

Decoupling Support in Agriculture

Impacts of redesigning European Agricultural Support

By

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Abstract

The objective of this paper is to discuss the concept of decoupling and to assess the impact at the individual member state level in the European Union and in non-member regions of liberalising domestic support in the EU. Three scenarios are analysed each one of them illustrating the impacts of eliminating or decoupling the European agricultural support.

It is found, that the existing domestic support payments in the EU are indeed coupled to production and hence they affect production decisions and distort international trade with adverse effects on the export potential of e.g. developing countries as a consequence. Furthermore, the value of this support is capitalised in significant higher land prices in Europe than would otherwise prevail.

The scenarios illustrate the economic implications of transforming all domestic support payments (as well as other distorting policies) into a nationally homogenous and fully decoupled payment to all agricultural land, i.e. irrespective of the farmers decision to crop or not. Specifically, the analysis suggest that it is possible to convert the existing agricultural support into a fully decoupled payment which would not distort international trade and it indicates a way forward to offset the negative impact on land prices. Such a policy would also comply with the WTO rules (i.e. fall within the green box as decoupled income support). The analysis also suggest, that such a policy reform could be achieved at somewhat lower budgetary costs as compared with the existing costs of the Common Agricultural Policy.

Keywords: CGE modelling, Common Agricultural Policy, WTO, Domestic Support, GTAP.

JEL classification: D58, F02, F15, Q17 and Q18

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Introduction

The Uruguay Round Agreement on Agriculture (URAA) marked the integration of agriculture into the multilateral trading system governed by WTO rules. The agreement covers the traditional WTO areas of market access and export competition, requiring member countries to reduce tariffs and export subsidies. However, it also contains an innovative feature, as it seeks to discipline the use of domestic support by restricting member countries' use of trade-distorting domestic support policies.

The primary policy instruments in the European Common Agricultural Policy (CAP) are market price support and area and headage payments supplemented by a number of quantitative restrictions. The URAA stipulations on market access, export competition, and domestic support policies commit the EU to reduce its use of market price support. Furthermore, although area and headage payments are not currently subjected to reduction requirements, international pressures for reform of these payments are expected to increase during the upcoming WTO negotiations. It is therefore pertinent to investigate the options for reforming European agricultural support in accordance with the WTO rules.

In this paper three decoupling or liberalisation scenarios are presented with particular attention given the importance of domestic support. We stress, that the results presented are entirely illustrative and the analysis clearly reflects so-called "work in progress" as in particular parts of the database still needs significant adjustments to reflect correctly the importance of domestic support measures as well as the importance of European agriculture in the European Economy.

Background

The inclusion of domestic support into the URAA is a formal recognition of the long-known fact that any domestic policy, which affects production (or consumption) of agricultural commodities, will generally have an effect on the country's international trade in agricultural commodities. Therefore, in order to establish a "fair and market-oriented agricultural trading system" (URAA), it is not enough to deal with the issues of market access and export competition - the issue of coupled domestic support policies (i.e. policies which affects the producer's production decision or the consumer's consumption decision) must also be addressed.

In the URAA domestic support policies are assigned to one of three boxes depending on their impact on international trade. Policies considered to have "no, or at most minimal trade-distorting effects or effects on production" (URAA) are placed in the green box and are not subjected to the requirement that support be reduced. All domestic support policies considered to distort trade are placed in the amber box and subjected to reduction requirements, except for certain distorting policies which are implemented under production limiting programs. These latter policies are placed in the blue box, which exempts them from reduction requirements. One of the major issues in the upcoming negotiations is what will happen to these boxes – should the reduction requirements for amber box policies be tightened, should the blue box policy measures be subjected to some sort of reduction requirements, or should the blue box be scrapped all together by moving these policies into the amber box etc. (WTO 2002).

The issue of what will happen to the three boxes have profound implications for the CAP. Market price support has long been considered the epitome of coupled support, and the provisions of the amber box along with the stipulations on market access and export subsidies seek to limit the use of this policy instrument significantly. The EU reforms of the CAP, which started with the MacSharry reform in 1992 and continued in Agenda 2000, have replaced some of the market price support with area and headage payments, which are less coupled and hence cause less distortions of international

trade. However, the area and headage payments are not decoupled and do not qualify for the green box. Instead they are declared as blue box payments at present (Beard and Swinbank 2001).

The blue box is currently a permanent provision of the agreement, and it can only be removed through negotiation. However, blue box policies are protected from challenge by the so-called “Peace Clause” (cf. article 13 of URAA), and it expires at the end of 2003. If the Peace Clause is not extended, other countries will have greater opportunity to take action against the EU area payments and headage payments, even if the box remains in place. And the blue box may not remain in place, as a number of developed and developing countries are proposing to get rid of the box and move the current blue box policies into the amber box. At the same time, there are also proposals to tighten the reduction requirements for amber box policies, and some countries even want amber box subsidies to eventually be eliminated (WTO 2002). The EU is thus under pressure not only to reduce or eliminate its use of market price support, but also to reduce or reform its use of area and headage payments. This paper will explore the consequences of reforming the CAP by replacing these policies with fully decoupled area payments, which would be permitted under the green box.

Green box policies are often referred to as “decoupled” policies, but although the notion of “no, or at most minimal, trade-distorting effects or effects on production” is clearly related to the concept of decoupling, it should be noted that the green box also encompass some policies which typically will not be fully decoupled and probably should not be evaluated in reference to the decoupling criteria.² In fact, in the URAA the term decoupled is only used in connection with one policy – the type of green box direct payments to producers dubbed “decoupled income support”. The URAA defines “decoupled income support” in the following way (URAA Annex 2)³:

- (a) *Eligibility 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.*

² The issue is whether the rationale for the policy is market failure correction or income redistribution. Certain market failure correcting policies neither can nor should be decoupled, since they aim to influence the farmer’s production decision. However, if the rationale for the policy is purely income redistribution, the policy should be designed in accordance with the criteria for decoupling.

³ In order to qualify for inclusion in the green box under the heading of “decoupled income support” the policy must also comply with the fundamental green box requirement of having “no, or at most minimal, trade-distorting effects or effects on production” and (URAA 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; and*
- (b) *the support in question shall not have the effect of providing price support to producers*

This URAA definition of decoupling is clearly very application-oriented in that it is basically a checklist of requirements that a policy must fulfil in order to be considered decoupled. However, although these requirements capture the core implications of the concept of decoupling, they do not fully reflect the economic meaning of the concept. Some additional theoretical analysis is therefore given below.

Decoupling: concept and theory

In a recent paper OECD explores the concept of decoupling and offers two possible definitions of the term: “effective full decoupling” and “full decoupling (in the restrictive sense)”. A policy is effectively fully decoupled if (OECD 2001a):

it results in a level of production and trade equal to what would have occurred if the policy were not in place... The shape of the supply or demand curves could be changed by an effectively decoupled policy, even if the equilibrium production and consumption are not changed.

On the other hand, a policy is fully decoupled in the restrictive sense if (OECD 2001a):

it “does not influence production decisions of farmers receiving payments, and if it permits free market determination of prices”. That is, full decoupling is a very restrictive concept that requires no change in the way farmers and consumers take decisions... After the introduction of a fully decoupled policy, both the shape and the position of the supply and demand curves should not be changed.

The important difference between these two concepts is that while effective decoupling is a concept that focuses on equilibrium quantities, decoupling in the restrictive sense also considers the adjustment process. Thus for a policy to be fully decoupled in the restrictive sense not only do equilibrium quantities have to remain unchanged, but the market must also respond to exogenous shocks as it would if the policy were not in place (OECD 2001a). However, although the concept of decoupling in the restrictive sense may be the most theoretically appropriate concept, it is also very difficult to operationalise this concept. Therefore, empirical studies typically rely on the less restrictive concept of effective decoupling, and this is also the concept that the present paper will employ.

Comparing the two definitions of decoupling offered by OECD to the definition in URAA, one difference that immediately stands out is that the URAA defines decoupling in terms of policy design, whereas the other two definitions define decoupling in terms of policy effects. Policy design and policy effects are obviously intimately connected, but there is not always a one-to-one correspondence, as the same policy may result in different effects when implemented in different locations (cf. Gohin et al 1999). As it is the policy’s effect on production and trade that matters rather than the policy design per se, this raises questions as to whether the URAA requirements will always be appropriate for determining whether a policy is decoupled in the true economic sense of the word.

When exploring the concept of decoupling theoretically, it is convenient to distinguish between decoupling from production and decoupling from trade. Decoupling from production refers to the notion of breaking the link between agricultural policies and the farmer’s production decision. To move from “decoupling from production” to “decoupling from trade” it is necessary to also include the policy’s effect on consumption and stockholding (OECD 2001a). Market price support is of course the classic example of a policy that affects both production and consumption by increasing

both the price received by the producer and the price paid by the consumer. Designing policies to be decoupled from trade thus requires attention to the policy's effect on the farmer's production decision as well as its effect on the consumer's consumption decision.

In order to design agricultural policies that are decoupled from production, it is necessary to understand the mechanisms through which agricultural policies may affect the farmer's production decision. The primary mechanism for a policy to affect the farmer's production decision is for the policy to affect the relative prices the farmer faces, be they market prices or shadow prices. Policies may change relative prices directly by subsidizing or taxing certain factors or commodities (e.g. area and headage payments), or they may change relative prices indirectly by altering regulations or market conditions, which in turn induces changes in market or shadow prices (e.g. market price support). As changing the price pertaining to the production of a particular commodity changes the relative profitability of producing this commodity, policies targeting a subset of commodities will generally produce *cross-commodity effects* affecting the production of the other commodities the farmer could produce.

The magnitude of these effects will depend on the design and coverage of the policy package as well as on the characteristics of production. A policy package that covers a wide array of commodities may well have smaller cross-commodity effects than a policy, which only targets one commodity.⁴ However, the magnitude of the cross-commodity effects induced by the policy will ultimately depend on production characteristics such as input mobility. If inputs are perfectly mobile across commodities, then a uniform policy covering all commodities (e.g. uniform area payments applied to all possible uses of agricultural land) would not generate any cross-commodity effects (and if total amount of agricultural land is fixed, such a policy of uniform area payments would also not generate any production effects). However, if inputs are not perfectly mobile across commodities, then a uniform policy covering all commodities may still induce cross-commodity effects (this would be the case, if uniform area payments are implemented in a situation where land is not perfectly mobile across commodities) (cf. OECD 2001a and Gohin et al 1999).

While a large number of agricultural policies work through the price mechanism to affect the quantity of output and/or input, other policies target these quantities directly. Typical examples of such policies would be quantity constraints on output or input use. Such policies may be introduced to offset the production effect of non-decoupled policies. By introducing a quantity constraint, the policy package may become effectively decoupled, although it is highly unlikely that it will also be decoupled in the restrictive sense. This issue of combining policy instruments as well as the issue of policies targeting one commodity affecting the production of other commodities highlights an important point for policy evaluation. As it is the aggregate effects that matter, policy evaluation should also focus on the aggregate effects of the policy package rather than only on the effects of the individual instruments. Furthermore the evaluation should not be limited to the commodities targeted in the policy package but should be extended to also include non-targeted commodities that may be effected through cross-commodity effects. Relating the former point to the URAA definition

⁴ Of course the aggregate supply response will depend on the elasticity of input supply and changes in technology. If all inputs are in fixed supply and no changes in technology occur, this will temper the overall supply response to a change in policy, as the farmers will only be able to use existing resources and existing technologies. However, if input supply is very flexible (or if new efficiency enhancing technologies become available), then the aggregate supply response to the policy package, which covers all commodities in a homogenous fashion, may be a large increase in output quantities, even if the relative resource allocation *within* the sector is largely unchanged (i.e. even if the cross-commodity effects are very small).

of decoupling, it becomes clear that one of the problems with the URAA definition is that it does not allow for several policy instruments to be evaluated as one policy package. Instead each policy instrument must be evaluated individually (cf. Gohin et al 1999)⁵.

The effects discussed so far can all be modelled and evaluated in a static and deterministic framework. However, agricultural policies may affect the farmer's production decision through other channels relating specifically to the dynamic dimension or the presence of uncertainty. Starting with the former, farmers do not merely make decisions pertaining to current production, they also need to make decisions about future production and what investments to undertake. Statically coupled support will always affect the farmer's investment decision, since it affects his production decision. Statically decoupled support, on the other hand, will not affect the farmer's investment decision if markets are perfect. However, if capital markets are imperfect, even decoupled income support will affect the farmer's investment decision as the market imperfection results in a breakdown of separability between the farmer's production and consumption decision (cf. OECD 2001a).

Through the investment mechanism, current policies can affect future production. However, through the expectation mechanism, future policies can affect current production. This will be the case, if the farmer's current production affects the policy payments he will receive in the future, either because the policy is explicitly designed this way, or because the farmer expects the government to change the policy so that current production will become the determining factor for future payments (OECD 2001a).⁶ In either of these cases, farmers will generally have an incentive to retain more resources in agricultural use and possibly produce more than justified by current market conditions.

Moving on to the issue of uncertainty, agricultural production is generally characterized by a high degree of uncertainty, and this suggests some additional channels through which agricultural policies may affect the farmer's production decision. If farmers are risk averse, and market failure results in a breakdown of separability between the farmers production and consumption decision, then risk aversion will affect the farmer's production decision. Agricultural policies may either mitigate the farmer's response to risk or reduce the amount of risk the farmer faces. The former will be the case, if policy payments increase the farmer's wealth, provided the farmer's preferences exhibit decreasing absolute risk aversion (DARA). Even lump-sum income support payments, which would be fully decoupled in a static deterministic world, may thus induce the farmer to produce more, if he is risk averse and has DARA preferences. On the other hand, policies can reduce the amount of risk faced by the farmer, if policy payments partially (or fully) offset the fluctuations in prices (OECD 2001a). However, this kind of policy may be market failure correcting rather than income redistributing, and as such it may not be appropriate to evaluate it based on the decoupling criteria.

Empirical studies on decoupling of agricultural policies often focus on the relative price effects, which can be analysed in a static deterministic framework. As the preceding discussion has shown,

⁵ A combination of a coupled payment and a quantity constraint that achieves an effectively decoupled outcome will thus not qualify for the green box under the heading "decoupled income support". However, this policy may well qualify for the blue box, which would at present exempt it from the requirements to reduce domestic support.

⁶ This would for instance be the case, if farmers expect the government to update the base year used for determining the amount of support each farmer receives. This problem is explicitly dealt with in the URAA, as green box decoupled income support payments may not be based on "output, prices or factors used in any year after a fixed base year" (OECD 2001).

taking dynamic aspects and uncertainty into consideration suggests additional channels through which agricultural policies may affect the farmer's production decision. These effects should be kept in mind when designing policies to be decoupled from production, and it should also be considered how the presence of these effects might skew the results of empirical studies using a static, deterministic framework. It is therefore important to obtain estimates of the relative magnitudes of these effects. However, OECD suggests "it seems reasonable to postulate that the static relative price effects are more significant for assessing the effective degree of decoupling and that the effects associated with risk and dynamics are more likely to be significant for assessing the degree of responsiveness with respect to external shocks and market signals (full decoupling in the restrictive sense)" (OECD 2001a). As this paper will focus on the issue of effective decoupling, the analysis will be restricted to considering relative price effects in a static, deterministic world.

European Agricultural Support – in short

Up until 1992 market price support was the primary policy instrument of the European Common Agricultural Policy. However, in response to the Uruguay Round negotiations, the EU implemented the so-called McSharry reform in 1993. The reform entailed a reduction of the guaranteed prices for a number of commodities while compensating farmers for the price cuts by introducing direct payments to producers in the form of area payments and headage payments (Walter-Jørgensen and Jensen 2001). The latest CAP reform, Agenda 2000, extends and deepens the McSharry reform for several commodities by further reducing the intervention prices and partially compensating farmers for these price cuts by increasing area and headage payments for the affected commodities (OECD 2001b). A new direct subsidy to milk production was also introduced.

EU area payments.

Under the EU area payment scheme, farmers can request area payments for land used for cereals, oilseed, and protein crops (COP). The farmer, who wishes to receive area payments, has to choose between two schemes: the simplified scheme and the general scheme. Under the simplified scheme, the farmers may not request payments for an area exceeding what corresponds to 92t cereals in his yield region. He is not obliged to set aside land, and he receives a non crop-specific payment corresponding to the cereal payment for all the eligible COP areas. Under the general scheme, the farmer is obliged to set aside a certain percentage of his declared area, and he receives crop-specific payments for the land he is farming, plus compensatory payments for the land he is setting aside. The total area, on which COP area payments are payable, is fixed on a Member State basis. In case of the planted area being expanded beyond the defined base area, there will be a proportionate reduction in the payment per hectare. However, overshooting of the national base areas has been small (Walter-Jørgensen and Jensen 2001).

From this description it is clear, why the current EU area payments are not likely to be decoupled from production. These payments are directly linked to the current use of land inducing the farmer to farm more land than he otherwise would. Although the area payment scheme strictly speaking only requires the farmer to sow, and not necessarily to harvest, it still distorts his production decision. The initial decision to sow will depend on the profitability of producing the particular crop, taking the area payment into consideration, while the ultimate decision on whether to harvest will only depend on the cost of harvesting and not the total cost of sowing and harvesting. In theory a set aside requirement could limit production just enough to ensure effective decoupling, but this would probably be quite difficult to implement in reality. Furthermore, since the area payments differ across commodities, they will distort the output mix. Under Agenda 2000, the area payment for

oilseed is scheduled to be reduced to align it with the area payment for cereals and the set aside compensatory payment (OECD 2001b). However, as long as area payments are not identical for all uses of agricultural land, the area payment scheme will continue to distort the farmer's production decision.

Comparing these issues to the green box criteria for decoupled income support, it becomes clear that the current EU area payments violate most of these criteria, as they depend on current factor use and type of production, and the farmer is required to sow to receive the payments. Furthermore, the payments also violate the eligibility criterion, as these payments are presently available to all current and future farmers.

EU headage payments

Under the headage payment schemes, farmers can request payments for bovine animals, sheep, and goats. The production of beef and veal is subject to several direct support programs, which are linked to production (special premium, suckler cow premium, slaughter premium, and additional payments), as well as some direct support programs, which are aimed at leveling seasonal variation in slaughtering or extensification of production (Walter-Jørgensen and Jensen 2001). There are regional ceilings for the number of animals, on which the special premiums are payable. There are also national ceilings on the number of animals, on which the suckler cow premium are payable, but here the claims are limited by a quota mechanism, and quota rights are tradable (Beard and Swinbank 2001 and European Commission 2001). Slaughter premiums are also subjected to national ceilings (European Commission 2001).

Producers of sheep may request a premium per head of ewe "based on a politically determined basis price for meat of sheep in the internal market", and producers of goat meat in less-favored areas are also granted support under a similar system (Walter-Jørgensen and Jensen 2001).

From this description it is clear that the various payments are directly linked to production, which would generally induce the farmers to increase production. However, the national or regional ceilings in the premium schemes serve to limit the supply response.

Adjusting the standard model and database

Adjusting the standard model

The base GTAP model is a standard multi-regional, static computable general equilibrium (CGE) model. Regional production is produced according to a constant return to scale technology in a perfectly competitive environment, and the private demand system is represented by a non-homothetic demand system (a Constant Difference Elasticity function)⁷. The foreign trade structure is characterised by the Armington assumption implying imperfect substitutability between domestic and foreign goods, cf. Hertel (1998).

In order to analyse the impacts of reforming the Common Agricultural Policy, i.e. decoupling the agricultural support, it is important to capture the key institutional features of CAP (the instruments) and the more recent reform of the CAP (Agenda 2000). We have therefore explicitly modelled the following features of the CAP, cf. Bach, Frandsen and Jensen (2000):

⁷ Hence, the present analysis abstracts from features such as imperfect competition and increasing return to scale, which may however be important in certain sectors.

- Direct payments to arable land and livestock, together with set-aside requirements and base area restrictions
- Budgetary limits on the total amount allocated to land and livestock according to the institutional rules of the Common Agricultural Policy
- Milk and sugar quotas⁸
- The European Union agricultural budget and the important effects of inter-regional transfers between member states.

Adjusting the data

In this paper the point of departure is version 5 of the GTAP database, cf. Dimaranan and McDougall (2002). This implies that all 15 members of the EU are explicitly represented in the database, including the important transformation of the OECD Producer Subsidy Estimates to the GTAP level of aggregation plus a full disaggregation of the EU-15 aggregate of domestic support to the individual EU member country level, cf. the discussion in Frandsen, Jensen og Yu (2001).

A number of important adjustments have been made to the standard database to allow a more precise representation of the CAP instruments and the level of domestic support. First, the GTAP database is updated to allow for the recent adjustments as reported by the OECD secretariat, i.e. the level of domestic support reflects the 1998-PSE numbers as reported in the OECD PSE edition 2001. Second, the database is adjusted to include all domestic support reported by the OECD's PSE tables (the standard GTAP database does not include domestic support for vegetables, fruits and nuts, plant based fibers and other crops). Third, hectare premiums given to silage crops in the EU, being included as an intermediate input subsidy, are moved to input subsidies to land and male animal premiums are moved from capital input subsidies to output subsidies. Fourth, the database has been adjusted to reflect the quota rents associated with the EU milk and sugar quota regimes. The data incorporated are based on two recent studies undertaken by Frandsen et al (2001) and SLI (2002). Finally, the common agricultural budget has been explicitly represented in the database (the 1998/99 budget) at the member state level, including the contribution of the individual member states to the financing of the agricultural expenditures.

Experimental design

Before analysing the impacts of reforming the Common Agricultural Policy, a baseline for the period 1997-2013 is constructed⁹. The baseline provides a benchmark against which alternative scenarios can be compared. It features projections of the world economy, plus incorporation of policy changes and the effects of changes in the CAP as outlined in the Agenda 2000 reform. In terms of results from the baseline it is decided to present only a few important characteristics, including the resulting level of market price support and domestic support – the support measures being eliminated in the following three scenarios.

⁸ In this study the representation of the EU sugar policy is rudimentary and not as detailed as in Frandsen et al (2001). The results for the production of sugar should therefore be considered with great care. Similar considerations relates to the dairy sector.

⁹ The model is solved using GEMPACK (Harrison and Pearson, 1996).

Scenario 1: Elimination of domestic agricultural support in the EU, that is a complete elimination of all domestic support given to European agriculture, i.e. all output subsidies, intermediate input subsidies, land-based payment and capital-based payment are phased out. The requirement to set-aside is also eliminated. The budgetary savings are reflected in a lower common contribution rate to the financing of the EU CAP budget.

Scenario 2a: Decoupling domestic agricultural support in the EU, that is all existing domestic support measures in each of the 15 EU member countries are converted into a region specific homogenous payment to land. All distorting payments are therefore converted into a land subsidy given irrespective of the use of the pre-defined and fixed agricultural area. The requirement to set-aside is again eliminated. The budgetary costs of the domestic support correspond to the costs prior to the change in the policy, i.e. no change in the common contribution rate.

Scenario 2b: Elimination of the homogenous and decoupled payment to land in the EU, that is the land subsidy defined in scenario 2a is now removed. The budgetary savings are reflected in a lower common contribution rate financing the EU CAP budget.

Scenario 3: WTO reform scenario, that is all export subsidies and all domestic support measures are eliminated. Market access is improved by reducing tariff barriers by 30 percent. To compensate the owners of agricultural land for the significant capital loss in terms of lower land prices, a region specific homogenous payment to land is introduced. The payment exactly offset the negative impact on land prices in each of the member states. Again the payment is given irrespective of the farmer's decision to crop or not.

The design of the scenarios are illustrated in figure 1.

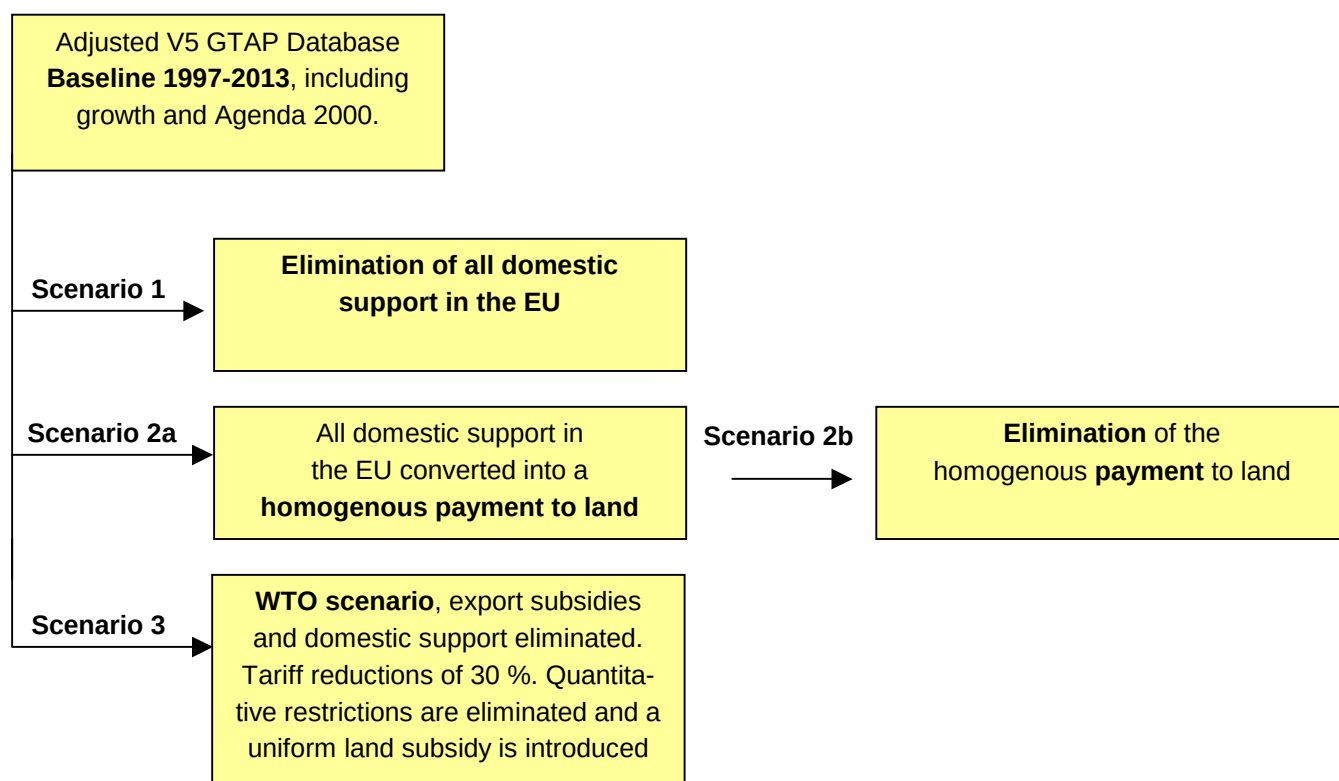
Quantitative description of the scenarios

For all the scenarios described above the analysis is undertaken in the year 2013 in a world shaped by the baseline scenario.¹⁰

The border protection and domestic support levels in the EU are shown in Table 1 for the beginning (1997) and the end of the baseline period (2013). Import protection in the European Union for rice, wheat, other grains, bovine meat products, and sugar and dairy products is relatively high in both 1997 and 2013. In 2013 only rice, other grains, and in particular sugar receive noteworthy export subsidies. According to the post Agenda 2000 simulation, the export subsidies to bovine meats and dairy products amounts to 1.7 and 5.6 percent.

¹⁰ The macroeconomic closure used is a neo-classical closure where investments are endogenous and adjust to accommodate any changes in savings. This approach is adopted at the global level and investments are then allocated across regions to equalise the marginal rate of return in all regions. Although global investments and savings must be equal, this does not apply at the regional level, where the trade balance is endogenously determined as the difference between regional savings and regional investments. This is valid as regional savings enter the regional utility function. The numéraire used in the model is a price index as suggested by de Melo and Robinson (1989) and de Melo and Tarr (1992), namely the global primary factor price index.

FIGURE 1. Experimental design



In a number of cases the database reflects significant domestic support measures in primary agriculture. In the case of wheat, the domestic support measures amount to 66 and 69 percent of the value of the domestic wheat production in 1997 and 2013, respectively. The changes from 1997 to 2013 reflects both the implementation of the Agenda 2000 reform and the deflation of the nominally fixed direct payments by 2 percent per annum.

In table 2 below, the aggregate power of domestic support for EU-15 is shown. The power of support equals 1 plus the ratio of total value of the payment (the sum of the value of output subsidies, intermediate input subsidies, land-based payments and capital-based payments) over the value of production. The total value of direct payments in the European Union amount to 38.3 billion EURO in 1998 or approximately 18 percent of the total value of agricultural production of which for example 7.7 billion EURO relates to the support of wheat production.

Table 3 shows the distribution of domestic support on member states. The value of domestic support to wheat producers in France amounts to 2.2 billion EURO or 48.7 percent of the French total value of wheat production, which is somewhat lower than the average EU level of domestic support for wheat. About 96 percent of these payments are area-based payments. In total, France receive almost 30 percent of the total amount spent on domestic support for the production of wheat in the EU. Germany receives another 20 percent of the total support given to wheat producers in the European Union.

TABLE 1. Protection and domestic support , EU-15, 1997 and 2013, percent

	Import tariff equivalent		Export subsidies		Domestic support	
	1997	2013	1997	2013	1997	2013
Paddy rice	64.9	64.9	13.8	13.8	12.4	8.0
Wheat	61.4	61.4	9.1	0.0	65.7	68.6
Other grains	38.6	38.6	34.2	14.1	60.3	66.2
Vegetables, fruit, nuts	14.5	14.5	0.8	0.8	3.6	3.3
Oilseeds	0.0	0.0	0	0.0	52.6	28.7
Sugar cane and beet	251.4	251.4	0	0.0	6.6	5.8
Plant based fibers	0.0	0.0	0	0.0	65.7	45.8
Other crops	3.1	3.1	0.4	0.4	7.8	6.8
Bovine animals	36.6	36.6	0	0.0	54.2	85.6
Other animal products	6.7	6.7	0	0.0	4.2	4.3
Raw milk	0.0	0.0	0	0.0	5.2	15.5
Wool	0.0	0.0	0	0.0	0.0	0.0
Fish	3.6	3.6	0	0.0	0	0
Resource extraction	0.0	0.0	0	0.0	0	0
Bovine meat products	88.9	88.9	27.1	1.7	0	0
Other meat products	30.9	30.9	4.2	4.2	0	0
Vegetable oils and fats	11.4	11.4	0.1	0.1	0	0
Dairy products	87.7	87.7	24.2	5.6	0	0
Processed rice	87.4	87.4	13.8	13.8	0	0
Sugar	76.4	76.4	54.4	54.4	0	0
Other processed foods	28.8	28.8	4.5	4.5	0	0
Beverages and tobacco	8.3	8.3	0	0.0	0	0
Textiles/wearing apparel	10.2	10.2	0	0.0	0	0
Wood/paper products	2.4	2.4	0	0.0	0	0
Petro/chemicals/minerals	3.2	3.2	0	0.0	0	0
Manufactures	3.7	3.7	0	0.0	0	0
Utilities	0.0	0.0	0	0.0	0	0
Transport	0.0	0.0	0	0.0	0	0
Services	0.0	0.0	0	0.0	0	0

Source: GTAP version 5 database, OECD PSE tables and own calculations.

TABLE 2 The aggregate power of domestic support, EU-15, 1998, million EURO

GTAP item	Total	Wheat	Rice	Course grains	Oilseeds	Sugar (refined)	Milk	Beef & sheep	Other meat	Wool	Miscellaneous
Value of production (1)	213534	12347	754	10684	3801	4917	33904	22072	32370	0	92685
Value of payments (2)	38349	7651	111	6187	2564	304	1834	10954	1367	0	7377
of which (in percent)											
Output subsidy	14.49	-0.23	-0.33	-0.19	-0.20	-3.15	-3.13	13.04	-7.80	0.00	58.77
Intermediate input subsidy	5.54	2.75	11.66	2.87	2.62	21.78	6.39	0.65	39.82	0.00	11.60
Land-based payment	51.72	95.26	80.00	94.96	95.68	63.25	58.23	14.66	16.15	0.00	14.10
Capital-based payment	28.26	2.22	8.67	2.35	1.90	18.12	38.50	71.65	51.83	0.00	15.52
Power of domestic support ((1+2)/1)	1.180	1.620	1.147	1.579	1.674	1.062	1.054	1.496	1.042	1.000	1.080

TABLE 3. Domestic support for wheat, EU-15 and at member state level, 1998, million EURO

	EU15	BEL	DK	GER	GRE	SPA	FRA	IRE	ITALY	LUX	NETH	AUS	POR	FIN	SWE	UK
Value of production (1)	12347	202	561	2303	294	688	4627	77	1221	7	122	157	18	45	261	1763
Value of payments (2)	7651	82	277	1642	373	574	2252	42	923	3	133	129	71	53	167	930
of which (in percent)																
Output subsidy	-0.232	-0.129	-0.221	-0.473	0.000	-0.134	-0.192	-0.166	-0.004	-0.190	-0.679	-0.382	-0.476	-0.570	-0.361	-0.152
Intermediate input subsidy	2.750	1.528	2.624	5.610	-0.004	1.589	2.274	1.971	0.049	2.255	8.060	4.530	5.653	6.764	4.279	1.808
Land-based payment	95.26	97.36	95.48	90.33	100.00	97.26	96.08	96.66	99.916	96.11	86.12	92.19	90.26	88.35	92.63	96.88
Capital-based payment	2.218	1.233	2.116	4.524	-0.003	1.281	1.834	1.589	0.039	1.819	6.499	3.653	4.559	5.455	3.450	1.458
Power of dom. support ((1+2)/1)	1.620	1.408	1.494	1.713	2.268	1.834	1.487	1.545	1.756	1.403	2.093	1.824	4.924	2.168	1.643	1.527

Finally, it is evident from Table 4 that the importance of the domestic agricultural support varies significantly across the agricultural commodities as well as across the individual EU member countries. The variations across the commodities reflects the different policy regimes for the different agricultural commodities – some commodities being highly dependant on border protection, e.g. sugar and dairy products, while others are more dependant on the direct support payments, e.g. grains, oilseeds and plant-based fibers.

The variations across the member countries for a given commodity reflects a number of different national characteristics, including differences in the historical reference yields and eligible hectares for the major crops, the actual harvested area and yields in 1997, as well as different crops and animals being produced in different regions (compositional effects). For a detailed description of the methods used in disaggregating the EU-15 power of support across the agricultural commodities at the EU member country level, see Frandsen, Jensen and Yu (2001).

This structure of domestic support is replicated in the data after undertaking the baseline simulation, including the introduction of the full Agenda 2000 reform and an implicit deflation of 2 percent per annum of the nominal fixed area and headage payments, cf. Table 5. Note, that in particular the domestic support for the production of milk and bovine animals increases significantly from 1997 to 2013 (the Agenda 2000 reform), and that the domestic support declines slightly for a number of the other commodities.

In the scenarios analysed, a number of different and significant changes will therefore take place simultaneously. Not only will the farmers in the individual member countries be affected differently in terms of different reductions in the domestic support received (relative to the value of production), but the relative competitiveness between the different agricultural commodities within a given region as well as between different member countries will change and impact significantly on the final outcome. Also, the initial trading pattern will influence the impact on the agricultural production in each of the 15 member countries depending on for example whether the major export markets for a given commodity are other European markets or markets outside the European Union.

Results

Scenario 1: Eliminating domestic support measures

Supply response in the EU

Eliminating domestic support in the European Union impacts significantly on the European production of a number of primary agricultural products, cf. Table 6. At the aggregate level, the production of wheat, other grains and oilseeds declines by 6.9, 5.6 and 8.9 percent, respectively as a result of the elimination of the land-based payments given to these crops. The production of plant based fibers, receiving domestic support that correspond to almost 60 percent of the value of production, declines by 63 percent – a decline that also reflects the relative weak competitiveness of these crops in Europe (cotton etc.). The production of vegetables and fruits and other crops, however, increase marginally – a result of an increased competitiveness relative to the other land using sectors in the European Union.

The production of bovine animals decrease by approximately 11 percent following the elimination of the relatively significant payments to cattle. The average EU production of other animals – pork and poultry – in the EU is unaffected by the elimination of the domestic support measures, which only constitute some 4 percent of the total value of production of pork and poultry.

TABLE 4. Domestic support, EU member countries, 1998, percent of the value of domestic production

	EU15	BEL	DK	DEU	GRE	SPA	FRA	IREL	ITALY	LUX	NLD	AUT	POR	FIN	SWE	UK
Paddy rice	14.7	0.0	0.0	0.0	14.7	14.7	14.7	0.0	14.7	0.0	0.0	0.0	14.7	0.0	0.0	0.0
Wheat	62.0	40.8	49.4	71.3	126.8	83.4	48.7	54.5	75.6	40.3	109.3	82.4	392.4	116.8	64.3	52.7
Other grains	57.9	40.0	69.4	76.5	26.2	45.3	50.1	64.8	39.6	48.0	157.6	57.3	58.8	82.7	95.7	83.4
Vegetables, fruit, nuts	3.8	1.2	4.6	0.8	7.6	6.7	5.2	0.2	2.8	0.0	1.6	2.0	3.9	1.9	2.2	0.7
Oilseeds	49.1	65.0	59.2	59.1	40.4	50.8	65.3	71.9	36.1	39.5	61.0	104.5	45.3	125.8	94.5	58.3
Sugar cane and beet	6.2	6.9	9.8	5.2	2.7	7.8	6.1	5.9	4.5	0.0	6.0	7.0	2.1	4.9	4.7	11.6
Plant based fibers	60.4	81.3	0.0	0.0	51.9	78.8	118.6	0.0	0.0	0.0	110.5	0.0	0.0	0.0	0.0	340.6
Other crops	6.6	1.2	8.2	3.6	35.1	11.5	5.5	5.4	7.0	3.1	0.2	11.0	9.0	9.1	14.3	11.8
Bovine animals	49.6	24.5	35.2	48.3	77.7	60.8	37.5	66.6	30.5	36.9	8.1	77.0	127.9	102.6	60.4	82.2
Other animal products	4.2	0.7	0.4	3.8	16.7	6.8	2.5	18.9	3.4	9.6	5.2	8.5	14.9	9.5	4.3	1.1
Raw milk	5.4	12.5	2.0	3.4	6.7	5.9	7.6	11.9	4.1	0.1	7.9	4.8	11.7	4.5	2.7	2.2
Wool	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source OECD PSE Tables and own calculations

TABLE 5. Domestic support, EU member countries, 2013, percent of the value of domestic production

	EU15	BEL	DK	DEU	GRE	SPA	FRA	IREL	ITALY	LUX	NLD	AUT	POR	FIN	SWE	UK
Paddy rice	8.0	0.0	0.0	0.0	10.2	9.2	9.2	0.0	12.4	0.0	0.0	0.0	12.4	0.0	0.0	0.0
Wheat	68.6	37.2	45.8	75.0	110.7	77.0	46.6	63.8	86.5	35.7	101.9	92.2	620.6	137.3	64.5	53.1
Other grains	66.2	38.1	65.9	87.0	26.5	43.8	52.5	72.9	50.1	47.4	144.7	67.8	51.6	122.5	100.2	83.5
Vegetables, fruit, nuts	3.3	1.2	4.2	0.8	6.3	6.0	5.1	0.1	2.6	0.0	1.5	0.8	4.7	2.7	3.5	0.7
Oilseeds	28.7	32.3	26.8	26.6	19.3	29.0	33.7	324.8	19.2	13.5	46.3	58.7	29.0	75.6	47.1	30.8
Sugar cane and beet	5.8	6.4	9.0	4.4	2.1	7.3	5.6	5.2	3.7	0.3	5.3	5.9	4.3	4.4	4.1	10.6
Plant based fibers	45.8	63.4	0.0	0.0	36.7	66.4	92.3	0.0	0.0	0.0	67.3	0.0	0.0	0.0	0.0	237.0
Other crops	6.8	1.1	5.8	2.2	34.6	10.7	4.6	2.3	6.7	3.4	0.2	9.1	8.2	7.3	10.7	6.1
Bovine animals	85.6	46.6	62.7	87.1	77.6	71.9	57.5	85.1	52.7	52.9	20.5	125.8	142.4	183.8	131.8	185.0
Other animal products	4.3	0.8	0.4	4.0	15.0	6.9	2.6	17.1	3.3	9.2	5.6	7.6	16.0	9.2	3.9	1.1
Raw milk	15.5	27.7	11.2	18.4	7.7	14.5	20.9	23.0	10.3	13.1	26.1	17.0	23.7	10.7	9.8	13.5
Wool	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source OECD PSE Tables and own calculations

At the individual EU member state level most of the production changes mirror the changes at the aggregate EU-level reflecting the relative reductions in domestic support in the individual EU member countries. It is also evident, that the production of a few number of agricultural commodities changes significantly, examples being the production of plant-based fibers and rice. This is explained by either a significant reduction in the subsidies received in the countries producing these commodities (for plant-based fibers this is Belgium, Greece, Spain, France, Netherlands and the UK; in the case of rice it is France, Italy, Spain, Greece and Portugal) or simply changes to an almost absent production of these commodities in the other countries.

The analysis also shows some interesting results. First, the raw milk quota is no longer binding in Germany, Italy and Austria. This is a result of a significant lower value of the milk quota in year 2013 compared to 1997 (cost increases due to higher prices of a number of important factors of production in these countries) and the removal of the domestic support measures, which amount to a value of 18.4, 10.3 and 17.0 percent of the value of production in 2013 in the three countries, respectively (recalling the milk payments being introduced according to the Agenda 2000 reform).

Second, the production of pork and poultry increases significantly in Denmark – a result of an increased market share in most export markets in Europe. The price of producing pigs in Denmark decline marginally – approximately 1 percent due to lower costs of production (whereas it increases in all other European countries). Furthermore, the initial domestic support constitute only 0.4 percent of the total value of production in Denmark – somewhat lower than in the other European Countries – which also impacts positively on the Danish competitiveness in the European markets for pork and poultry meat. This also implies that the demand for grains in Denmark increases correspondingly, wherefore the negative impact of lower domestic support for wheat and other grains is more or less offset by the increased demand from the Danish producers of pigs (as opposed to the impact in most other European countries).

The impacts on industries outside agriculture and the processing industry are generally minor and slightly positive – the industrial production increases in the range of 0.1 to 1.0 percent.

Supply response outside Europe

For countries outside Europe the impacts of eliminating EU domestic agricultural support is typically positive, cf. Figure 2. In particular there is a positive impact on the production of grains, oil-seeds, plant-based fibers (the latter not shown) and both the production of bovine meats and other meats (pork and poultry meat) increase in the range of 0.5 to 3.0 percent – the variation being mainly explained by the initial trading structure between the region/country in question and the European Countries.

The production of vegetables, fruit and nuts and other crops, however, fall marginally in a number of countries outside Europe (e.g. Eastern and Central European Countries and the Former Soviet) – in the range of 2 to 5 percent. This is caused by slightly declining European export prices due to in particular lower land and capital prices.

In figure 3 the impacts on the world market prices of liberalising the domestic support in the European Union are shown. In particular the price of grains and bovine meats increase and only in the case of rice, vegetables and fruits and other crops the average world market prices fall (marginally). The positive terms of trade effect and increased exports from a number of countries outside Europe also leads to a positive macroeconomic effect in terms of a higher value of GDP in these countries – typically around 0.1 to 0.2 percent (not shown).

TABLE 6. Scenario 1: Change in production, EU member countries, percent

	BEL	DK	DEU	GRE	SPA	FRA	IREL	ITALY	LUX	NLD	AUT	POR	FIN	SWE	UK	EU15
Paddy rice	12.1	22.1	38.5	23.6	-1.7	-0.5	26.4	-2.2	11.9	9.4	22.6	11.7	25	22.1	43.1	5.5
Wheat	-9	2	-13	-19.1	-5	-2.2	-7.2	-4.7	-7.2	-30.9	-16.6	-53.3	-7.2	-0.5	-9	-6.9
Other grains	-16.9	-0.2	-10.3	-6.1	-3.3	-0.7	-8.3	-1.3	-13.1	-70.3	-1.4	-3.8	-5.1	-8	-12.3	-5.6
Vegetables, fruit, nuts	1.1	7.2	18.5	5.1	-5.1	-4.6	28.2	3.3	16	-5.3	39.4	10.2	22.7	45.8	5.5	2.2
Oilseeds	-42.8	8.4	-2	-14.7	-18.7	7.2	-18.5	-7.7	16.1	-76.3	-6.6	-19.6	-8.8	-2.4	-2.2	-8.9
Sugar cane and beet	-0.2	0	0.3	-5.2	0	0.5	0.2	0	0.2	0.3	0.1	41.9	0.6	0	-0.7	0.0
Plant based fibers	-95.9	26.9	87.9	-80.5	-96.9	-95.7	6.5	12.9	40.1	-96.2	33.7	94.8	4.3	122.1	-99.8	-63.1
Other crops	-1.3	0	33.4	-36.3	-12.9	4.2	26.6	-2.8	5	9.7	-0.4	2.7	13.6	18.4	14.2	3.1
Bovine animals	-12.4	-26.6	-12.4	-13.7	-13.6	-7.7	-52.8	-6.7	-22.2	21.1	-7.5	-11.6	-6.9	-11.9	-12.7	-10.7
Other animal products	6	17.9	0	-5.8	-1.8	1.6	-5.7	0.2	-8.4	1.2	-0.3	-2.9	-4.1	0.9	-9.3	0.0
Raw milk	0	0	-1.2	0	0	0	0	-3.3	0	0	-4.7	0	0	0	0	-0.5
Wool	19.7	11.2	70.5	12.6	18.9	3	66.2	9.3	31	9.3	33.1	36.1	29.3	7.3	-22.6	-5.1
Fish	-1	-0.8	0	1	0.1	-0.2	0.2	-0.1	-0.5	-0.6	-0.8	-0.1	-0.4	-0.6	-0.3	0.4
Resource extraction	0	0	0	0.3	0.1	0	0	0	0	0	0	0.1	0.1	0	0	0.0
Bovine meat products	-14.9	-27.9	-14.1	-13.5	-13.6	-8.5	-57.7	-7.2	-25.2	24.6	-7.6	-11.1	-7	-12.2	-10.8	-10.9
Other meat products	7	21.4	-0.1	-5.5	-1.8	2.1	-7.3	0.7	-9.2	0.7	-0.4	-3.1	-5.9	1	-20.7	-1.6
Vegetable oils and fats	1.4	4.7	0.1	-14.8	-5.7	2	4.2	-4.1	-0.1	-1.4	0.7	-3.5	-0.8	-1.3	-5.2	-1.5
Dairy products	0.6	0.7	-0.9	3.1	2.5	1.7	5.4	-2.8	3.9	-0.8	-7.6	3	0.2	0.1	0.6	0.1
Processed rice	6.8	-0.7	32	19	-1.1	-0.8	3.6	-1.4	4.4	-4.3	26.3	2.1	17.6	16.3	37.5	2.2
Sugar	0.1	0	0	0	0	0	-0.2	0	0.1	0.1	0	-1.4	-0.3	0	0	0.0
Other processed foods	-2.3	-0.5	-1.1	-23.2	-1.6	0.9	0.6	-0.8	-5	0.4	0.5	-0.5	-3.8	-0.9	-1.2	-0.8
Beverages and tobacco	0.9	-0.4	0	1.9	0	1.5	4.1	-1.5	1.2	-0.3	0.5	0.7	-2.7	-0.8	-0.6	0.0
Textiles/wearing apparel	-0.1	-0.5	0	8.7	0.6	-0.6	-3.4	-0.9	-0.1	-0.7	-1.7	2.6	0.9	-1.2	-2.7	-0.3
Wood/paper products	0	-0.5	-0.1	1.7	0.9	0.2	1.6	0.1	0.2	-0.1	0.2	0.9	0.3	-0.1	0.3	0.2
Petro/chemicals/minerals	-0.2	-0.9	-0.3	3.1	0.7	0.1	2.8	0	0	-0.3	0	0.8	0.2	-0.2	0.4	0.1
Manufactures	-0.3	-1.3	-0.6	9	3.2	0.2	3.3	0.3	0	-0.5	-0.1	2	0.4	-0.3	0.7	0.3
Utilities	0	-0.1	0	0.9	0.3	0.2	-0.1	0	0.3	0	0	1.1	0.3	0	0.3	0.2
Transport	0.1	-0.1	0	2.3	0.2	0.1	0.6	0.1	0.3	0	0.1	0.7	-0.1	0.1	0.3	0.2
Services	0.2	0	0.1	0.8	0.1	0	0	0.2	0.3	0.1	0.1	0.1	0.2	0.1	0.4	0.2

FIGURE 2. Scenario 1: Changes in production in third countries, selected commodities and regions, percent

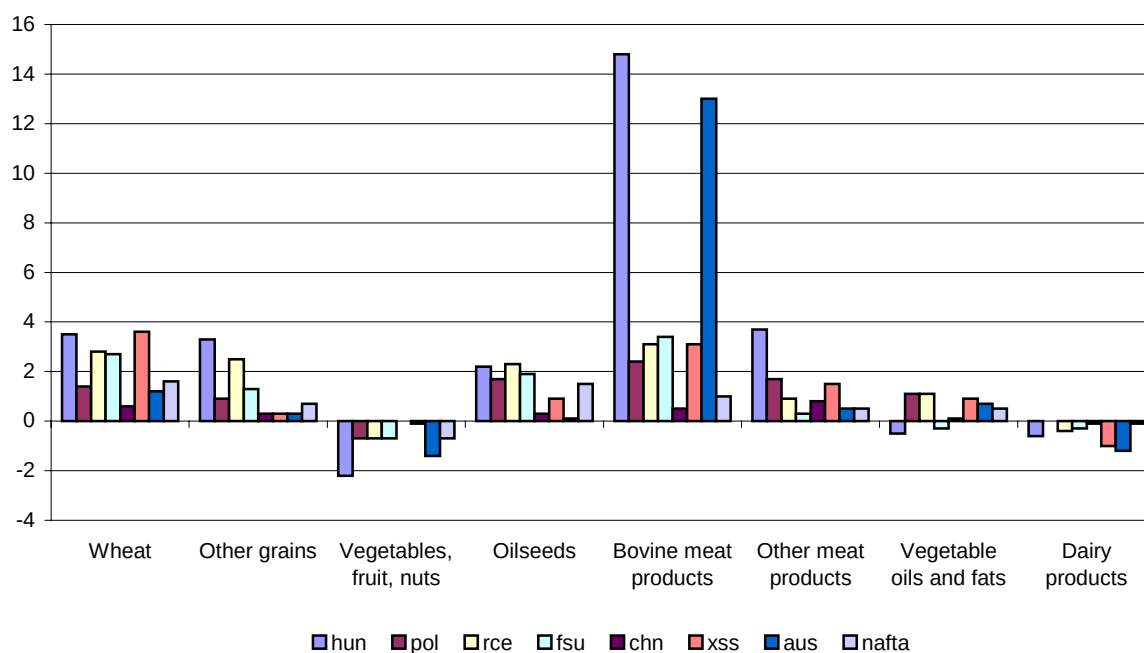
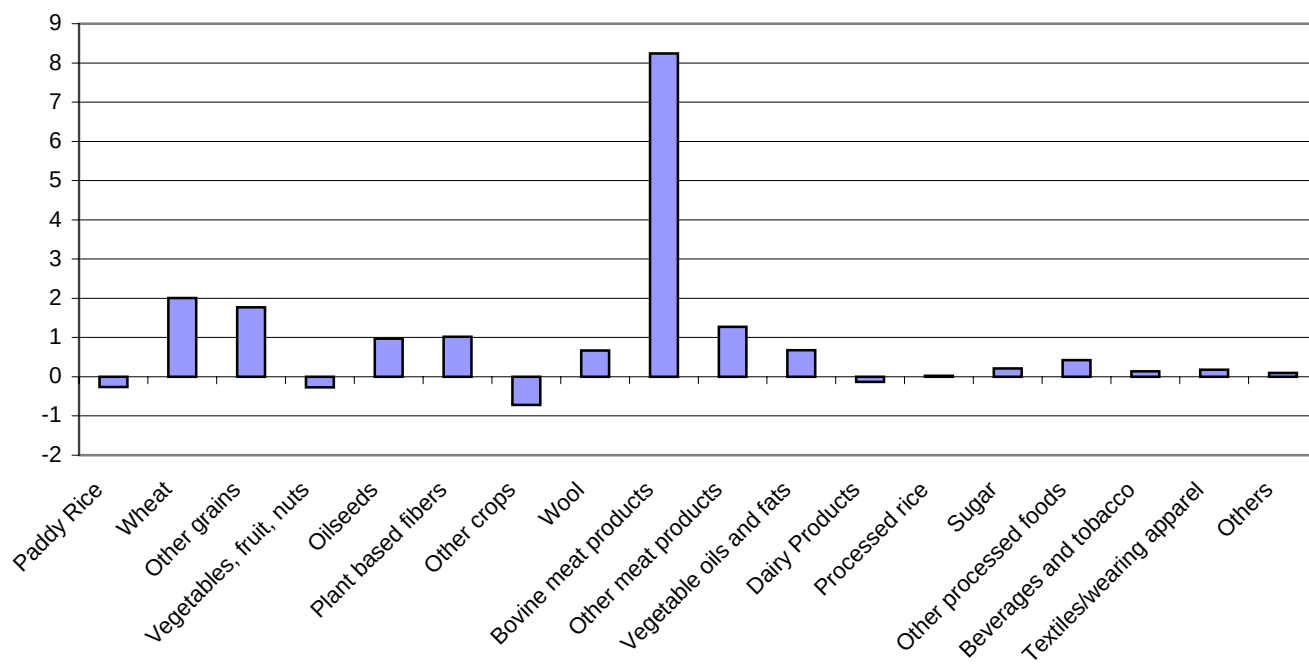


FIGURE 3. Scenario 1: Changes in world market prices, selected commodities, percent



Macroeconomic results

Liberalising the domestic support in the European Union results in a slightly higher gross domestic product for EU-15 of 0.1 percent, cf. Table 7. Measured in terms of equivalent variations this corresponds to a welfare gain of 11 billion EURO – a significant result given the relative limited overall importance of the agricultural sectors in the European Economy.

At the EU member state level real GDP increases by 0.1 to 0.7 percent, of which a major part is explained by the significant changes in the interregional transfers between the individual EU member countries (the common financing of the Common Agricultural Policy). In particular Germany gains in terms of significant lower contribution to the common financing of the CAP, and the UK gain of 0.3 percent of GDP is explained by significant budgetary savings as well as a noteworthy efficiency gain. Among the losers, measured in terms of the equivalent variation, are the major recipients of domestic support, including Greece, Spain, France, Ireland and Portugal. Also, and as expected, the average land prices fall significantly across all EU member states in particular as a result of the removal of the area payment. The regional differences reflects the relative importance of the different agricultural commodities and the policy regimes related to those commodities.

TABLE 7. **Scenario 1: Macroeconomic results.**

	Real GDP	Total EV	of which				Land price
	% change		CAP transfers	Terms of trade	Allocative efficiency	Other effects	% change
			Mill. 1997		EURO		
EU15	0.1	10679	-17	-71	10526	241	-78.43
Belgium	0.1	636	366	54	214	2	-54.90
Denmark	0.1	210	-35	100	128	17	-71.70
Germany	0.1	4968	3197	470	1244	57	-82.60
Greece	0.7	-1409	-1841	-274	824	-118	-76.30
Spain	0.2	-1752	-2471	-432	1111	40	-74.10
France	0.1	-525	-1832	211	975	122	-78.40
Ireland	0.5	-708	-1140	-9	414	28	-85.70
Italy	0.1	1596	1255	-494	785	50	-80.10
Luxembourg	0.2	48	26	3	20	0	-62.60
Netherlands	0.1	1075	503	214	342	16	-41.10
Austria	0.1	318	90	41	188	-2	-84.50
Portugal	0.4	-329	-576	-127	409	-35	-95.20
Finland	0.2	298	17	4	257	20	-91.70
Sweden	0.1	597	333	33	215	16	-91.50
United Kingdom	0.3	5655	2092	135	3400	28	-77.80

Scenario 2: Converting domestic support measures into a uniform hectare payment

Supply response in the European Union

Scenario 2a analyses the impacts of converting all domestic support in each member state into a uniform hectare payment given to all agricultural land (i.e. no budgetary savings). Scenario 2b analyse the removal of this subsidy (i.e. budgetary savings). Only a few illustrative results will be shown below to demonstrate that combining scenario 2a and 2b leads to exactly the same supply response as identified in scenario 1, cf. Table 8 (i.e. the identical results in column 3 and 6). It is therefore concluded, that a uniform hectare payment to all agricultural land (where the eligible number of hectares are pre-determined and fixed) can be termed fully decoupled as all the results from the model simulation demonstrate that the supply response (as well as the macroeconomic results) are similar in scenario 1 and 2 (2a+2b). The minor adjustments in scenario 2b, cf. the small percentage changes in column 5, mirror a budgetary effect as the interregional transfers between the EU member states vanish resulting in positive/negative income (and demand) effects in the net-contributing/-receiving countries.

TABLE 8. Supply response, EU-15, scenario 1 and 2, percent

	Index 2013	Scenario 1	Index Scenario 1	Scenario 2a	Scenario 2b	Index Scenario2a+b
Wheat	100	-6.907	93,1	-6.902	0.002	93,1
Other grains	100	-5.556	94,4	-5.532	-0.021	94,4
Vegetables, fruit, nuts	100	2.229	102,2	2.214	-0.005	102,2
Oilseeds	100	-8.910	91,1	-8.986	0.096	91,1
Bovine meat products	100	-10.899	89,1	-10.837	-0.069	89,1
Other meat products	100	-1.589	98,4	-1.547	-0.042	98,4
Vegetable oils and fats	100	-1.508	98,5	-1.463	-0.009	98,5
Dairy products	100	0.142	100,1	0.170	-0.029	100,1

Scenario 3: WTO liberalisation scenario

Supply response in the European Union

In addition to eliminating all direct support as illustrated in scenario 1, this scenario eliminates all export subsidies (which mainly affects the export of other grains, dairy products, processed rice and sugar) supplemented by a 30 percent reduction in the import tariff equivalents across all the agricultural commodities. Note also, that the set-aside requirement and the production quotas on milk and sugar are removed in this scenario. By definition, the average price of land is unaffected, as the decoupled payment to land is exactly determined to neutralise the negative impact on land prices of the reduction of the distorting support.

The production response in the EU and the member countries are shown in Table 9. The production of grains and oilseeds decline by 11 and 8 percent, respectively, and the production of beef and veal as well as pork and poultry fall by 17 and 4 percent. Again, these supply effects reflects the importance of both the domestic support measures as well as the assumed reductions in the border protection rates.

The overall EU production of dairy products increase by 7 percent – the net result of both the reductions of the domestic support and the border protection as well as the impact of lifting the restrictive milk quota system. Although the market prices for dairy products decline somewhat, the net impact in this scenario implies that milk production in the European Union increases (a result of the assumed initial quota rent and the estimated price reduction). It is also evident from the table, that the impact on the dairy production in each of the EU member states varies significantly – a reflection of the underlying and assumed relative quota rents prior to the subsidy cuts and the lifting of the national milk quotas. As the competitiveness of milk production in particularly Germany, Italy and Austria decreases in the constructed baseline and that the quota rent is relative small in Finland, Sweden and the UK prior to the policy changes, the result of the lower level of support in this scenario leads to a somewhat smaller milk production in these countries. The Netherlands, Denmark and Ireland gain in terms of a higher export of dairy products to these countries.

Supply response in third countries

The impact on countries outside Europe is generally positive in terms of a slightly higher level of agricultural production and somewhat higher world market prices, cf. Figure 4 and 5. The supply responses correlate with the relative cuts in the European agricultural protection and with the trading structure – those countries trading initially most with the European Countries gain the most in terms of export increases to the European markets or a lower level of imports of European commodities. In particular, the world market price of grains and beef and veal increase by 2 and 7 percent, respectively whereas the world market price of dairy products decline by 9 percent – a result

TABLE 9. Scenario 3: Change in production, EU member countries, percent

	BEL	DK	DEU	GRE	SPA	FRA	IREL	ITALY	LUX	NLD	AUT	POR	FIN	SWE	UK	EU15
Paddy rice	-15.9	-15.2	3.1	-4.5	-29.6	-21.5	-15.0	-20.1	-24.1	-32.9	-10.6	-10.4	-0.7	-4.0	0.2	-20.6
Wheat	-16.4	-1.1	-18.0	-22.5	-8.6	-6.1	-14.5	-11.0	-20.2	-37.7	-22.2	-54.5	-13.6	-5.9	-11.3	-11.1
Other grains	-28.3	-7.9	-15.5	-7.3	-7.4	-8.9	-13.5	-4.9	-22.9	-74.6	-6.2	-3.0	-12.4	-23.5	-16.2	-11.4
Vegetables, fruit, nuts	0.2	7.3	18.1	4.3	-7.1	-5.9	21.1	2.4	4.0	-16.1	38.9	8.6	22.4	46.7	5.5	0.1
Oilseeds	-39.0	8.9	1.1	-17.4	-18.5	9.8	-17.8	-8.1	-0.6	-76.9	-4.9	-20.1	-7.3	-2.6	-2.0	-8.3
Sugar cane and beet	-17.0	0.9	-4.3	11.4	-0.9	-2.1	0.9	-4.2	-16.6	-1.1	-2.9	-53.8	10.7	6.5	14.5	-0.5
Plant based fibers	-95.9	30.8	101.5	-78.7	-96.6	-95.6	10.5	13.7	25.8	-95.9	39.9	137.1	5.6	141.4	-99.8	-60.9
Other crops	0.0	1.8	37.9	-37.6	-15.1	4.1	23.9	-3.8	-4.9	-6.3	-0.2	1.2	11.8	20.6	16.1	1.5
Bovine animals	-24.3	-38.1	-20.8	-16.4	-15.7	-9.5	-55.8	-8.8	-31.9	-5.8	-11.0	-10.5	-8.4	-17.5	-15.8	-15.0
Other animal products	3.2	11.4	-2.0	-6.2	-2.1	1.4	-5.5	-0.4	-10.7	-6.1	-1.3	-2.4	-4.7	-0.8	-11.5	-1.8
Raw milk	11.1	21.3	-20.4	10.8	-0.9	2.7	20.3	-11.4	128.8	168.7	-12.0	21.6	-1.2	-7.8	-3.9	11.4
Wool	41.7	11.8	86.1	27.5	31.3	4.1	65.2	10.0	50.6	0.9	37.3	103.5	29.7	9.2	-19.1	-0.4
Fish	-4.2	-2.3	-0.1	0.9	-0.8	-0.7	-0.8	-0.4	-1.9	-1.8	-1.1	-1.3	-0.7	-2.1	-0.8	0.0
Resource extraction	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	0.0	0.0	0.0	0.0
Bovine meat products	-27.6	-39.5	-22.4	-16.2	-15.8	-10.9	-61.0	-10.2	-35.2	-6.5	-11.2	-10.5	-8.6	-17.9	-21.7	-17.2
Other meat products	3.9	13.6	-2.2	-5.9	-2.1	1.7	-6.7	-0.8	-11.6	-9.0	-2.5	-3.0	-6.8	-1.0	-21.5	-3.7
Vegetable oils and fats	-3.5	3.5	-0.7	-18.5	-8.2	-0.9	-0.4	-5.4	-5.7	0.3	-0.1	-4.9	0.6	-1.9	-6.6	-2.6
Dairy products	15.9	24.1	-24.7	18.1	1.6	2.9	31.0	-12.1	185.8	180.6	-19.8	28.1	-1.1	-8.0	-5.0	7.1
Processed rice	-18.7	-42.5	-4.1	-7.8	-26.1	-9.7	-35.8	-28.6	-27.1	-42.4	-20.3	-11.5	-15.2	-13.1	-4.6	-22.2
Sugar	-18.0	0.8	-3.5	18.7	-5.1	-2.2	-2.7	-15.5	-17.6	-2.0	-2.7	-72.0	1.6	5.2	38.1	2.1
Other processed foods	-10.6	-9.4	-5.7	-27.0	-6.7	-3.0	-8.0	-4.1	-12.6	-4.3	-2.8	-3.2	-10.1	-4.9	-3.1	-4.9
Beverages and tobacco	-2.2	0.2	1.3	1.6	-0.6	1.1	6.3	-2.1	-3.0	-0.6	1.8	-0.4	-1.3	1.4	2.2	0.6
Textiles/wearing apparel	1.8	-0.1	0.9	7.4	1.3	0.0	-3.3	0.2	-0.6	-1.4	-0.4	2.1	0.9	-0.7	-2.2	0.4
Wood/paper products	0.4	-0.5	0.1	2.1	1.0	0.2	1.7	0.3	0.1	-0.2	0.4	1.0	0.3	0.0	0.4	0.3
Petro/chemicals/minerals	0.2	-0.5	0.1	2.9	0.6	0.2	2.7	0.2	-0.7	-0.8	0.0	0.6	0.2	-0.3	0.5	0.3
Manufactures	0.6	-1.1	0.2	7.7	3.3	0.4	3.2	0.8	-1.0	-2.4	0.2	1.2	0.2	0.0	1.1	0.6
Utilities	0.1	-0.3	0.2	1.1	0.1	0.2	0.1	0.0	0.3	0.1	0.0	1.0	0.2	0.1	0.2	0.2
Transport	0.1	-0.1	0.2	2.4	0.5	0.1	0.7	0.2	0.2	-0.3	0.1	0.7	0.2	0.1	0.4	0.2
Services	0.2	0.0	0.2	0.5	0.2	0.0	0.1	0.2	0.4	0.1	0.1	0.2	0.2	0.2	0.4	0.2

of both slightly higher exports of dairy products from the European Union and lower intra-European union prices.

Macroeconomic results

Real GDP in the European Community increases by 0.2 percent and the aggregated equivalent variation increases by 14.6 billion EURO of which the community gains 15.2 billion EURO in efficiency due to the (partial) liberalisation of the Common Agricultural Policy. The efficiency gain is therefore 50 percent higher in this scenario as compared with scenario 1 and 2.

At the member state level real GDP increase by 0.1 to 0.8 percent, as shown in Table 10 below. The real GDP increases the most in Greece (0.8 %), Portugal (0.5 %) and Ireland (0.5 %), whereas the German gain is more limited (0.1%) – Germany being relative large in the European Economy as well as the agricultural sector is only of minor economic importance in Germany. Nevertheless, Germany saves some 2.8 billion EURO in lower net-transfers to the common agricultural budget. In Germany and the UK the efficiency gain amounts to 1.9 and 4 billion EURO, respectively.

The negative impacts on the average land price in each of the EU member states is exactly offset by a homogenous and decoupled area payment. This payment differs somewhat across the individual member states, but the overall budgetary cost is still being financed through a common contribution rate across all member states. The impact on the EU budget is a decrease from a total cost of 53 billion EURO in 2013 to roughly 26 billion EURO, and the common contribution rate decrease from 0.45 percent of GDP to 0.21 percent in this scenario, cf. Table 11.

Comparing this scenario with scenario 2a demonstrates an interesting feature in our scenario design. In scenario (2a) where all the domestic support is converted into a homogenous and decoupled land payment, there are no savings on the common agricultural budget – and all the agricultural support is given entirely as land payments. This implies that the land prices in all the European countries increase tremendously as the support, which prior to the change is not only given to land but also to other input factors (i.e. the initial support is also reflected in higher returns to capital and labour being employed in the agricultural sectors), is now entirely allocated to the support of land. In this scenario 3, however, the landowners are only just compensated and the negative impact on land prices is just offset by a higher uniform payment to land.

TABLE 10. Scenario 3: Macroeconomic results

	Real GDP	Total EV	of which				Land Price
	% change		CAP transfers	Terms of trade	Allocative efficiency	Other effects	% change
		Mill.1997 EURO					
EU15	0.2	14627	-9	-744	15169	209	0.0
Belgium	0.2	325	-106	41	394	-4	0.0
Denmark	0.2	377	110	-4	252	19	0.0
Germany	0.1	5177	2835	412	1882	50	0.0
Greece	0.8	-303	-1081	-118	994	-99	0.0
Spain	0.2	-490	-1661	-282	1416	37	0.0
France	0.1	1591	-378	154	1696	118	0.0
Ireland	0.5	-742	-1066	-170	469	26	0.0
Italy	0.1	1971	1017	-310	1208	56	0.0
Luxembourg	0.4	57	11	1	44	0	0.0
Netherlands	0.3	170	-596	-555	1338	-18	0.0
Austria	0.1	462	113	55	298	-3	0.0
Portugal	0.5	248	-237	-70	585	-31	0.0
Finland	0.2	489	109	26	336	18	0.0
Sweden	0.1	667	332	41	274	19	0.0
United Kingdom	0.3	4627	590	37	3981	19	0.0

FIGURE 4. Scenario 3: Change in production in third countries, selected commodities and regions percent.

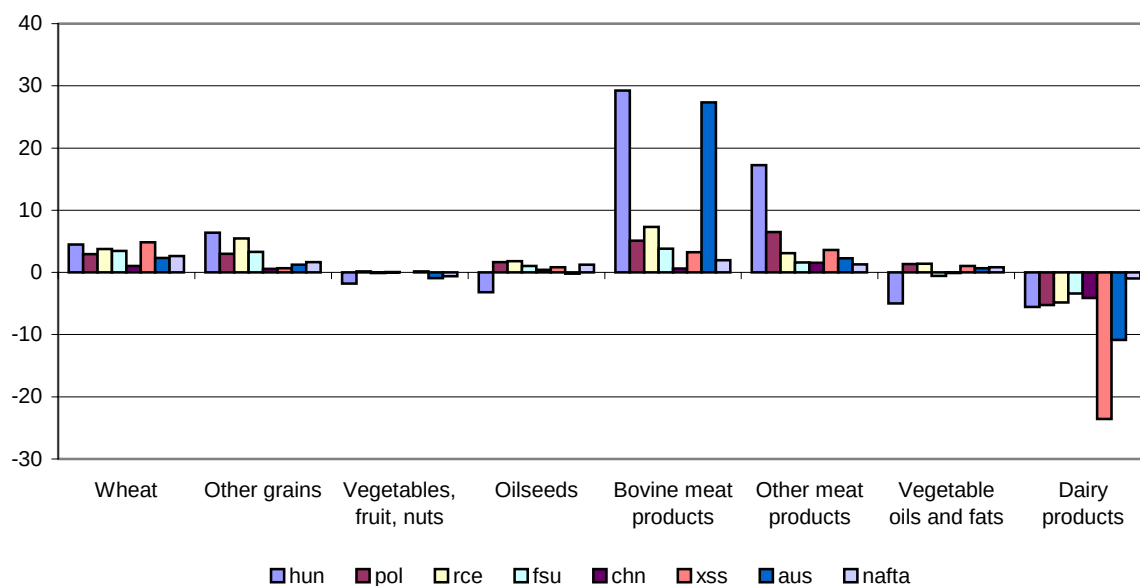
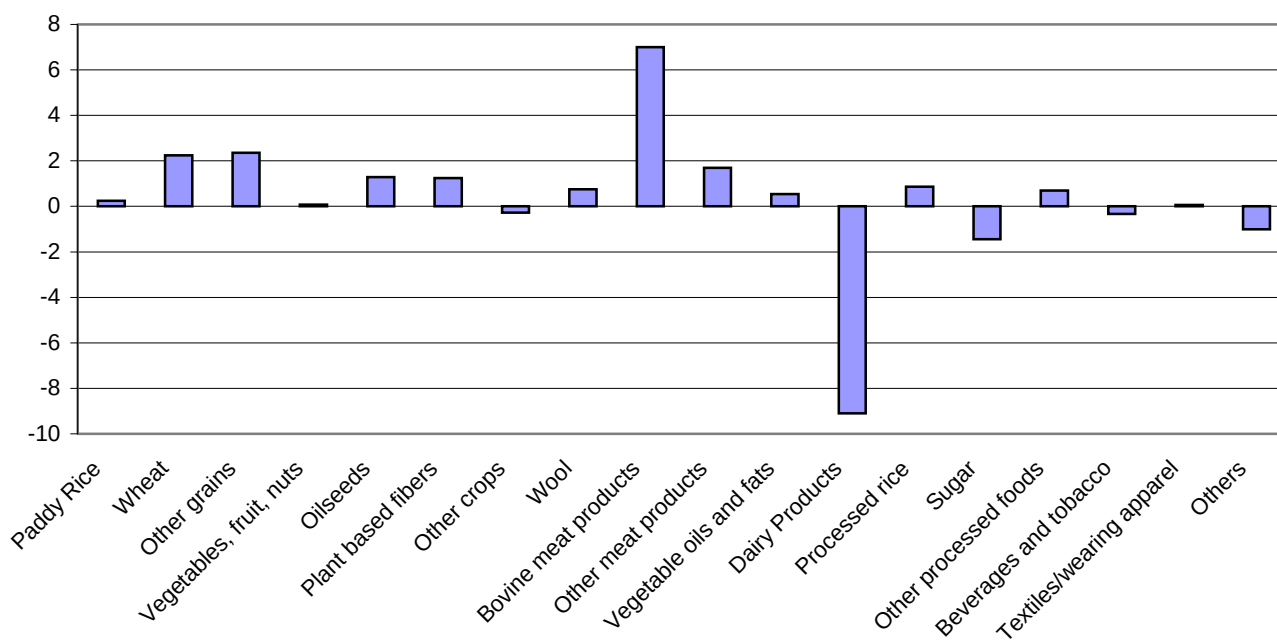


FIGURE 5. Scenario 3: Changes in world market prices, selected commodities, percent.



TABEL 11. Implication for the Common Agricultural Budget, million EURO (current prices)

	1997	2013	scenario 1	scenario 2a	scenario 2b	scenario 3
Total CAP budget	43173	52882	4112	52814	4112	25495
	0	0	0	0	0	0
Homogenous land subsidy	0	0	0	48712	0	25495
Area premium	15467	15990	0	0	0	0
Animal premium	5289	13039	0	0	0	0
Other subsidies	17584	19632	0	0	0	0
Export restitutions	4833	4221	4113	4102	4113	0
-Levies on imports	-1102	-858	-1053	-1051	-1053	-1012
			0	0	0	0
Net Cost	42071	52024	3059	51763	3059	24482
% of GDP	0.598	0.453	0.027	0.451	0.027	0.213

Conclusions and the need for further research efforts

The results estimated in this analysis are no better than the data and parameters used, and the results reflects only work in progress, as we have identified several important characteristics in the database that need to be addressed in the future. This relates in particular to the relative size of the agricultural sector in a number of the European countries and the cost structure in a number of the land using sectors can be improved. These issues are of particular importance related to the illustrative scenarios we have undertaken in this paper. Furthermore, our study has also identified a need for further improving aspects of the modelling of the Common Agricultural Policy, where the milk quota regime and the explicit representation of the tariff quota regimes are important examples.

Nevertheless, our paper has addressed the issue of decoupling and demonstrated that the domestic support policies can be incorporated in the GTAP database and that the impacts can be assessed in a global general equilibrium model. Having said that we also recognise, that we have not addressed all relevant issues related to the discussion of decoupling the existing agricultural support. For example in our scenarios we have not addressed a number of political relevant distributional issues – both among different types of farms and landowners in European agriculture and we have not addressed the financing scheme of the European common policies.

The analysis demonstrates that the existing domestic support payments in the European Union are indeed coupled to production and hence they affect production decisions and distort international trade with adverse effects on the export potential of e.g. developing countries as a consequence. Furthermore, the value of this support is capitalised in significant higher European land prices in Europe than would otherwise prevail. The discussion of the Enlargement of the European Union and the international trade talks under the auspice of the WTO also underlines the need for reforming these policies.

In this paper we analysed the economic implications of transforming all domestic support payments (as well as other distorting policies) into a nationally homogenous and fully decoupled payment to all agricultural land, i.e. irrespective of the farmers decision to crop or not (the number of hectares and reference yields being fixed). Specifically, the analysis suggest that it is possible to convert the existing agricultural support into a fully decoupled payment which would not distort international trade and it indicates a way forward to offset the negative impact on land prices. Such a policy would also comply with the WTO rules (i.e. fall within the green box as decoupled income support). The analysis also suggest, that such a policy reform could be achieved at somewhat lower budgetary costs as compared with the existing costs of the Common Agricultural Policy.

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