.00	6961.00		28917.68
Corn	1493.01	465.21	0.00	0.00	16426.55	3504.51	1900.00	0.00	10553.71	336.11	906.64	4981.90	0.00	0.00		40567.64
C. wheat	1462.16	1511.42	4663.94	488.90	30188.72	22814.00	401.20	769.23	2789.29	990.69	50.92	3108.20	2344.80	11574.00		83157.46
Durum	46.12	0.00	0.00	0.00	1351.61	23.84	1429.20	0.00	3624.04	0.00	102.69	1755.90	0.00	6.00		8339.41
Eggs	82.60	217.03	69.00	56.10	951.44	839.88	122.94	31.00	789.75	592.00	106.00	765.72	97.90	609.52		5330.87
Arab. fodder	1038.32	1263.71	7608.38	7438.08	31938.27	13493.43	4125.40	1508.79	23838.25	930.96	269.43	10397.40	4158.25	9209.07		117217.74
Grass	5384.58	4067.29	1073.83	72.87	44439.38	34531.90	235.43	5419.14	6245.45	2630.23	182.90	9218.90	1071.10	5368.86		119941.85
Milk	3300.00	3626.40	4553.00	2529.90	24879.00	28191.00	778.00	5445.00	10793.00	10970.00	1983.00	6520.00	3339.00	14707.00		121614.30
Oth. energy	463.33	1212.67	789.70	414.12	5147.97	3858.12	341.54	3007.90	2243.75	4322.78	489.03	2067.79	354.62	3850.14		28563.46
Oth. protein	586.88	1536.05	1000.29	524.55	6520.76	4886.95	432.62	3810.01	2842.08	5475.53	619.44	2619.20	449.18	4876.85		36180.38
Oth. grains	600.45	96.28	460.61	1322.00	2261.19	4688.57	81.70	117.66	558.91	132.03	54.88	826.70	1223.80	695.98		13120.76
Pork	488.49	1081.56	1714.38	175.53	2315.18	4074.32	136.63	239.80	1509.64	1432.47	315.24	2992.71	275.87	781.41		17533.22
Potato	694.60	2587.04	1543.03	732.80	6049.65	11502.84	870.00	477.64	1971.25	7015.25	694.05	2992.42	925.00	6649.06		44704.64
Poultry	113.01	401.50	216.10	75.64	2215.40	860.00	154.37	134.28	1135.00	790.00	284.94	1030.53	98.05	1566.83		9075.65
Milk powder	7.60	63.99	40.20	18.00	246.00	295.00	0.00	86.00	0.00	68.00	9.30	7.90	39.40	71.00		952.39
Rapemeal	109.40	328.16	178.40	112.56	695.00	2459.60	0.00	5.45	17.00	47.00	0.42	25.03	131.45	766.50		4875.95
Rapoil	74.80	244.93	124.50	75.04	541.00	1779.19	0.00	2.51	12.00	32.00	0.26	17.50	95.20	588.51		3587.45
Rapeseed	146.53	27.23	211.58	100.80	2877.67	4160.09	0.00	7.26	28.94	2.40	0.00	24.53	106.00	1157.17		8850.18
Rice	0.00	0.00	0.00	0.00	69.00	0.00	100.00	0.00	849.00	0.00	97.00	593.00	0.00	0.00		1708.00
Rye	213.53	7.67	332.36	64.10	115.96	5132.35	30.20	0.00	8.59	17.03	24.19	101.45	180.00	23.41		6250.84
Sheep	8.00	5.30	2.00	0.70	140.20	46.87	121.06	77.00	66.00	18.00	24.00	251.20	4.28	258.00		1022.61
Silage maize	743.78	2080.79	702.61	0.00	15113.41	12299.64	62.73	211.93	3883.40	2239.00	1161.86	1064.43	0.00	1107.53		40671.11
Soybean	33.87	0.00	0.00	0.00	309.69	0.00	4.00	0.00	881.82	0.00	0.00	6.64	0.00	5.00		1241.02
Soymeal	13.80	869.75	68.70	145.79	579.00	3371.90	294.95	17.70	1145.00	3343.90	720.00	2188.70	10.79	571.90		13341.87
Soyoil	3.10	197.69	15.40	32.80	139.00	803.00	68.06	4.03	230.00	821.60	154.00	489.00	2.43	140.10		3100.23
Sugar	411.00	942.00	533.00	144.00	4494.00	4383.00	368.00	219.00	1540.00	840.00	63.00	1104.00	412.00	1325.00		16778.00
Sunmeal	42.00	41.08	22.88	8.16	664.00	175.80	52.17	0.00	378.00	348.20	110.50	521.28	9.47	1.30		2374.83
Sunoil	46.40	34.99	11.50	4.68	518.00	143.03	31.48	0.00	274.00	284.20	79.00	484.91	4.66	1.10		1917.95
Sunseed	50.57	0.00	0.00	0.09	1584.05	54.37	18.80	0.00	411.41	0.00	23.62	871.00	0.00	1.00		3014.91

Table B-3: Supply, 2002, in the EU-15 (1000 t)

	AT	BE	DK	FI	FR	GE	GR	IE	IT	NL	PT	ES	SW	UK		EU-15
Barley	861.39	394.52	4120.86	1739.00	10987.71	10927.97	201.00	962.81	1190.33	315.30	20.01	8332.90	1777.90	6128.00		47959.71
Beef	211.86	316.13	153.59	89.54	1639.85	1316.22	61.97	539.90	1133.80	383.95	105.02	676.08	146.47	692.10		7466.48
Butter	32.40	112.08	82.50	53.50	455.00	434.00	1.80	145.28	115.71	163.00	27.40	53.40	46.00	136.00		1858.07
CGF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Cheese	135.80	64.80	320.30	103.60	1660.60	1762.00	20.50	115.80	1019.90	638.00	58.90	240.00	128.30	373.10		6641.60
Cons. milk	531.00	781.00	511.00	719.20	3871.00	5524.00	415.00	553.00	3100.00	320.00	898.00	3651.00	1022.00	6957.00		28853.20
Corn	1666.61	533.02	0.00	0.00	16439.90	3738.45	2002.00	0.00	10554.42	315.28	796.60	4463.40	0.00	0.00		40509.68
C. wheat	1384.75	1746.66	4056.24	569.00	37319.73	20791.98	381.00	867.24	3279.93	1056.64	85.84	4709.70	2112.60	15954.30		94315.62
Durum	49.46	0.00	0.00	0.00	1613.70	25.76	1402.00	0.00	4251.85	0.00	327.20	2073.20	0.00	18.70		9761.86
Eggs	84.80	214.72	70.00	54.30	922.20	819.19	115.92	31.27	748.64	578.27	107.00	773.49	93.40	669.93		5283.13
Arab. fodder	1182.23	1090.51	6849.07	7455.10	31637.12	13674.32	3947.42	1359.76	23657.98	877.16	270.17	9458.08	4105.94	9355.78		114920.63
Grass	5693.32	3899.67	1001.52	25.32	44117.71	34852.96	237.99	5433.24	6052.18	2951.46	184.89	5312.15	507.40	5396.94		115666.75
Milk	3292.00	3720.00	4590.00	2532.00	25173.00	27874.00	758.00	5293.00	10879.34	10677.00	2104.00	6610.00	3274.00	14870.00		121646.34
Oth. energy	463.33	1212.67	789.70	414.12	5147.97	3858.12	341.54	3007.90	2243.75	4322.78	489.03	2067.79	354.62	3850.14		28563.46
Oth. protein	586.88	1536.05	1000.29	524.55	6520.76	4886.95	432.62	3810.01	2842.08	5475.53	619.44	2619.20	449.18	4876.85		36180.38
Oth. grains	617.19	123.62	397.11	1558.00	3055.46	4190.60	63.80	133.55	575.19	119.81	86.87	1045.30	1443.20	835.59		14245.28
Pork	511.49	1055.20	1759.35	183.90	2350.42	4110.15	139.41	229.70	1535.90	1377.12	328.04	3070.12	283.81	795.27		17729.86
Potato	684.32	2929.11	1486.50	780.00	6877.41	11113.86	875.00	518.61	1855.32	7362.74	781.29	3078.14	913.55	6966.47		46222.29
Poultry	112.59	422.61	217.54	82.60	2104.60	892.00	155.37	132.68	1156.00	774.00	250.92	1042.00	103.35	1530.70		8976.96
Milk powder	8.60	86.70	42.40	20.10	305.20	313.00	0.00	97.30	0.00	70.00	12.30	19.00	33.70	87.00		1095.30
Rapemeal	97.10	213.92	227.10	101.49	809.60	2592.20	0.00	5.94	20.20	41.00	0.39	15.84	137.50	785.40		5047.67
Rapoil	66.50	162.01	135.30	67.66	629.00	1860.40	0.00	2.74	14.70	28.00	0.25	11.10	99.60	586.20		3663.46
Rapeseed	128.65	30.82	217.81	103.00	3317.02	3848.70	0.00	6.74	13.44	1.46	0.00	10.79	159.20	1467.72		9305.33
Rice	0.00	0.00	0.00	0.00	70.00	0.00	113.00	0.00	915.00	0.00	97.00	544.00	0.00	0.00		1739.00
Rye	171.09	10.27	229.50	73.00	139.20	3666.00	25.10	0.00	9.63	16.82	34.30	173.90	128.20	28.80		4705.80
Sheep	7.60	3.36	2.00	0.00	135.10	44.23	123.05	67.00	63.00	17.69	26.00	252.20	4.35	368.84		1114.42
Silage maize	804.88	1985.46	886.88	0.00	14771.63	12463.12	61.81	213.21	3645.21	2493.29	1193.12	962.84	0.00	1068.11		40549.57
Soybean	35.33	0.00	0.00	0.00	210.31	0.00	4.00	0.00	566.18	0.00	0.00	1.61	0.00	3.54		820.96
Soymeal	16.20	973.35	72.60	104.37	637.30	3259.10	261.12	17.70	1080.00	2985.00	890.00	2194.07	2.49	590.00		13083.28
Soyoil	3.60	220.45	16.30	23.48	150.00	769.40	60.26	4.03	217.00	737.40	190.00	490.30	0.56	144.50		3027.28
Sugar	423.00	840.00	479.00	151.00	3897.00	3740.00	314.00	208.00	1284.00	805.00	80.00	931.00	402.00	1222.00		14776.00
Sunmeal	42.00	42.04	0.63	9.73	565.40	102.90	40.57	0.00	266.10	211.40	95.00	439.07	10.63	1.60		1827.08
Sunoil	47.00	34.03	0.30	5.58	414.00	81.90	24.48	0.00	174.30	169.30	68.00	408.44	5.23	1.30		1433.87
Sunseed	58.48	0.00	0.00	0.00	1496.68	51.85	23.27	0.00	354.20	0.00	21.14	771.11	0.00	2.00		2778.72

Table B-4: Area, 2000, in the EU-15, in 1000 ha

	AT	BE	DK	FI	FR	GE	GR	IE	IT	NL	PT	ES	SW	UK	EU-15
Barley	223.76	59.11	732.00	558.70	1533.85	2067.59	96.60	182.31	343.70	47.17	21.76	3278.03	408.73	1128.00	10681.30
Beef	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Butter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CGF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cheese	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Corn	164.06	36.04	0.00	0.00	1764.77	360.84	208.20	0.00	1063.56	20.30	153.01	433.15	0.00	0.00	4203.91
C. wheat	278.14	224.11	619.00	149.30	4910.51	2960.32	160.00	77.97	658.78	136.69	87.37	1485.68	401.17	2085.00	14234.03
Durum	15.66	0.00	0.00	0.00	337.92	8.62	672.80	0.00	1663.12	0.00	138.89	867.35	0.00	1.00	3705.35
Eggs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arab. fodder	132.10	153.78	697.91	678.55	3389.07	1014.77	294.21	232.78	2185.72	121.56	47.17	1003.56	942.90	1291.61	12185.69
Grass	1917.39	570.80	179.40	25.90	10007.54	5047.64	246.82	3333.03	4352.85	901.89	191.75	7033.07	371.90	5000.00	39179.97
Milk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oth. Energy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oth. Protein	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oth. Grains	94.44	21.20	99.00	414.20	476.25	765.59	44.81	18.77	181.58	16.27	108.87	492.70	363.28	127.00	3223.95
Pork	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Potato	23.74	66.67	40.00	32.30	162.64	304.38	36.00	13.54	83.16	180.21	57.35	118.75	32.90	164.79	1316.43
Poultry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Milk powder	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rapemeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rapeseed	51.76	8.00	99.12	52.50	1186.26	1078.01	0.00	2.68	36.29	0.85	0.00	28.82	47.58	402.00	2993.88
Rice	0.00	0.00	0.00	0.00	19.87	0.00	20.00	0.00	220.35	0.00	23.86	117.05	0.00	0.00	401.12
Rye	52.47	1.78	50.00	44.50	31.59	842.69	11.70	0.00	3.48	5.96	44.67	109.61	34.52	7.00	1239.97
Sheep	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Silage maize	73.96	177.14	61.49	0.00	1395.93	1154.47	5.00	14.00	285.15	205.32	108.00	81.65	0.00	104.00	3666.11
Soybean	15.54	0.00	0.00	0.00	77.70	0.00	1.85	0.00	252.65	0.00	0.00	3.05	0.00	0.00	350.78
Soymeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sugar	42.84	90.87	59.17	32.10	409.66	452.01	50.00	32.20	249.15	111.00	7.98	125.26	55.48	173.00	1890.71
Sunmeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sunseed	22.34	0.00	0.00	0.10	728.56	25.79	17.00	0.00	216.85	0.00	51.84	838.90	0.00	2.00	1903.38

Table B-5: Area, 2001, in the EU-15, in 1000 ha

	AT	BE	DK	FI	FR	GE	GR	IE	IT	NL	PT	ES	SW	UK	EU-15
Barley	217.47	63.13	743.83	547.20	1705.04	2111.82	129.50	181.97	333.09	66.38	11.76	2992.09	394.51	1245.00	10742.80
Beef	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Butter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CGF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cheese	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Corn	171.42	41.03	0.00	0.00	1916.42	396.54	210.00	0.00	1109.34	27.17	155.13	512.50	0.00	0.00	4539.56
C. wheat	275.74	190.87	634.04	144.60	4460.19	2892.52	170.50	84.92	625.18	124.29	49.95	1291.90	398.57	1634.00	12977.28
Durum	12.03	0.00	0.00	0.00	306.37	4.68	760.60	0.00	1664.20	0.00	133.54	885.11	0.00	1.00	3767.52
Eggs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arab. fodder	138.11	135.35	631.05	656.85	3368.64	963.62	293.11	208.53	2130.82	121.86	47.17	930.31	938.53	1255.42	11819.36
Grass	1917.39	586.18	184.30	25.30	9964.26	5012.60	235.43	3219.78	4364.72	880.88	182.90	7210.50	371.90	5000.00	39156.13
Milk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oth. Energy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oth. Protein	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oth. Grains	95.10	18.47	94.88	435.20	500.71	793.94	61.61	18.97	181.76	14.27	80.16	516.06	337.73	128.85	3277.70
Pork	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Potato	23.12	62.89	38.21	30.00	161.59	282.10	35.70	14.26	79.61	163.93	49.79	115.13	32.24	165.35	1253.92
Poultry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Milk powder	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rapemeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rapeseed	56.10	8.16	78.88	73.10	1082.27	1137.96	0.00	2.42	26.20	0.71	0.00	18.97	44.77	451.00	2980.53
Rice	0.00	0.00	0.00	0.00	19.18	0.00	20.30	0.00	217.62	0.00	24.94	115.59	0.00	0.00	397.63
Rye	51.22	1.51	65.31	29.00	28.40	836.98	20.10	0.00	2.96	3.57	37.57	102.06	34.14	4.82	1217.62
Sheep	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Silage maize	72.25	194.01	78.82	0.00	1471.66	1132.48	7.40	19.70	294.76	203.87	108.00	83.09	0.00	129.20	3795.24
Soybean	16.34	0.00	0.00	0.00	120.89	0.00	1.85	0.00	233.51	0.00	0.00	2.48	0.00	2.20	377.27
Soymeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sugar	44.70	95.55	56.32	31.10	429.19	447.70	43.00	31.07	222.60	109.13	5.37	106.94	54.83	177.36	1854.87
Sunmeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sunseed	20.33	0.00	0.00	0.10	707.61	24.58	16.80	0.00	207.80	0.00	41.52	861.15	0.00	0.50	1880.40

Table B-6: Area, 2002, in the EU-15, in 1000 ha

	AT	BE	DK	FI	FR	GE	GR	IE	IT	NL	PT	ES	SW	UK	EU-15
Barley	200.95	54.95	824.51	522.20	1642.50	1970.34	105.20	175.98	342.83	56.94	11.20	3100.20	408.33	1100.97	10517.09
Beef	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Butter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CGF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cheese	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Corn	172.23	47.72	0.00	0.00	1830.86	398.75	225.30	0.00	1111.95	23.69	140.31	462.60	0.00	0.00	4413.41
C. wheat	276.19	214.43	576.62	174.20	4894.84	3009.77	130.20	102.68	682.06	135.22	42.37	1476.40	339.14	1993.53	14047.64
Durum	12.58	0.00	0.00	0.00	335.51	4.85	760.10	0.00	1733.26	0.00	188.32	925.40	0.00	2.34	3962.35
Eggs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arab. fodder	145.35	112.98	634.21	658.26	3343.72	986.37	294.11	188.21	2093.82	116.11	47.17	968.03	939.80	1275.33	11803.46
Grass	1917.39	601.05	186.39	24.07	9903.23	4969.62	237.99	3193.38	4378.87	891.88	184.89	7296.40	482.27	5000.00	39267.45
Milk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oth. Energy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oth. Protein	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oth. Grains	100.25	21.09	80.36	463.50	577.25	819.41	46.06	20.65	193.17	13.58	74.19	525.30	344.29	143.17	3422.27
Pork	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Potato	22.52	62.37	36.95	29.60	162.29	284.08	36.10	15.39	81.41	165.16	52.60	119.50	31.73	158.49	1258.18
Poultry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Milk powder	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rapemeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rapeseed	55.38	8.59	84.14	67.40	1036.42	1296.65	0.00	2.18	9.66	0.48	0.00	6.40	67.43	432.00	3066.73
Rice	0.00	0.00	0.00	0.00	18.49	0.00	21.36	0.00	218.67	0.00	25.22	113.47	0.00	0.00	397.21
Rye	47.15	1.75	46.35	30.50	28.65	728.39	15.15	0.00	3.36	3.57	33.50	101.80	24.06	4.97	1069.18
Sheep	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Silage maize	73.69	180.86	95.74	0.00	1410.45	1119.16	7.10	19.30	273.62	214.40	108.00	75.76	0.00	121.34	3699.42
Soybean	14.00	0.00	0.00	0.00	74.82	0.00	1.85	0.00	152.02	0.00	0.00	0.60	0.00	0.98	244.26
Soymeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sugar	44.72	96.46	57.81	30.60	437.73	459.40	41.50	31.27	245.66	108.89	9.04	113.76	54.82	169.13	1900.81
Sunmeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sunseed	21.38	0.00	0.00	0.00	616.04	26.10	16.50	0.00	165.60	0.00	37.58	753.63	0.00	0.80	1637.64

Table B-7: Feed demand, 2000, in the EU-15 (1000 t)

	AT	BE	DK	FI	FR	GE	GR	IE	IT	NL	PT	ES	SW	UK	EU-15
Barley	718.46	511.56	2602.87	1073.88	3121.11	7022.85	394.00	821.23	1771.63	438.95	140.16	8441.01	1131.23	3289.83	31478.78
Beef	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Butter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CGF	95.75	143.99	238.70	67.69	808.50	814.69	93.78	66.54	476.88	300.91	100.46	697.91	89.09	386.11	4381.00
Cheese	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cons. milk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Corn	1201.87	747.69	59.00	47.77	5526.16	2537.01	2568.00	173.82	9301.41	1199.12	1678.27	5737.85	3.00	308.00	31088.96
Com. wheat	360.10	1401.19	3289.28	133.98	11769.12	8475.38	39.45	709.47	1182.05	2330.87	554.90	4358.35	931.97	6888.60	42424.72
Durum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eggs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arab. fodder	916.70	1393.91	8050.10	8009.45	33693.88	14088.90	4109.57	1688.92	25445.42	965.40	269.81	11155.59	4415.43	9464.22	123667.31
Grass	5645.18	3732.06	1044.27	78.20	49530.08	35070.17	246.82	5881.25	6443.90	3272.69	191.75	8949.77	1122.94	5660.41	126869.50
Manioc	0.02	774.62	0.01	0.00	78.98	159.42	0.00	0.36	42.28	1349.47	268.96	1300.24	0.01	1.63	3975.98
Milk	572.00	346.00	200.00	82.50	1431.00	1121.00	119.00	105.00	690.20	421.00	168.00	487.00	51.00	1016.00	6809.70
Oth. energy	463.33	1212.67	789.70	414.12	5147.97	3858.12	341.54	3007.90	2243.75	4322.78	489.03	2067.79	354.62	3850.14	28563.46
Oth. protein	586.88	1536.05	1000.29	524.55	6520.76	4886.95	432.62	3810.01	2842.08	5475.53	619.44	2619.20	449.18	4876.85	36180.38
Oth. grains	309.42	143.79	392.99	739.99	2034.67	3504.35	90.65	98.82	616.09	180.52	143.32	1141.71	892.58	379.40	10668.31
Pork	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Potato	1.00	229.05	239.85	13.99	239.00	1457.99	0.00	4.86	10.05	1782.33	5.00	128.00	44.41	404.16	4559.68
Poultry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Milk powder	4.10	10.20	30.00	0.00	190.00	107.43	0.00	0.00	0.00	145.00	4.00	0.00	0.30	3.80	494.83
Rapemeal	83.29	218.82	489.97	136.49	1046.76	1739.68	0.00	165.27	114.83	505.28	4.96	145.31	224.85	838.85	5714.35
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rapeseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rice	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rye	103.71	2.15	70.12	2.00	94.85	1255.04	12.94	0.00	20.15	48.01	1.01	202.41	41.06	12.00	1865.46
Sheep	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Silage maize	865.11	1926.77	515.82	0.00	14320.83	12743.03	42.46	150.88	3312.09	2347.77	1163.97	935.62	0.00	967.58	39291.95
Soybean	0.00	0.00	58.02	154.00	334.01	0.00	0.00	20.00	160.04	147.05	113.00	185.04	0.00	132.14	1303.30
Soymeal	478.38	1039.41	1636.47	190.91	4455.23	3613.66	377.11	328.00	3261.29	2358.43	749.65	4124.89	320.77	1846.94	24781.15
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sugar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sunmeal	54.45	65.22	308.47	6.05	979.10	318.35	49.90	119.47	595.84	617.46	182.37	558.15	24.77	416.84	4296.44
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sunseed	11.00	0.00	0.00	7.10	178.01	54.98	0.00	0.00	10.00	3.80	0.00	101.08	0.00	0.00	365.97

Table B-8: Feed demand, 2001, in the EU-15 (1000 t)

	AT	BE	DK	FI	FR	GE	GR	IE	IT	NL	PT	ES	SW	UK	EU-15
Barley	737.61	655.51	2814.12	1163.00	3667.04	7208.99	380.00	846.10	1802.76	556.91	182.82	7630.00	1064.06	3869.65	32578.57
Beef	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Butter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CGF	95.75	143.99	238.70	67.69	808.50	814.69	93.78	66.54	476.88	300.91	100.46	697.91	89.09	386.11	4381.00
Cheese	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cons. milk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Corn	1202.24	890.69	53.00	57.00	6309.10	2964.26	2548.00	214.23	9648.75	1508.75	1657.73	6803.68	4.00	341.00	34202.42
Com. wheat	412.78	1606.43	3168.96	139.89	10786.89	8389.79	20.01	706.14	1114.02	2460.85	539.89	4643.18	789.93	6152.50	40931.25
Durum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eggs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arab. fodder	1038.32	1263.71	7608.38	7438.08	31938.27	13493.43	4125.40	1508.79	23838.25	930.96	269.43	10397.40	4158.25	9209.07	117217.74
Grass	5384.58	4067.29	1073.83	72.87	44439.38	34531.90	235.43	5419.14	6245.45	2630.23	182.90	9218.90	1071.10	5368.86	119941.85
Manioc	0.01	628.23	0.00	0.00	35.60	12.02	0.00	0.04	3.86	1330.38	216.59	909.91	0.03	1.75	3138.42
Milk	646.00	304.80	135.00	80.60	1654.00	1109.00	72.00	107.00	657.50	347.00	161.00	757.00	49.00	977.00	7056.90
Oth. energy	463.33	1212.67	789.70	414.12	5147.97	3858.12	341.54	3007.90	2243.75	4322.78	489.03	2067.79	354.62	3850.14	28563.46
Oth. protein	586.88	1536.05	1000.29	524.55	6520.76	4886.95	432.62	3810.01	2842.08	5475.53	619.44	2619.20	449.18	4876.85	36180.38
Oth. grains	369.48	138.33	381.73	718.39	1936.47	3950.94	93.51	97.00	602.10	306.57	82.75	863.89	877.84	292.64	10711.64
Pork	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Potato	10.00	178.58	193.94	7.00	231.99	412.12	0.00	5.07	10.05	1135.30	5.00	104.16	43.76	514.63	2851.58
Poultry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Milk powder	0.50	6.06	40.00	0.00	161.38	83.19	0.00	0.00	0.00	75.73	4.00	0.00	0.10	3.00	373.95
Rapemeal	85.93	129.84	374.10	157.18	959.16	1501.49	0.00	131.93	90.08	418.27	0.42	71.17	209.59	836.03	4965.18
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rapeseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rice	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rye	101.84	2.09	142.13	15.01	75.98	1568.71	18.09	0.00	21.61	165.02	1.00	425.92	28.00	0.98	2566.39
Sheep	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Silage maize	743.78	2080.79	702.61	0.00	15113.41	12299.64	62.73	211.93	3883.40	2239.00	1161.86	1064.43	0.00	1107.53	40671.11
Soybean	25.95	0.00	58.03	154.00	330.52	0.00	0.00	31.00	159.99	145.92	103.91	474.67	0.00	120.62	1604.59
Soymeal	521.98	1213.11	1604.79	253.19	4884.88	4040.58	461.48	334.58	3719.21	3510.71	823.83	4367.56	362.48	1977.01	28075.38
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sugar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sunmeal	38.91	94.31	294.95	8.16	739.63	237.94	46.23	182.16	639.33	499.60	122.58	546.48	21.20	483.94	3955.44
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sunseed	16.94	0.00	0.00	8.05	167.15	61.18	0.00	0.00	9.01	3.78	0.00	97.98	0.00	0.00	364.09

Table B-9: Feed demand, 2002, in the EU-15 (1000 t)

	AT	BE	DK	FI	FR	GE	GR	IE	IT	NL	PT	ES	SW	UK	EU-15
Barley	667.00	628.28	2673.90	1117.81	3328.23	6844.94	417.79	844.93	1919.19	506.97	185.01	7771.95	1098.33	3267.00	31271.34
Beef	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Butter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CGF	95.75	143.99	238.70	67.69	808.50	814.69	93.78	66.54	476.88	300.91	100.46	697.91	89.09	386.11	4381.00
Cheese	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cons. milk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Corn	1174.58	794.25	51.42	53.16	5801.91	2826.21	2483.87	194.14	10266.70	1288.85	1604.68	6266.58	7.00	367.00	33180.34
Com. wheat	407.35	1523.68	3209.00	133.69	11029.93	8650.98	22.28	729.94	2059.04	2222.39	627.02	4370.11	730.55	6873.32	42589.28
Durum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eggs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arab. fodder	1182.23	1090.51	6849.07	7455.10	31637.12	13674.32	3947.42	1359.76	23657.98	877.16	270.17	9458.08	4105.94	9355.78	114920.63
Grass	5693.32	3899.67	1001.52	25.32	44117.71	34852.96	237.99	5433.24	6052.18	2951.46	184.89	5312.15	507.40	5396.94	115666.75
Manioc	0.00	528.36	0.00	0.01	2.44	4.20	0.00	0.04	3.13	471.84	118.86	595.86	0.02	1.97	1726.71
Milk	643.00	400.90	134.00	84.50	1551.00	1035.00	80.00	104.00	695.34	320.00	172.00	735.00	48.00	944.00	6946.74
Oth. energy	463.33	1212.67	789.70	414.12	5147.97	3858.12	341.54	3007.90	2243.75	4322.78	489.03	2067.79	354.62	3850.14	28563.46
Oth. protein	586.88	1536.05	1000.29	524.55	6520.76	4886.95	432.62	3810.01	2842.08	5475.53	619.44	2619.20	449.18	4876.85	36180.38
Oth. grains	336.06	142.49	388.78	727.04	1991.26	3672.95	103.80	115.23	592.99	204.86	94.26	943.45	772.83	448.83	10534.82
Pork	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Potato	9.97	235.89	182.07	7.13	239.61	364.60	0.00	5.09	10.05	1248.68	5.33	108.79	43.75	515.62	2976.59
Poultry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Milk powder	0.50	11.65	40.00	0.00	185.30	96.14	0.00	0.00	0.00	129.00	4.00	0.58	0.00	3.10	470.27
Rapemeal	79.04	114.58	376.57	188.44	1068.33	1724.78	0.00	112.18	86.24	417.48	0.39	55.66	182.34	691.93	5097.96
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rapeseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rice	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rye	95.65	1.95	110.86	15.00	89.01	1570.72	16.64	0.00	19.65	104.02	1.01	286.05	0.00	1.00	2311.54
Sheep	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Silage maize	804.88	1985.46	886.88	0.00	14771.63	12463.12	61.81	213.21	3645.21	2493.29	1193.12	962.84	0.00	1068.11	40549.57
Soybean	18.24	0.00	58.03	145.67	319.56	0.00	0.00	23.19	144.70	146.32	106.52	435.20	0.00	120.00	1517.43
Soymeal	487.52	1092.01	1578.24	203.99	5012.54	4102.49	419.15	336.10	3804.94	3387.38	908.78	4871.88	314.28	1988.29	28507.58
Soyoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sugar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sunmeal	40.00	115.16	199.38	9.73	699.91	121.65	60.70	120.49	539.34	422.41	104.56	442.40	11.73	245.24	3132.68
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sunseed	17.41	0.00	0.00	7.10	168.08	57.23	0.00	0.00	10.24	3.86	0.00	111.70	0.00	0.00	375.61

Table B-10: Human demand, 2000, in the EU-15 (1000 t)

	AT	BE	DK	FI	FR	GE	GR	IE	IT	NL	PT	ES	SW	UK		EU-15
Barley	196.00	329.20	435.00	334.00	337.00	2681.00	20.00	302.00	262.00	482.00	160.00	776.00	116.00	1834.00		8264.2
Beef	158.70	13.36	119.00	98.10	1561.00	1148.41	195.98	62.00	1418.00	261.00	173.00	605.37	191.00	1024.50		7029.416
Butter	39.80	53.20	28.00	19.67	525.00	545.00	7.20	12.40	155.00	52.00	19.00	36.00	29.80	254.00		1776.07
CGF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0
Cheese	140.50	167.30	100.00	85.80	1509.00	1619.00	268.00	22.00	1284.00	297.00	102.00	371.40	150.00	567.00		6683
Cons. milk	513.00	817.60	518.00	738.20	3813.43	5424.00	408.00	546.00	2944.00	357.00	876.00	3538.00	1024.00	6969.00		28486.23
Corn	852.00	31.00	13.00	34.00	1043.00	1349.00	35.00	110.00	614.00	446.00	364.00	1066.00	80.00	1261.00		7298
Com. wheat	539.00	1431.00	637.00	426.40	6848.00	6491.00	952.00	326.00	6296.00	2076.00	1034.00	3704.00	886.00	6465.00		38111.4
Durum	86.10	148.10	8.00	13.00	937.00	900.00	1149.00	89.00	3094.20	92.00	166.00	430.40	97.00	133.00		7342.8
Eggs	107.80	145.40	74.00	51.10	940.40	1132.90	116.09	36.00	847.00	234.00	91.00	708.88	106.48	613.76		5204.802
Arab. fodder	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0
Grass	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0
Milk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0
Oth. energy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0
Oth. protein	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0
Oth. grains	30.30	3.10	41.00	52.00	29.00	287.00	3.00	11.00	5.20	47.00	22.00	27.50	77.00	227.00		862.1
Pork	492.00	17.91	343.00	170.00	2191.40	4456.76	344.09	150.00	2108.00	692.00	452.00	2596.50	314.92	1415.20		15743.78
Potato	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0
Poultry	139.40	5.70	102.00	69.00	1499.50	1317.70	207.17	127.00	1095.00	342.00	309.00	1165.90	110.84	1719.90		8210.109
Milk powder	2.73	33.59	20.00	2.67	52.00	88.08	16.03	2.00	30.00	56.00	8.00	7.67	5.36	98.40		422.527
Rapemeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0
Rapeseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0
Rice	22.80	30.00	4.00	21.20	324.00	308.00	57.00	16.00	305.00	86.00	162.00	264.30	44.80	256.00		1901.1
Rye	111.00	7.00	79.00	108.00	29.00	920.00	7.00	3.00	5.00	69.00	51.00	25.00	104.00	49.00		1567
Sheep	10.30	0.89	7.00	2.30	304.90	95.42	144.77	30.00	91.00	24.00	38.00	239.40	8.21	393.60		1389.792
Silage maize	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0
Soybean	8.00	0.20	0.20	0.20	0.20	12.00	0.20	4.00	0.20	0.20	0.20	0.20	0.20	50.00		76
Soymeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0
Soymeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0
Sugar	325.00	510.00	185.00	175.00	2104.00	2907.00	375.00	126.00	1396.00	539.00	312.00	1288.00	372.00	2122.00		12736
Sunmeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0
Sunseed	2.00	0.10	0.20	0.20	0.20	20.00	4.00	0.10	0.20	0.20	0.20	37.00	0.20	23.00		87.6

Table B-11: Human demand, 2001, in the EU-15 (1000 t)

	AT	BE	DK	FI	FR	GE	GR	IE	IT	NL	PT	ES	SW	UK	EU-15
Barley	214.00	214.77	435.00	336.00	385.00	2805.00	20.00	329.00	264.00	518.00	167.00	721.00	253.00	1467.00	8128.77
Beef	148.60	12.43	120.00	92.50	1553.80	818.39	197.34	66.00	1315.00	303.00	158.00	523.32	182.26	1113.10	6603.74
Butter	40.00	51.00	24.00	17.91	513.00	536.00	7.20	12.40	155.50	53.00	17.00	36.00	27.30	256.00	1746.31
CGF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cheese	150.60	167.70	102.00	85.50	1538.00	1649.00	280.00	23.00	1300.00	316.00	103.00	380.00	153.00	568.00	6815.80
Cons. milk	530.00	818.10	520.00	732.70	3991.88	5485.00	429.00	556.00	2944.00	357.00	857.00	3715.00	1021.00	6961.00	28917.68
Corn	855.00	34.35	16.00	36.00	1188.00	1432.00	46.00	112.00	621.00	386.00	362.00	1113.00	71.00	1281.00	7553.35
Com. wheat	517.00	1452.52	710.00	403.60	6564.00	6928.00	966.00	298.00	6332.10	1735.00	1035.00	3776.00	896.00	6424.00	38037.22
Durum	83.40	160.95	10.00	21.00	1015.00	934.00	968.00	124.00	3104.20	80.00	157.00	475.20	89.00	366.00	7587.75
Eggs	107.10	139.18	74.00	51.10	937.10	1120.12	123.83	38.00	750.67	221.00	93.00	719.92	105.67	678.32	5159.02
Arab. fodder	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grass	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Milk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oth. energy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oth. protein	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oth. grains	33.20	1.00	44.00	58.00	28.00	335.00	7.00	17.00	1.20	53.00	20.00	26.50	78.00	237.00	938.90
Pork	457.80	19.10	337.00	165.70	2222.40	4446.00	340.95	153.00	2188.00	680.00	447.00	2618.30	308.11	1502.00	15885.35
Potato	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poultry	148.20	6.88	111.00	75.10	1584.00	1496.47	206.75	117.00	1058.00	355.00	320.00	1356.90	121.08	1729.70	8686.08
Milk powder	1.10	47.07	25.00	1.96	59.88	63.37	17.89	2.00	30.00	22.87	8.00	7.67	5.36	80.98	373.13
Rapemeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rapeseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rice	26.40	23.93	4.00	16.00	366.00	269.00	55.00	20.00	346.00	85.00	162.00	261.00	40.20	283.00	1957.53
Rye	109.00	34.01	90.00	102.00	40.00	924.00	10.00	3.00	5.00	71.00	49.00	32.00	102.00	35.00	1606.01
Sheep	9.90	0.93	7.00	1.70	258.00	92.71	142.35	17.00	92.00	23.00	36.00	236.20	9.13	339.10	1265.02
Silage maize	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Soybean	10.00	0.00	0.00	0.20	0.00	15.00	0.00	15.00	1.00	0.00	0.00	0.00	0.00	50.00	91.20
Soymeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Soymeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sugar	314.00	510.00	215.00	198.00	2077.00	2821.00	375.00	101.00	1448.00	536.00	317.00	1122.00	393.00	2163.00	12590.00
Sunmeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sunseed	2.10	0.10	0.00	0.00	0.00	18.00	4.00	2.00	0.00	0.00	0.00	38.00	0.00	23.00	87.20

Table B-12: Human demand, 2002, in the EU-15 (1000 t)

	AT	BE	DK	FI	FR	GE	GR	IE	IT	NL	PT	ES	SW	UK		EU-15
Barley	214.00	202.41	440.00	458.00	366.00	2776.00	20.00	293.00	270.10	492.00	168.00	1130.30	282.00	1500.00		8611.81
Beef	151.00	242.64	141.00	93.20	1701.30	987.79	189.17	69.00	1408.00	309.00	173.00	646.34	206.68	1204.30		7522.42
Butter	37.30	47.20	22.00	15.66	510.00	537.00	7.00	12.00	160.00	52.00	20.00	36.00	24.80	262.00		1742.96
CGF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Cheese	146.70	167.00	101.00	86.51	1499.00	1662.00	290.00	23.00	1310.00	309.00	104.00	380.00	155.00	584.00		6817.21
Cons. milk	531.00	781.00	511.00	719.20	3871.00	5524.00	415.00	553.00	3100.00	320.00	898.00	3651.00	1022.00	6957.00		28853.20
Corn	847.00	9.80	19.00	86.00	942.00	1664.00	30.00	113.00	482.10	389.00	339.00	1127.80	79.00	1231.00		7358.70
Com. wheat	555.00	1376.39	715.00	421.00	6684.00	7258.00	1149.00	303.00	6315.10	1474.00	1064.00	4028.40	949.00	6332.00		38623.89
Durum	70.40	148.24	7.00	39.00	917.00	955.00	920.00	114.00	2486.20	274.00	174.00	487.40	83.00	369.00		7044.24
Eggs	112.30	141.47	74.00	51.10	919.50	1106.94	117.89	40.00	721.70	224.00	94.00	762.77	100.57	757.81		5224.05
Arab. fodder	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Grass	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Milk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Oth. energy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Oth. protein	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Oth. grains	30.70	1.10	42.00	158.00	32.00	331.00	6.00	20.00	10.20	76.00	21.00	33.90	91.00	244.00		1096.90
Pork	454.60	554.00	312.00	165.50	2231.70	4455.57	300.37	150.00	2203.00	680.00	454.00	2728.60	322.22	1515.00		16526.56
Potato	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Poultry	143.60	222.90	121.00	79.90	1507.60	1421.21	211.15	121.00	1045.00	363.00	323.00	1376.90	128.19	1712.10		8776.54
Milk powder	0.70	40.62	13.00	2.06	60.06	114.09	14.00	2.00	30.84	20.94	6.00	7.99	5.36	99.02		416.68
Rapemeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Rapoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Rapeseed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Rice	22.00	36.54	4.00	22.80	315.00	283.00	97.00	23.00	479.00	85.00	164.00	253.50	43.40	325.00		2153.24
Rye	108.00	23.13	103.00	89.00	28.00	910.00	10.00	2.00	5.00	96.00	49.00	25.00	98.00	43.00		1589.13
Sheep	9.50	19.28	6.00	1.10	273.10	85.68	138.12	21.00	87.00	23.00	37.00	236.60	9.03	360.00		1306.41
Silage maize	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Soybean	8.60	10.00	0.00	0.40	0.00	4.00	0.00	8.00	1.00	0.00	0.00	0.00	0.00	50.00		82.00
Soymeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Soymeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Sugar	313.00	493.45	233.00	187.00	2077.00	2909.00	277.70	122.00	1462.00	536.00	316.00	1210.00	390.00	2376.00		12902.15
Sunmeal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Sunoil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Sunseed	2.10	0.18	0.00	0.00	0.00	35.00	2.77	0.00	0.00	0.00	0.00	38.00	0.00	44.00		122.05

Table B-13: Processing demand, 2000 - 2002, in the EU-15 (1000 t)

	AT	BE	DK	FI	FR	GE	GR	IE	IT	NL	PT	ES	SW	UK	EU-15
								2000							
Milk	2661.00	3345.60	4519.00	2441.10	23303.00	27211.00	670.00	5160.00	10083.60	10734.00	1892.00	5413.00	3297.00	13473.00	114203.30
Rapeseed	190.32	1070.92	296.73	169.90	1286.44	4280.71	0.00	15.00	37.01	199.44	1.00	44.05	233.48	1339.89	9164.89
Soybean	14.96	1400.00	5.47	200.00	435.02	3932.00	337.15	40.00	1555.43	4152.53	515.00	2602.63	2.00	780.80	15973.00
Sunseed	96.97	300.00	100.00	15.00	1378.06	315.91	103.76	0.00	617.73	513.93	291.57	1278.93	11.82	2.08	5025.76
								2001							
	AT	**BE**	**DK**	**FI**	**FR**	**GE**	**GR**	**IE**	**IT**	**NL**	**PT**	**ES**	**SW**	**UK**	**EU-15**
Milk	2654.00	3321.60	4418.00	2449.30	23225.00	27082.00	706.00	5338.00	10135.50	10623.00	1822.00	5763.00	3290.00	13730.00	114557.40
Rapeseed	182.60	426.24	385.62	174.80	1232.63	4246.03	0.00	10.00	29.95	206.78	1.00	39.29	230.84	1376.33	8542.12
Soybean	0.00	1000.00	5.47	250.00	430.46	3811.04	387.63	25.00	1826.83	4120.65	473.57	2828.04	2.00	791.04	15951.72
Sunseed	85.71	80.00	30.00	15.00	1293.97	351.49	100.81	0.00	484.38	511.43	285.98	1076.83	15.00	3.11	4333.71
								2002							
	AT	**BE**	**DK**	**FI**	**FR**	**GE**	**GR**	**IE**	**IT**	**NL**	**PT**	**ES**	**SW**	**UK**	**EU-15**
Milk	2649.00	3319.10	4456.00	2447.50	23622.00	26839.00	678.00	5189.00	10184.00	10357.00	1932.00	5875.00	3226.00	13926.00	114699.60
Rapeseed	184.63	786.75	362.96	175.33	1296.21	4336.05	0.00	8.00	43.99	210.54	0.50	44.73	234.48	1319.92	9004.11
Soybean	0.00	1500.00	5.47	150.00	416.20	3796.64	343.29	25.00	1652.32	4132.06	485.49	2592.87	2.00	786.99	15888.33
Sunseed	88.05	100.00	1.00	15.00	1301.19	328.79	104.38	0.00	550.55	522.12	285.74	1227.57	13.34	2.91	4540.66

Annex C: Feed demand under various scenarios

Table C-1: Feed demand under various scenarios in the EU-15

	Grandes cultures							Cereals						
	Coupled			Actual		Full		Coupled			Actual		Full	
	2002	2009	2013	2013	change (%)	2013	change (%)	2002	2009	2013	2013	change (%)	2013	change (%)
Austria	3564.4	3673.8	3693.1	3555.5	-3.7	3483.1	-5.7	2730.9	2885.1	2919.4	2860.8	-2.0	2809.9	-3.7
Belg./Lux.	5060.8	4905.4	4902.7	4712.4	-3.9	4668.0	-4.8	3063.2	3010.9	3028.5	3004.4	-0.8	2975.9	-1.7
Denmark	7234.9	7443.5	7508.6	7400.4	-1.4	7402.7	-1.4	6473.5	6715.1	6783.4	6725.2	-0.9	6729.7	-0.8
Finland	2203.6	2493.3	2573.4	2521.8	-2.0	2490.3	-3.2	2045.1	2314.9	2390.8	2343.7	-2.0	2315.2	-3.2
France	37808.4	37989.5	37778.8	36673.2	-2.9	35446.0	-6.2	22537.8	23243.4	23143.4	22972.0	-0.7	22678.1	-2.0
Germany	36062.6	36783.0	36811.5	35121.5	-4.6	35438.3	-3.7	23491.8	24522.3	24641.1	23853.4	-3.2	24009.6	-2.6
Greece	3124.3	3067.1	3027.1	2912.8	-3.8	2910.8	-3.8	3068.7	3013.4	2974.1	2862.0	-3.8	2860.1	-3.8
Ireland	2063.7	1819.0	1773.0	1595.3	-10.0	1622.6	-8.5	1847.2	1620.0	1577.1	1423.1	-9.8	1448.4	-8.2
Italy	17409.9	17827.4	17996.6	16953.7	-5.8	16997.8	-5.6	13636.0	14150.1	14291.4	13664.7	-4.4	13695.9	-4.2
N'lands	7043.9	6905.2	7000.9	6940.9	-0.9	6842.7	-2.3	4523.9	4550.3	4649.2	4643.3	-0.1	4543.3	-2.3
Portugal	3779.5	3647.5	3630.2	3583.6	-1.3	3514.7	-3.2	2498.7	2455.2	2449.6	2422.4	-1.1	2372.8	-3.1
Spain	21409.9	20914.4	20726.9	20567.5	-0.8	20161.0	-2.7	19955.0	19562.9	19405.0	19291.2	-0.6	18943.1	-2.4
Sweden	2788.6	2948.5	2981.3	2784.4	-6.6	2761.1	-7.4	2788.6	2948.5	2981.3	2784.4	-6.6	2761.1	-7.4
UK	11993.3	11726.9	11631.5	10759.8	-7.5	10900.1	-6.3	10822.1	10554.0	10454.2	9739.3	-6.8	9867.7	-5.6
EU-15	161547.9	162144.5	162035.5	156082.9	-3.7	154639.2	-4.6	119482.3	121546.1	121688.2	118589.9	-2.5	118010.7	-3.0

Table C-2: Feed demand under various scenarios in the EU-15, continued

	Oilseeds							Silage maize						
	Coupled			Actual		Full		Coupled			Actual		Full	
	2002	2009	2013	2013	change (%)	2013	change (%)	2002	2009	2013	2013	change (%)	2013	change (%)
Austria	29.8	31.7	32.1	31.0	-3.5	30.2	-6.0	803.7	757.0	741.6	663.6	-10.5	642.9	-13.3
Belg./Lux.	0.0	0.0	0.0	0.0		0.0		1997.6	1894.5	1874.1	1708.0	-8.9	1692.1	-9.7
Denmark	58.1	62.5	64.7	63.9	-1.2	63.9	-1.2	703.4	665.9	660.6	611.3	-7.5	609.2	-7.8
Finland	158.6	178.4	182.6	178.1	-2.5	175.1	-4.1							
France	500.3	534.3	549.3	535.5	-2.5	515.7	-6.1	14770.4	14211.9	14086.1	13165.8	-6.5	12252.1	-13.0
Germany	57.8	62.4	63.3	59.9	-5.4	60.5	-4.5	12513.0	12198.3	12107.1	11208.2	-7.4	11368.3	-6.1
Greece	0.0	0.0	0.0	0.0		0.0		55.7	53.8	53.0	50.8	-4.2	50.7	-4.4
Ireland	24.7	20.9	19.9	16.9	-15.4	17.4	-12.7	191.9	178.1	176.1	155.4	-11.8	156.9	-10.9
Italy	164.5	177.2	181.6	169.4	-6.7	170.7	-6.0	3609.5	3500.1	3523.7	3119.7	-11.5	3131.2	-11.1
N'lands	151.2	150.5	164.5	162.1	-1.5	154.1	-6.3	2368.8	2204.3	2187.2	2135.5	-2.4	2145.3	-1.9
Portugal	107.8	106.1	106.5	106.0	-0.4	103.1	-3.2	1172.9	1086.2	1074.1	1055.2	-1.8	1038.8	-3.3
Spain	468.3	467.9	463.1	458.3	-1.0	445.9	-3.7	986.7	883.6	858.8	818.0	-4.8	772.0	-10.1
Sweden	0.0	0.0	0.0	0.0		0.0								
UK	124.1	127.8	128.3	111.6	-13.0	114.3	-11.0	1047.2	1045.2	1049.0	908.9	-13.4	918.2	-12.5
EU-15	1845.0	1919.7	1955.9	1892.7	-3.2	1850.9	-5.4	40220.6	38678.8	38391.4	35600.2	-7.3	34777.6	-9.4

Table C-2: Feed demand under various scenarios in the EU-15, continued

	Grasss							Arable fodder						
	Coupled			Actual		Full		Coupled			Actual		Full	
	2002	2009	2013	2013	change (%)	2013	change (%)	2002	2009	2013	2013	change (%)	2013	change (%)
Austria	5573.4	5771.6	5881.2	6120.7	4.1	6115.0	4.0	1044.3	1037.9	1048.0	1257.4	20.0	1240.8	18.4
Belg./Lux.	3899.6	4013.5	4082.1	4425.6	8.4	4429.8	8.5	1249.2	1176.6	1168.4	1492.6	27.7	1514.3	29.6
Denmark	1041.2	1068.4	1096.3	1227.9	12.0	1228.1	12.0	7528.1	7522.4	7737.5	8929.3	15.4	8902.4	15.1
Finland	58.8	62.5	64.5	74.4	15.3	74.7	15.9	7627.9	8232.5	8598.6	9122.6	6.1	8963.5	4.2
France	46066.1	47167.6	48018.5	51879.2	8.0	52462.5	9.3	32532.2	32158.7	32541.4	37677.5	15.8	38048.6	16.9
Germany	34831.0	35690.0	36247.7	38783.6	7.0	38845.6	7.2	13769.5	13946.7	14157.4	15578.0	10.0	15773.1	11.4
Greece	240.1	239.8	240.8	308.0	27.9	312.3	29.7	4059.8	3953.2	3947.6	3987.5	1.0	4014.3	1.7
Ireland	5576.7	5649.3	5739.5	6159.7	7.3	6164.5	7.4	1517.1	1371.8	1372.7	1664.7	21.3	1681.6	22.5
Italy	6245.3	6511.4	6674.7	7709.7	15.5	7744.7	16.0	24281.7	24776.9	25742.0	26048.5	1.2	26391.3	2.5
N'lands	2953.8	3065.4	3142.3	3341.0	6.3	3336.6	6.2	930.0	911.7	935.1	1269.4	35.7	1336.0	42.9
Portugal	186.6	185.9	185.8	207.9	11.9	213.9	15.1	270.0	269.0	269.0	272.2	1.2	272.1	1.2
Spain	7827.3	7708.1	7729.9	8819.6	14.1	9023.7	16.7	10338.0	9598.7	9568.4	9767.3	2.1	9451.0	-1.2
Sweden	900.1	941.4	965.3	1107.6	14.7	1109.4	14.9	4222.5	4402.2	4535.9	5671.4	25.0	5692.8	25.5
UK	5474.8	5698.7	5823.3	6417.5	10.2	6418.7	10.2	9336.4	9426.8	9589.1	10532.3	9.8	10660.8	11.2
EU-15	120874.7	123773.3	125891.9	136582.4	8.5	137479.5	9.2	118706.6	118785.0	121211.0	133270.6	9.9	133942.6	10.5

Table C-3: Feed demand under various scenarios in the NMS

	Grandes cultures											
	Actual				Full				No top ups			
	2002	2007	2010	2013	2010	chg. (%)	2013	chg. (%)	2010	chg. (%)	2013	chg. (%)
Latvia	553.0	667.5	670.0	687.0	673.9	0.6	685.4	-0.2	667.2	-0.4	687.3	0.0
Romania	9893.6	9378.5	10251.3	10716.4	10263.2	0.1	10742.2	0.2	10216.6	-0.3	10691.1	-0.2
Slovenia	910.3	919.0	963.1	984.5	927.2	-3.7	951.4	-3.4	948.5	-1.5	985.0	0.0
Lithuania	1513.8	1680.9	1619.9	1606.7	1619.6	0.0	1586.1	-1.3	1611.7	-0.5	1607.3	0.0
Bulgaria	2704.3	2939.5	3118.5	3253.6	3115.1	-0.1	3255.8	0.1	3088.7	-1.0	3229.3	-0.7
Poland	18441.2	20795.8	21397.4	22254.5	21543.7	0.7	22353.6	0.4	21389.7	0.0	22262.5	0.0
Hungary	6542.8	6460.5	6912.8	7310.2	6897.9	-0.2	7247.4	-0.9	6885.0	-0.4	7312.8	0.0
Czech Rep.	5883.7	5685.0	5735.5	5873.3	5709.6	-0.5	5763.7	-1.9	5689.5	-0.8	5874.2	0.0
Slovakia	2060.0	1946.5	2002.2	2083.9	2004.7	0.1	2067.9	-0.8	1990.5	-0.6	2084.3	0.0
Estonia	535.1	674.4	670.2	676.3	666.5	-0.5	664.1	-1.8	665.0	-0.8	676.5	0.0
NMS	49037.7	51147.4	53340.7	55446.5	53421.5	0.2	55317.6	-0.2	53152.2	-0.4	55410.1	-0.1
	Cereals											
	Actual				Full				No top ups			
	2002	2007	2010	2013	2010	chg. (%)	2013	chg. (%)	2010	chg. (%)	2013	chg. (%)
Latvia	546.3	659.0	661.2	677.8	665.1	0.6	676.2	-0.2	658.5	-0.4	678.0	0.0
Romania	9770.8	9237.0	10100.3	10557.5	10109.8	0.1	10581.0	0.2	10067.5	-0.3	10533.5	-0.2
Slovenia	674.8	653.7	679.9	685.1	657.5	-3.3	665.6	-2.8	671.5	-1.2	685.5	0.1
Lithuania	1460.7	1617.3	1555.5	1539.0	1556.0	0.0	1520.6	-1.2	1548.1	-0.5	1539.6	0.0
Bulgaria	2464.5	2625.2	2787.2	2905.2	2780.9	-0.2	2904.3	0.0	2763.0	-0.9	2885.4	-0.7
Poland	16518.5	18443.8	18961.5	19676.0	19088.7	0.7	19773.6	0.5	18958.6	0.0	19683.7	0.0
Hungary	5858.6	5647.5	6078.7	6398.1	6057.4	-0.4	6359.7	-0.6	6069.6	-0.1	6400.4	0.0
Czech Rep.	4108.0	3864.5	3936.3	3994.9	3927.8	-0.2	3974.3	-0.5	3927.9	-0.2	3995.5	0.0
Slovakia	1478.5	1314.2	1365.2	1411.6	1364.7	0.0	1409.2	-0.2	1363.6	-0.1	1411.8	0.0
Estonia	533.4	672.4	668.3	674.3	664.6	-0.5	662.2	-1.8	663.1	-0.8	674.4	0.0
NMS	43414.1	44734.6	46794.2	48519.3	46872.4	0.2	48526.7	0.0	46691.5	-0.2	48487.8	-0.1

Table C-4: Feed demand under various scenarios in the NMS, continued

	Oilseeds											
	Actual				Full				No top ups			
	2002	2007	2010	2013	2010	chg. (%)	2013	chg. (%)	2010	chg. (%)	2013	chg. (%)
Latvia	0.6	0.7	0.7	0.7	0.7	0.0	0.7	0.0	0.7	-1.5	0.7	0.0
Romania	0.0	0.0	0.0	0.0	0.0		0.0		0.0		0.0	
Slovenia	1.5	1.3	1.3	1.3	1.2	-6.9	1.3	-6.0	1.3	-2.3	1.3	0.0
Lithuania	0.1	0.2	0.1	0.1	0.1	0.0	0.1	-7.1	0.1	0.0	0.1	0.0
Bulgaria	0.6	0.7	0.7	0.8	0.7	-1.4	0.8	0.0	0.7	-2.7	0.8	-1.3
Poland	2.0	2.2	2.2	2.2	2.2	0.9	2.3	0.9	2.2	0.0	2.2	0.0
Hungary	25.7	21.5	21.9	22.6	21.6	-1.3	22.1	-2.3	21.7	-0.7	22.6	0.0
Czech Rep.	9.2	5.6	5.5	5.7	5.5	-1.3	5.6	-2.1	5.5	-0.7	5.7	0.0
Slovakia	0.0	0.0	0.0	0.0	0.0		0.0		0.0		0.0	
Estonia	0.0	0.0	0.0	0.0	0.0		0.0		0.0		0.0	
NMS	39.7	32.1	32.4	33.4	32.0	-1.3	32.7	-2.1	32.2	-0.8	33.4	0.0

	Silage maize											
	Actual				Full				No top ups			
	2002	2007	2010	2013	2010	chg. (%)	2013	chg. (%)	2010	chg. (%)	2013	chg. (%)
Latvia	6.1	7.8	8.1	8.6	8.1	0.2	8.5	-1.2	8.0	-0.9	8.6	0.0
Romania	122.8	141.6	151.0	158.9	153.4	1.6	161.1	1.4	149.1	-1.3	157.6	-0.9
Slovenia	234.0	263.9	281.9	298.1	268.5	-4.8	284.6	-4.5	275.6	-2.2	298.2	0.0
Lithuania	53.0	63.4	64.2	67.6	63.5	-1.0	65.4	-3.3	63.4	-1.2	67.6	0.0
Bulgaria	239.2	313.6	330.5	347.7	333.4	0.9	350.7	0.9	324.9	-1.7	343.2	-1.3
Poland	1920.7	2349.9	2433.7	2576.3	2452.8	0.8	2577.7	0.1	2428.9	-0.2	2576.6	0.0
Hungary	658.5	791.4	812.2	889.5	819.0	0.8	865.7	-2.7	793.7	-2.3	889.8	0.0
Czech Rep.	1766.4	1814.9	1793.6	1872.8	1776.4	-1.0	1783.9	-4.7	1756.1	-2.1	1873.1	0.0
Slovakia	581.5	632.3	637.0	672.3	640.0	0.5	658.7	-2.0	626.9	-1.6	672.5	0.0
Estonia	1.7	1.9	1.9	2.0	1.9	-1.5	1.9	-3.5	1.9	-1.0	2.0	0.0
NMS	5583.9	6380.7	6514.0	6893.7	6517.1	0.0	6758.1	-2.0	6428.6	-1.3	6889.0	-0.1

Table C-5: Feed demand under various scenarios in the NMS, continued

	Grasss											
	Actual				Full				No top ups			
	2002	2007	2010	2013	2010	chg. (%)	2013	chg. (%)	2010	chg. (%)	2013	chg. (%)
Latvia	1323.5	1500.1	1522.4	1561.9	1535.3	0.8	1572.2	0.7	1521.9	0.0	1562.1	0.0
Romania	8975.5	9784.1	10162.3	10481.5	10227.7	0.6	10540.6	0.6	10156.2	-0.1	10477.1	0.0
Slovenia	839.2	903.1	941.7	977.7	960.9	2.0	985.7	0.8	937.3	-0.5	977.9	0.0
Lithuania	757.3	834.0	846.9	860.5	851.9	0.6	865.6	0.6	847.9	0.1	860.6	0.0
Bulgaria	2936.2	3457.4	3537.0	3606.1	3564.0	0.8	3626.1	0.6	3527.6	-0.3	3599.9	-0.2
Poland	10717.9	11751.5	12001.1	12231.7	12181.1	1.5	12412.9	1.5	12040.3	0.3	12233.0	0.0
Hungary	1924.4	2189.1	2271.1	2350.3	2289.7	0.8	2362.1	0.5	2275.6	0.2	2350.7	0.0
Czech Rep.	2190.4	2387.0	2470.2	2536.7	2487.5	0.7	2562.7	1.0	2476.7	0.3	2536.8	0.0
Slovakia	1649.6	1808.4	1866.6	1933.3	1899.9	1.8	1961.8	1.5	1870.5	0.2	1933.5	0.0
Estonia	245.6	271.1	276.7	281.1	275.8	-0.3	281.5	0.1	277.0	0.1	281.1	0.0
NMS	31559.5	34885.7	35896.0	36820.8	36273.8	1.1	37171.1	1.0	35930.8	0.1	36812.6	0.0

	Arable fodder											
	Actual				Full				No top ups			
	2002	2007	2010	2013	2010	chg. (%)	2013	chg. (%)	2010	chg. (%)	2013	chg. (%)
Latvia	137.1	166.8	167.0	170.4	168.2	0.7	171.1	0.4	166.3	-0.4	170.5	0.0
Romania	3861.8	4526.2	4798.0	5020.2	4874.5	1.6	5092.7	1.4	4779.1	-0.4	5007.0	-0.3
Slovenia	187.7	196.9	203.5	210.1	207.0	1.7	210.8	0.3	201.0	-1.2	210.2	0.0
Lithuania	2574.7	3031.6	3062.3	3128.6	3186.0	4.0	3182.6	1.7	3058.3	-0.1	3129.0	0.0
Bulgaria	369.5	488.2	507.1	524.9	520.3	2.6	536.9	2.3	502.4	-0.9	521.2	-0.7
Poland	4263.4	5239.4	5369.2	5526.4	5518.0	2.8	5715.2	3.4	5319.9	-0.9	5527.3	0.0
Hungary	2268.2	2929.0	3111.4	3419.3	3348.4	7.6	3651.5	6.8	3114.1	0.1	3420.9	0.0
Czech Rep.	4967.4	5361.0	5486.0	5659.0	5703.8	4.0	5773.0	2.0	5468.3	-0.3	5660.2	0.0
Slovakia	1055.6	1137.7	1157.3	1203.7	1190.7	2.9	1235.0	2.6	1158.0	0.1	1204.1	0.0
Estonia	831.3	993.5	1022.2	1060.9	1058.3	3.5	1075.1	1.3	1019.1	-0.3	1061.0	0.0
NMS	20516.5	24070.3	24883.9	25923.5	25775.1	3.6	26643.8	2.8	24786.5	-0.4	25911.3	0.0