

DECOUPLING: POLICY IMPLICATIONS

Foreword

This report presents the main results and policy implications from an OECD project on decoupling that began under the auspices of the 2001-02 programme of work and which was continued under the 2003-04 programme of work. All the background studies to the present report have been declassified by the Working Party on Agricultural Policies and Markets, or were originally unclassified OECD documents of a technical nature. These are available on the OECD website at the address indicated below.

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Decoupling: Policy Implications

Introduction

Decoupling agricultural support from production decisions has become one of the central issues in agricultural policy, both nationally and internationally. The need to minimize international trade distortions associated with support to the agricultural sector was a key element in the principles for agricultural policy reform adopted by OECD Ministers in 1987. This same issue dominated much of the debate leading to the adoption of the Uruguay Round Agreement on Agriculture (URAA) in 1994. Since the opening of the new WTO (World Trade Organisation) round of multilateral trade negotiations in December 1999, it has been clear, from the debate and the proposals being put forward, that decoupling remains an important aspect of the negotiations on agriculture.

This report presents the main results and policy implications from an OECD project on decoupling that began under the auspices of the 2001-02 programme of work and was continued under the programme of work 2003-04. The work undertaken across several studies (see Annex 2) focused on the economic analysis of the production and trade impacts of different agricultural support measures. The conclusions and policy implications presented here therefore build on: *i*) the estimates of relative price effects of different kinds of stylised policy measures, first developed using the Policy Evaluation Model (PEM)¹ (OECD, 2001a); *ii*) a conceptual framework on decoupling (OECD, 2001b) which drew attention to the potential for risk-related and dynamic effects which theory suggests are likely to occur in addition to the relative price effects; and *iii*) a series of studies aimed at explaining, analysing and, where possible, quantifying some of the

1. The PEM is a partial equilibrium model developed by OECD Secretariat in collaboration with some member countries for the purpose of analysing the economic impacts of support measures as classified in the Producer Support Estimate (PSE) database.

potentially important static, risk and dynamic effects and their implication on the degree of decoupling of different measures. Annexes 1 and 2 give details of the issues investigated in each of the background studies.

This report, however, does not analyse the legal concept of decoupling that is embodied in the WTO agreement on agriculture, nor does it examine the effects of different agricultural policy instruments on variables other than production and trade. In particular, it does not cover the impact of agricultural policy measures on the level of positive or negative externalities, on public goods that may be associated with agricultural production, or on the welfare implications of risk reducing policies.

What are then the effects of the various policy measures on production and trade? Is it possible to classify these measures from the least to the most production and trade neutral? To what extent are measures intended to be, or described as “more decoupled”, actually decoupled in terms of their programme design and market effects?

Several OECD countries have implemented support programmes inspired by the idea of decoupling. These include the AMTA/direct payments in the United States, PROCAMPO in Mexico, and successive reforms in the European Union which culminated in the Single Farm Payment. The broad conceptual framework developed by OECD sought to provide the empirical support necessary to determine the degree of decoupling for a broad range of policy measures. The objective was not to question the reform process leading to more decoupled measures, but rather to ensure that maximum gains could be obtained from this process. In this context, several studies attempted to measure the extent to which policies were already decoupled and to identify the characteristics of programmes that contributed to higher or lower degrees of decoupling.

Clearly, the studies carried out by OECD are not exhaustive. The areas of research covered are relatively new, and the methods and data used to investigate them vary from subject to subject. Nonetheless, to the extent possible, the research was designed to enable the results to be expressed in terms of the degree of decoupling relative to a benchmark – market price support – just as was done for the work using the PEM model. Several studies, particularly those using micro-economic data, were influenced by specific structural characteristics of the countries, regions and data sets involved as well as the time periods analysed. Similar work could usefully be undertaken for other regions and countries in order to test the general applicability of the results. The policy implications derived from these studies, however, are considered sufficiently interesting in terms of the insights they offer to policy-makers. Specific quantitative measures derived from the studies, however, are illustrative and not definitive. All the

technical work reported here relates to analysis of the effects on production and trade of existing or past policy measures. The results may not, therefore, be directly applicable to measures that have not been explicitly examined or to future measures, especially if different implementation criteria are employed.

A broad conceptual framework

In line with the economic concept of decoupling already developed in the academic literature, the OECD has adopted an *ex post* concept. More precisely, the classification of policy measures from the least to the most decoupled (or production and trade neutral) relies on an *ex post* empirical measurement of the extent of their production and trade impacts. Hence, in contrast to the URAA legal definition, the approach is empirical. Specific studies may be sensitive to the country or time period covered or to the market conditions prevailing.

Fully decoupled measures are market oriented, *i.e.* they do not interfere with market forces, because they have no link with input or output quantities or prices. For a measure to be fully decoupled requires, not only that the equilibrium level of production (or trade) be the same as without the measure, but that the adjustments due to any outside shock should also be the same as if the measure did not exist (OECD, 2001b). There is a less restrictive concept of decoupled policies as measures for which actual levels of production (or trade) do not differ as a result of the measure². Such measures could be implemented using production or other quantitative restrictions that prevent market responses. For example, in the case of price support a measure could be introduced that would prevent production from exceeding the quantity that would have been produced in the absence of the measure. This project relies mainly on a related notion that is referred to as the *degree of decoupling*. This is an indicator which is derived *ex post* and which relates the production and trade impacts of a given policy to those of a benchmark policy, market price support. All the results referred to in this report are based on this concept of decoupling.

There are several mechanisms by which policies affect production and trade. They interact and can occur simultaneously in response to a given measure.

- *Static effects* refer to the production (and trade) effects of policy measures that occur in the same time period of analysis. There is no consideration of the links between current decisions and any

2. Such policies are defined as “effectively fully decoupled” in Cahill (1997).

decisions or policy information from other periods. Typically, static effects come from changes in the incentive prices of outputs or inputs. These changes may be direct, as is the case for market price support policies or input subsidies. The induced changes may also be more indirect, such as in the case of quantitative constraints, which affect the implicit incentive prices of the constrained outputs or inputs.

- *Risk-related effects* refer to the production (and trade) effects of policy measures on the risk faced by farmers. Usually, policy measures increase expected farm income and reduce farm income variability. For a risk-averse farmer, this may lead to two distinct effects. The first one is an insurance effect that results from the reduced income variability. The second one is a wealth effect arising from the increased expected income, leading the farmer to adopt riskier behaviour. Both the insurance and the wealth effects may contribute to increased production (and trade).³
- *Dynamic effects* relate to current production and trade effects of policy measures through the change that they induce in current and future income. In a long-term perspective, farmers make intertemporal choices involving current and future income. When these intertemporal links exist, a policy measure that changes current and future income may affect current decisions. Furthermore, expectations about future policy measures based on information about policy changes in the past may affect current production decisions. Dynamic effects commonly affect investment decisions.

Finally, it is worth noting that expectations (which is a dynamic concept *per se*) of government behaviour in terms of future policies is relevant to all three kinds (static, risk and dynamic) of effects. The expectation dimension is especially relevant for risk and dynamic effects that rely on expected income and its expected variability, because these are affected by farmers' expectations about future policies.

3. Hennessy (1998) argues that risk related effects of an individual farmer would vanish if contingent markets are complete and accessible due to the property of separability in decision making. However, risk effects would still exist in the case of programs that affect a substantial group of producers whose demand in contingent markets is crowded out by risk reducing support. Therefore, imperfect contingent markets can exacerbate risk related effects, but they are not a pre-requisite for these effects to exist.

Little is known about the relative importance of the static, risk and dynamic effects of policies. Adopting a broad concept of decoupling requires an empirical examination of all three. Consequently, OECD work on decoupling has attempted to extend the scope of the initial study (OECD 2001a) by encompassing not only static effects but all three effects (OECD, 2001b). It has also incorporated empirical analysis at different levels of aggregation, with a view to improving our understanding of the impact of policy changes that have taken place and to indicate to researchers in government and academia the avenues of research that are likely to be most useful and pertinent. The project involved several experts and researchers co-ordinated by the OECD Secretariat. Some studies were carried out directly by OECD, while others, in particular those involving micro data, were authored by consultants from academia. All these studies were discussed in technical workshops specifically organised for that purpose, as well as in the working parties of the Committee for Agriculture. Some of these studies were also presented in academic fora. Thirteen studies in total constitute the basis of the present analysis on policy implications. These studies focus mainly on the arable crops sector with special emphasis on area based payments. These later include two different categories of payments in the Produce Support Estimate (PSE) classification: payments based on area planted and payments based on historical entitlements (historical area).⁴ Both the arable crop sector and area based payments have been at the forefront of the first reforms towards “decoupling”.

What have we learned?

Static effects

Relative price effects of policies

Four conclusions summarize the crop results in OECD (2001a), obtained from the Policy Evaluation Model (PEM). First the production and trade effects of a given change in the amount of support differ substantially among the types of support measures used to provide that support. Second, payments based on area (*i.e.* payments based on area planted and payments based on historical entitlements) were found to be less production and trade distorting than all the other forms of support investigated. Furthermore, among payments based on land, payments having the least production and

4. This paper uses the term “area based payments” when referring to both types of area based payments, and uses the terms “payments based on area planted” and “payments based on historical area” when referring to programmes under these specific PSE categories.

trade distorting impact were those that impose fewer conditions on the use to which eligible land is put. Third, the estimated production and trade impacts of market price support and payments based on output were found to be similar and always higher than the corresponding effects associated with any category of payments based on land. Fourth, payments based on variable input use were found to be the most production and trade distorting among the five categories of support considered. It was also found that high initial levels of one type of support will reduce the marginal impact on production of an increase in that category of support and could potentially reverse these results. Finally, the more decoupled a policy measure is, the more effective it is in transferring income to farmers; in other words, it is more transfer efficient.

Additional studies conducted confirm these findings on relative price effects. The two studies on Italian farmers, OECD (2002a) and (2005a), show that 1992 area payments in the European Union increase land use and crop output for each commodity. However, both land allocation and output are less responsive in terms of the elasticity in the mean values to these area payments than to crop price support. This supports the hypothesis that payments based on area planted are more decoupled than price support measures. The review of the literature on estimations of impacts of US payment (OECD, 2004a) underlines the lack of empirical work testing the hypothesis of a smaller production response to acreage payments as compared to price support in the United States. This lack of empirical evidence is also observed in other countries such as the European Union. This is surprising given that these payments constitute the core of agricultural reform in the main OECD countries in the last decades. Indeed, one of the main lessons learned is that there is little econometric work testing the main hypotheses that underpin the movement towards area based payments on the basis that they are “more decoupled”. Given the technical complexities attached to these tests, it would be desirable to have much broader empirical work.

All studies find that area based payments induce significant cross commodity effects, sometimes larger than the direct effects, even when payments are the same rate across commodities. This may be explained in part by market forces, as relative prices play a more important role in production choices following a switch to area payments. It is also a consequence of the heterogeneity of land and it implies that it is very difficult to design area payments to avoid these kinds of cross commodity allocations of land. When payments are provided with significant freedom to plant a range of different crops, those cross effects may constitute a very substantial part of their impact.

A main component of the argument explaining smaller production response to area based payments is the different yields response to area payments as compared to price support: the former being smaller than the latter, or even negative. The implicit hypothesis is that land and other inputs can be substituted by each other, at least up to a certain extent, and area payments create incentives for a more extensive use of land. The study on Spanish programmes (OECD, 2002b) shows a positive response of yields when payments based on planted area are increased. The study on Italy (OECD, 2005a) estimates a positive response of durum wheat yield, hardly any response of maize yield, and a negative response for other cereals, but in all cases the response of yields to payments based on planted area is smaller than the response to market price support. The study on yield response to EU 1992 reforms (OECD, 2004b) estimates the yield response to this area payments in five EU countries using aggregate data. The estimated yield responses are in most cases negative, but of a small magnitude. In all the cases, the statistical test barely, if at all, confirms a significant response. The estimated coefficient for supported prices is positive in most cases, but in many cases it is not significantly different from zero either. This empirical evidence does not seem strong enough to confirm the main underlying hypothesis about yield response; that is, yields are reduced in response to a shift from price support to area payments. There is considerable uncertainty about the magnitude of these effects and more empirical work is required in this area.

Effects of area restraints

In the EU crop sector, the provision limiting the amount of land eligible for the direct payment to a base area was developed as a budgetary stabiliser. This explains why the provision does not operate at the individual producer level but at the country level. On the other hand, the set-aside provision was actually designed to stabilise domestic crop production. Hence it applies at the individual producer level. These provisions were studied in OECD (2002c).

Data observed since the introduction of the EU's direct area payment scheme in 1992 suggest that the base area provision imposes a slight constraint for some member States. Accordingly, the simulations carried out with the PEM crop model show that this provision has very little impact on the degree of decoupling of EU payments based on area planted. On the other hand, observed data suggest that the set-aside provision is quite effective in limiting the cultivated crop area at the individual farm level and so also at member State and EU level. Simulation results confirm that the set-aside provision increases the degree of effective decoupling of EU area payments. However, it should be noted that quantitative constraints are

usually put in place in order to limit the budgetary costs or the distortions caused by support policies already in place. In that sense, a set of policy instruments that includes a binding quantitative restriction may be less coupled than in the absence of the restraint. However, the resulting edifice of off-setting measures may make agriculture less responsive to market signals.

Conditions attached to area based payments

The implications of conditions attached to area based payments are explored in OECD (2005b). It is found that the absence of an obligation to produce can reduce the aggregate production response, but it is not a sufficient condition for a payment to be effectively fully decoupled. Other current conditions attached to payments, such as excluding the production of some commodities, requiring minimum maintenance activities on the land or imposing cross compliance conditions may create incentives to change production patterns. A detailed analysis of each condition for each case can provide insights about the likely direction these effects will take. The exact magnitude of these effects remains an unsolved empirical question.

Risk effects

Insurance and wealth effects

The statistical analysis shows that most PSE categories implicitly or explicitly reduce the variability of receipts in most OECD countries. Even if market price support is the main risk reducing type of support, in some countries other categories of payments also smooth the variability of receipts from the market.

Whenever estimation of behaviour with respect to risk has been possible, it was found that risk variables are significant in decision making. Across the whole range of policy interventions, these risk-related impacts on production have to be considered in addition to the direct price impacts already estimated. Estimation results in OECD (2002a), (2002b), (2005a), (2005c) and other estimations in the literature confirm that farmers are risk averse. This does not mean that all farmers are risk averse or have the same degree of risk aversion. The estimated values of the risk aversion parameters are in the lower range of what can be found in the literature. However, when the estimated risk aversion parameters are plugged into the PEM model, large risk related impacts on production are found for at least some PSE categories (OECD, 2002d). In some cases, the risk related effects are estimated to be larger than the traditional relative price effects. All the relevant studies conclude that among the risk-related effects, insurance

effects (associated with direct reduction in risk or variability) tend to be much larger than the wealth effects (associated with reduction in risk aversion when farmers become wealthier).

In the past, the truncation of the distribution of producer prices by the EU intervention price has created significant insurance effects. Statistical analysis of the risk reducing effects of each PSE category confirms this result. Indeed, it is found that in most OECD countries the most important risk reducing support category is market price support. The support provided to market prices is not usually given in the form of simple tariffs; this very fact often reduces the transmission of world price variability into domestic prices and generates risk related effects. There are other mechanisms (*e.g.* quantitative restrictions on imports, TRQs) that smooth or prevent the transmission of world market signals to domestic producers. In these cases, including risk related effects might make support to market prices more production distorting than otherwise.

Payments based on area planted in the European Union have moderate effects in reducing relative variability and moderate wealth effects. Policies that are designed or implemented with the intention of reducing variability in market receipts are able to smooth the revenues of farmers and have more significant insurance effects. This is the case of the market loss assistance payments in the US. These payments were increased when market prices were low and vice versa. Both Production Flexibility Contract (PFC) and Market Loss Assistance (MLA) payments are found in some studies that are reported in OECD (2004a) to have an impact on production.

The study on PSE and risk (OECD, 2002d) shows that large risk reducing programmes like Loan Deficiency Payments in the US and the *ad hoc* Market Loss Assistance (MLA) payments paid per historical hectare have insurance effects that can be much larger than their relative price effects. They can be especially larger for the latter with relatively small price effects, but large income transfer efficiency.⁵ Their impact on production (albeit small) is estimated to be ten times larger when risk related effects are included. Those risk effects are due to the MLA payments and not the fixed AMTA payments. The study on Italian programmes (OECD, 2005a) estimates risk effects associated with the intervention price scheme that are much larger than the corresponding relative price effects. However, this latter result may reflect the difficulty in disentangling the two types of

5. Income transfer efficiency is an indicator of the efficiency of a given measure for transferring net income to farmers and it is measured as the percentage of the government transfer that reached the pocket of the farmer as additional net income.

effects when both originate in the same policy variable; that is, the intervention price.

Wealth effects due to farmers becoming less risk averse when they are wealthier are estimated to be rather small across all of the studies. The magnitude of the wealth effects is correlated to the transfer efficiency of the PSE measures, *i.e.* to the extent to which the measures are successful in actually increasing farmers' net income. This, in turn, is related to the extent to which farmers own or rent the lands that they farm and is a factor that may prove particularly important when measuring income related effects such as the impacts on investment. The background studies sought to measure risk and investment-related income effects, but did not address other areas, such as imperfect labour markets where higher income or wealth may affect production decisions through labour/leisure trade-offs.

Insurance subsidies and interaction among risk reducing policies and strategies

Insurance subsidies have an impact on production to the extent that farmers are risk averse and, therefore, willing to buy insurance at subsidised rates. The study on insurance programmes in Spain finds small, but statistically significant, area and production impacts of insurance subsidies. Insurance is a special kind of input. The way insurance substitutes for other kinds of inputs in agriculture is not obvious and the results from this study are not conclusive. Insurance subsidies are estimated to increase yields (the use of other inputs), although overall, estimated impacts on production would seem to be smaller than those of payments based on planted area. Further work is required before definitive conclusions can be drawn about the relative production effects of insurance subsidies as compared to other forms of support.

According to the micro data used in OECD (2004c), risk reducing measures are more effective in reducing risk if they are targeted to the main source of variability of returns; in this example they are targeted to yields rather than prices. Support that encourages the use of market strategies tends to be more efficient in reducing risk. The illustrative simulations in OECD (2004c) conclude that there can be important crowding out effects of risk reducing support measures on market strategies with potential perverse effects on risk reduction. In any case, all measures that reduce the variability of farming risk have an impact on production that is often strongly correlated with their effectiveness in reducing risk.

Smoothing supply response

Theoretical considerations suggested that the base area and set-aside provisions in the EU could reduce the response of domestic crop markets to world market shocks. However, it was found that these provisions had very limited impact on such a response in the case of base area provisions (OECD, 2002c).

Risk reducing policy measures have the effect of smoothing the volatility of world price signals that are passed through to domestic markets. Results in OECD (2002c) suggest that partial or zero price transmission in main OECD countries may have a large impact in increasing the variability of world prices. In other words, this study shows that risk reducing effects of policies in the country where they are implemented and the increase in risk faced by producers in third countries are two sides of the same coin.

Dynamic effects

Expectations

All the econometric studies carried out for this project [OECD (2002a,b) (2005a,c)] find that most of the estimated parameters for price expectations are significant. This is a logical result: farmers use available information about prices in order to infer what current and future prices will be. However, the most appropriate way to model price expectations is not easy to decide. In many cases, the decision is constrained by the structure of the model and availability of data.

The study on risk and PSEs (OECD, 2002d) assumes that expectation effects also occur with payments: farmers use available information about payments in order to infer what future payments will be. Under this assumption and building expected distributions of payments on the basis of the past, the study finds that expectations of future payments — and especially their correlation with market prices — can have important risk related effects on current production decisions.

In general, expectations concerning future policies and, particularly, the possibility of updating base area or yields will most likely affect production decisions. This hypothesis is analysed with several examples in OECD (2005b). There are well founded economic reasons as to why expectations of future policies can affect current production. However, there is no single agreed framework explaining how these expectations are created, nor about the underlying decision process concerning future policies. If the expectation of updating base area and yields has been created and is confirmed, this will generate the strongest production responses. If,

however, the update is uncertain and only voluntary, the expectations effect of production can be significantly reduced.

Investment

All agricultural support programmes studied in OECD (2005a) and (2005c) are estimated to have some impact on investment, sometimes changing investment by as much as 20%. The reduction in the variability of returns due to support measures seems to be the main source of the investment effects: making returns more certain creates incentives to invest. The investment effects of payments based on planted area in the Italian study are found to be smaller than those of price support. The results from the study on Manitoba are consistent with the idea that more decoupled programmes have larger income effects on investment but smaller relative price effects. But it is difficult from this evidence to infer general rules about the relative dimension of investment effects of different types of programmes. The Italian study also estimates that the investment effects on production are smaller than the more direct relative price or risk related effects.

Degree of decoupling of different measures

An attempt has been made to summarise the results from each of the studies using a summary measure of the degree of effective coupling/decoupling. This was possible in only some of the studies. This measure is the total production ratio defined as the ratio between the production impact of one additional dollar spent on a given measure, and the impact of the same dollar spent as market price support. It can be calculated using the estimated equations and simulations.

All the available production impact ratios are summarised in Table 1. Whenever more than one ratio was estimated, only one was selected or calculated⁶. However, given the different nature of the modelling frameworks and the databases used in each case the results must be interpreted with considerable caution and are not, strictly speaking, comparable across the different studies⁷. Different institutional frameworks

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6. The main commodity in each study was selected when ratios were available for several commodities. When results were available for several countries, an average across countries was calculated.
 7. Results shown in the first three rows of Table 1 are derived from the PEM model and are subject to the usual caveats. These are explained in detail in OECD (2001a) which also reports the extensive sensitivity analysis undertaken.

with an impact on different kinds of market imperfections, may also affect comparability and there are, of course, differences in the country and commodity coverage. Different methodologies and data sources also make comparisons difficult, particularly between the results based on simulations with the aggregate PEM model as compared to results from econometric studies using micro data. The results from simulations using the PEM model allow for the adjustment of all factors of production, with more or less rigidity depending on the corresponding factor supply elasticities. The adjustment, however, of “quasi fixed” factors such as family labour and capital is controlled in the estimated econometric studies. This and the different adjustment potential at the individual and aggregate levels introduce further caveats about comparisons among the studies. All the figures in Table 1 are illustrative and should not be interpreted as definitive estimates of the actual degree of coupling / decoupling of different PSE measures. They show that the numerical value of the impact ratios for each type of support can be very sensitive to the design of the experiment, the data source, the country, and the underlying analytical/empirical framework.

The studies about payments based on area planted in the EU show, in general, higher production impact ratios when non-price effects are included. As expected, prices supported through the system of intervention prices have larger risk related effects than do these area payments that are not counter-cyclical. The results vary significantly from one study to another, although, as noted, they are not strictly comparable. The econometric study (OECD, 2002a) shows an average production ratio from econometric estimations in Italy as high as 0.9 for single commodity support (*i.e.* payments based on area planted with a specific commodity have almost as much impact on production as market price support). However, this ratio was calculated with a slightly different methodology that introduces some cross effects from changes in prices and payments of other crops. Results in OECD (2005a) are obtained from the same Italian micro data, but with a different estimation methodology, using equations that account for dynamic investment effects. The ratios obtained are smaller (0.25) and more in line with the simulation results in OECD (2001a). The study on Spain (OECD, 2002b) estimates production ratios of 1.3. Results in studies OECD (2002a), (2002b), and (2005a) rely on short time series and large cross section variability, which may bias the results in favour of area response rather than yield response, which may affect those ratios. Including compulsory set-aside in the simulations of EU area payments in OECD (2002c) lowers the production ratio of relative effects to as low as 0.02 when payments are provided across all crops. This low production ratio applies only at the margin when the constraints are binding. For this and for the reasons already explained these results should be interpreted with caution and do not claim

to be in any way definitive on the degree of coupling/decoupling of EU area payments.

Simulations which include risk-related effects of payments based on historical hectares (including MLA payments in the United States) brings average production ratios of this category of support to 0.18 in OECD (2002d). This higher number is due to MLA payments that are provided counter-cyclically and not to fixed AMTA payments. No estimation of this nature was identified in the empirical literature review in OECD (2004a).

Payments based on output are found to have an average production ratio of 2.16 in OECD (2002d). The strong counter-cyclical component of this kind of payment in some countries can explain the fact that much larger impacts on production compared with price support are estimated. Payments based on general input use are studied in OECD (2001a), which finds production ratios of 1.6. OECD (2002b) investigates one specific type of input, which is insurance. A production ratio of 1.0 is found but cannot be extrapolated to other inputs or to other insurance subsidy programmes.

Levels of support

Highly decoupled support programmes may have a large total impact on production if the total level of support is high (OECD, 2005b). The estimated degrees of decoupling must be interpreted in the context of the whole programme and the complete relationship between support and production. When payments are not fully decoupled, the higher the payment, the bigger the impact on production. Furthermore, extrapolating marginal results in order to obtain the total impact can be misleading and may require empirical investigation because the relationship between support and production may not be linear. For instance, extrapolating results from marginal results from simulation models like PEM typically underestimate the total impact on production of programmes involving high support levels (OECD, 2001a and 2005b).

Table 1. Production impact ratios from the different studies

	Included effects (P=price, R=risk, I=Investment)	Payments based on inputs	Payments based on output main crop	Market price support	Payments based on area planted of main crop	Payments based on area planted of all crops	Payments based on historical entitlements
Studies based on a Simulation aggregate Model (PEM)							
<i>OECD (2001a): Market effects</i>							
Average across six countries	P	1.59	1.36	1.00	0.39	0.20	0.07
<i>OECD (2002d): Risk in crops PSEs</i>							
Average across available countries	P & R		2.16	1.00	0.45		0.18 ¹
<i>OECD (2002c): Quantitative constraints</i>							
Wheat with base area and set-aside	P			1.00		0.02	
<i>Econometric studies using micro data</i>							
<i>OECD (2002b): Spanish Insurance studies</i>							
Cereals (Spain)	P, R & I	1.00 ³		1.00		1.30	
<i>OECD (2002a): Italian risk study</i>							
Durum wheat (Italy), average	P & R			1.00	0.90 ²		
<i>OECD (2005a): Italian Investment studies</i>							
Durum wheat (Italy)	P, R & I			1.00	0.25	0.22	

This table must be read with caution given the different methodologies, data sources, and country/commodity coverage in each case. Figures should not be directly compared and should be considered as illustrative rather than definitive.

1. This higher ratio is mainly due to the risk reducing effects of the Market Loss Assistance (MLA) payments in the United States and not to other payments also classified as based on historical entitlements that are fixed, such as AMTA payments.

2. This ratio is calculated for durum wheat, but the simulations on which it is based included payments based on area planted and price support for other crops. Calculations are made for the individual farmers and an average is then calculated.

3. This ratio for insurance subsidies should be interpreted with caution because the simulated increase in insurance subsidies is probably too big to be realistic.

Conclusions and policy implications

Decoupling support from producer decisions has become an important ingredient in agricultural policies of a growing number of OECD countries. Over a number of years now, OECD analysis has contributed to clarifying the implications of policies with different degrees of decoupling. Probably the most important finding of this analysis is the following ranking of stylised PSE measures from more coupled to more decoupled: payments based on input use, market price support/payments based on output, payments based on area planted and payments based on historical entitlements. This general ranking emerged already from the initial analysis of production impacts of different support measures. The set of additional studies pursued later and also summarized in this study confirms that this ranking is relatively robust. However, the degree of decoupling is found to be a continuum and the details of the implementation of each programme in each country are found to be important in determining its impact on production and, therefore, its degree of decoupling as compared to other measures. In this context, several conclusions and implications for reducing the link between agricultural support and farm production decisions (*i.e.* for decoupling) have been obtained⁸:

- (a) *There are differences in production effects between different policy instruments but all agriculture specific support measures investigated have some effect on production.*

The approach in this study to the question of whether a policy measure is decoupled or not is essentially an empirical one. The five econometric studies all found statistically significant effects on land allocation and/or production and/or investment decisions for all types of payments studied. More generally it suffices that a measure be contingent on the recipient being involved in farming, for the measure to have some effect on production. The greater the freedom of choice given to the producer on whether to produce at all and on what to produce, the smaller the effects of a policy measure. The research reported here indicates that the differences between measures generally remain significant under different technical approaches, implying that efficiency gains can always be made by switching to policy instruments with higher degrees of decoupling.

8. Each conclusion is underpinned by one or several of the studies in the project. See Table A1 in Annex I in the annex for the source of each implication.

- (b) *There is evidence that the yield response to area payments is smaller than for price support, but the magnitude of this difference, which is crucial for determining the degree of decoupling of area payments, is not well known.*

Reforms towards more decoupled payments have often focused on shifting from price support to payments based on area, and this step does represent a move towards more decoupled support. However, the underlying theoretical base and the empirical estimation of the degree of decoupling of those payments need further investigation. Conditions attached to area payments, risk effects and dynamic effects can alter their linkage to area and yield responses and have been investigated in the studies discussed in this report. There are very few published studies investigating these empirical relationships and policy makers would significantly gain from this type of research. The use of micro farm household data has proved to be a promising avenue of research.

- (c) *There is evidence that payments that are based on historical area with wider freedom to plant (or not to plant) are more decoupled than payments based on area planted.*

There is a strong theoretical basis for this result, which is confirmed by the results from simulation models: the larger the freedom to plant, the smaller the potential for production incentives. However, the magnitude of these differences needs further investigation using econometric techniques. It may be possible to improve further the degree of decoupling by eliminating all current planting restrictions (on all current conditions) but to date no such policy has been implemented and therefore at present no empirical investigation of the impacts of such a policy is yet possible.

- (d) *Reducing the risk faced by farmers increases production and also the risk born by third-country producers.*

The available evidence suggests that farmers do not like income variability from one year to another. Policies that reduce the income variability faced by farmers will have impacts on production decisions. In all the studies that tackle the issue, risk related effects are large, and could be of similar magnitude to the standard relative price effects. Risk reducing policies may crowd out other risk reducing strategies and have a perverse effect on farmer's risk. Furthermore, the lack of adjustment in the domestic market due to a risk reducing policy creates additional world price variability for producers in other countries and may generate demand for further risk reducing policies. For all these reasons it is important to take the risk dimension of policies into account when designing decoupled payments.

- (e) *Support measures that are counter-cyclical have risk related impacts on production.*

Because of these risk-related impacts, for a given expenditure, policy measures that have counter-cyclical design features have bigger impact on production than a similar policy instrument, but without the counter-cyclical component, everything else being the same. For instance, there is some evidence that AMTA payments in the United States (a fixed payment per historical tonne) may have significantly smaller effects than MLA payments, the latter being related to current prices. As well, it is clear that market price support measures impede or prevent the transmission of world price signals to domestic markets, through, for example, the use of prohibitive tariffs. The level of price support is counter-cyclical, fluctuating relative to current border prices, and this exacerbates the trade distorting impact of price support as compared to other support measures that do not directly reduce the transmission of price signals. Given the importance of market price support in total support, changing the policy set to allow for price transmission (for example, applying simple tariffs that are not prohibitive) could significantly reduce production impacts.

- (f) *Support based on current conditions or market variables may create production incentives.*

All programmes can have important incentive effects through risk and other effects, if the amount of the support is decided on the basis of current conditions or current market variables. This is true even if the disbursement conditions are not current (*e.g.* they are based on historic entitlements). Direct payments with no requirement to produce may still have some impacts on production if some current conditions are attached to the payments. For instance, current conditions such as the exclusion of the production of some commodities in the eligible land or the requirement to respect some cross compliance conditions may affect the production mix of farmers.

- (g) *Ad hoc policy decisions about payments may create expectations and potentially affect production.*

The degree of decoupling of a given measure is not only related to the written rules governing it. *Ad hoc* decisions on the amounts or the rules create expectations concerning the future. This is especially the case when it is known that these decisions have been taken in response to current market conditions. For instance, increasing the amount of a given payment when market prices are low will create an expectation of reduced

variability. These kinds of *ad hoc* adjustments in policy affect current production decisions, irrespective of the category of support used.

- (h) *Quantitative constraints on production and land or input use will be most effective if they are binding at the individual producer level.*

The study on quantitative constraints shows that these constraints will reduce the production impacts of agricultural support measures only if they are binding at the level at which the relevant production decisions are taken. That is usually the individual farm level. Therefore, effective, binding, quantitative constraints, by which is meant that production is smaller than it would have been without the constraint, have to be imposed directly on individual farmers. It should be noted, however, that quantitative constraints are not consistent with the idea that agriculture should be responsive to market signals.

- (i) *Agricultural support measures generate significant incentives to invest in agriculture, but the little evidence available shows relatively small investment-related effects on production.*

The reduction of risk is found to be the main driving force affecting investment. Despite the significant differences in the investment effects across different programmes, there is little evidence of some particular type of policy instrument or characteristic generating larger investment effects than others.

- (j) *The magnitude of production effects depends both on policy design and “size.”*

There are policy instruments and particular characteristics of policy instruments that are found to be more decoupled than others. However, even instruments with a relatively high degree of decoupling may have significant effects on production and trade. This can happen simply because the programme is big (*i.e.* expenditure is high), and also because the impact of a given measure depends on the starting point. If the existing level of support is high the effect per currency unit may be lower than if the starting point was no, or low, support. If total support is very large, the total effect is likely to be also large.

The studies reported here are consistent with and deepen the findings from earlier work showing that there are efficiency gains and reductions in trade distortions to be obtained by moving away from market price support into area based payments, especially if there are no requirements about how to use the land. Results concerning production and trade impacts through risk-reduction, through increases in income or wealth and through other channels suggest that the differences in the degree of decoupling of different policy instruments may be less than when only direct price impacts are

measured. The hierarchy of impacts — from least decoupled variable input subsidies and market price support to most decoupled payments based on historical entitlements — is confirmed in general terms. Insight has also been gained into the importance of the level of support in determining the degree of decoupling.

In considering future policy options, the finding that both implementation criteria and programme size determine production impacts is extremely important. To avoid undesired and unintended production and trade impacts, policies will need to have both specific, well-defined implementation criteria and corresponding limits on the amount and duration of policy support. To be effective in achieving their objectives, policies will need to have those objectives clearly and explicitly described. These three requirements for more effective, lower cost and less distorting policies can be mutually supportive. Policy support that is targeted to some specific objective, with correspondingly well-defined implementation criteria — whether the objective is related to a farm practice, a geographic area, or an individual or group — will cost less than policy support that is universally available. While transactions costs may be higher for some targeted policies, it is necessary to consider all costs (policy support costs as well as transactions costs, for example) and benefits (for example, any increase in policy effectiveness and any decrease in unwanted production and trade effects) to confirm whether or not the targeted policy option is always the optimal one.

The evidence presented here clearly demonstrates that decoupling support from production decisions is an essential step in limiting unwanted impacts of many traditional policy approaches. This understanding is widely held and is already being acted upon by many governments. But there are also other policy approaches that have not been examined here, including measures that are not linked to commodity production or factors of production, and that aim to ensure sustainable use of land and water resources, to improve rural and remote community well-being, to stabilize unavoidable income fluctuations for farm families, and so on. Such measures address evolving interests in society and seem increasingly important to many governments. Decoupling is in itself not sufficient to ensure that such a diversity of policy objectives are in fact achieved. A second step is required to specify those policy objectives and to link directly any policy support (type, amount and duration) to those objectives. This, of course, is a complex issue which is being analyzed in other OECD work.

Much of this summary report is based on studies that involved intensive analysis of micro-economic data, with the main focus on the arable crop sector and area payments. The results of each of these studies are influenced

by specific structural characteristics of the countries and commodities investigated. Increased confidence and further insights would undoubtedly be gained if additional analyses of the same kind were to be undertaken for a broader range of countries, regions and commodities. The OECD's body of research has identified types of policies that could affect production and that merit further investigation. Such exploration of agricultural policy reform can only be undertaken, however, on the basis of data that must be collected, disseminated and subject to careful empirical analysis.

Annex 1.

Which Issues Have Been Tackled?

The publication *Market Effects of Crop Support Measures* (OECD 2001a) focused on the standard relative price effects of policy measures. The objective was to assess the production and trade impacts of various categories of policy measures, through their relative price effects, in order to be able to classify them according to their degree of decoupling. The analysis was carried out using the PEM crop model, which is directly linked to the PSE database. Based on the classification adopted in the PSE database, five stylized crop support measures were analyzed: market price support, payments based on output, payments based on variable input use, payments based on area planted and payments based on historical entitlements.

The results obtained in OECD (2001a) refer only to relative price effects of policies. Do these results, and especially the rank ordering of categories of support according to their degree of decoupling, remain valid when production and trade effects of policies through other channels are taken into account? This question is at the heart of the work on decoupling. As mentioned above, there are multiple mechanisms through which policy measures may affect farmers' production decisions. A first phase of the decoupling project focused mainly on two aspects: quantitative constraints, as part of the static effects of policies, on the one hand, and risk-related effects of policies on the other hand. Other aspects, in particular investment effects were taken up in more depth in the second phase of the project.

All studies are listed in Table A1, with complete reference for each at the end of the study. Most of the studies are of an empirical nature, but use different methods (simulation models and econometric estimations) and data (aggregate versus microeconomic data) and rely on different country examples. Annex 2 contains a summary of the method and the main results obtained in each study.

Table A1. Issues tackled in the studies on decoupling

Study, Topic or Method	Effects covered (S=Static, R=Risk, D=Dynamic) / Conclusions affected	Country coverage	Levels of support	PSE coverage					Static effects			Risk effects		Dynamic effects		
				- Market Price support	- Pay. based on output	- Pay. based on area planted	- Pay. on Hist. Entitlement	- Pay. on use of inputs	- Relative price effects	- Production constraints	- Imperfect input markets	- Insurance effects	- Wealth effects	- Expectations	- Investment	- Full decoupling
Conceptual / illustrative examples/ literature reviews																
OECD (2001b) Conceptual Overview	S,R,D / a - j		X	X	X	X	x	X	X	X	X	X	X	X	X	X
OECD (2004a) Review of Studies on US payments	S,R,D / a,b	US			X		X		X		X	X	X		X	
OECD (2005b) Decoupling - Illustrating some open questions on the production impacts of different agricultural policy instruments	S,D / a-c,f,g,j		X	X		X	X		X	X	X				X	X
OECD (2005d) Principal Findings on Investment	S,R,D / a,b,e,g,i	Italy and Manitoba									X				X	

Table A1. Issues tackled in the studies on decoupling (cont.)

Study, Topic or Method	Effects covered (S=Static, R=Risk, D=Dynamic) / Conclusions affected	Country coverage	Levels of support	PSE coverage					Static effects			Risk effects		Dynamic effects		
				- Market Price support	- Pay. based on output	- Pay. based on area planted	- Pay. on Hist. Entitlement	- Pay. on use of inputs	- Relative price effects	- Production constraints	- Imperfect input markets	- Insurance effects	- Wealth effects	- Expectations	- Investment	- Full decoupling
Simulation models																
OECD (2001a) The Market Effects of Crop Support Measures	S / a,b,c,f,j	OECD		X	X	X	X	X	X							
OECD (2002c) Quantitative Constraints	S / a,b,h	EU		X		X			X	X					X	
OECD (2002d) Risk and crops PSEs	S,R / a - f	All OECD		X	X	X	X	X	X			X	X	X	X	
OECD (2004c) Risk reducing Policies / micro	S,R / a,b,d,e		X	X	X	X	X	X	X			X	X			

Table A1. Issues tackled in the studies on decoupling (cont.)

Study, Topic or Method	Effects covered (S=Static, R=Risk, D=Dynamic) Conclusions affected	Country coverage	Levels of support	PSE coverage					Static effects			Risk effects		Dynamic effects		
				- Market Price support	- Pay. based on output	- Pay. based on area planted	- Pay. on Hist. Entitlement	- Pay. on use of inputs	- Relative price effects	- Production constraints	- Imperfect input markets	- Insurance effects	- Wealth effects	- Expectations	- Investment	- Full decoupling
Econometric studies																
OECD (2002a) Risk in EU Area Payments /micro	S,R / a,b,d,e	EU		X	X				X	X		X	X		X	
OECD (2002b) Insurance Programmes /micro	S,R/ a,b,d	Spain		X	X		X		X			X	X		X	
OECD (2004b) Yields response to area payments(aggr.)	S/ a,b	EU		X	X				X							
OECD (2005a) Investment response / micro data	S,R,D/ a,b,d,e,i	Italy		X	X				X	X	X	X	X		X X	
OECD (2005c) Investment response / aggregate data	S,R,D/ a,b,d,e,i	Manitoba			X		X	X	X		X	X	X		X X	

See Annex B for full references to the econometric studies.

Further empirical studies may be necessary to support robust conclusions. With this in mind extensive consultations have been embarked on with academic researchers who can contribute to the empirical literature in an area where empirical evidence is still scarce. The OECD has brought the outstanding empirical questions on decoupling to the attention of both policy makers and researchers with a view to increasing the priority given to this type of work. However, to fully explore the technical difficulties of this agenda is well beyond OECD means, objectives and comparative advantage. Nevertheless, the policy implications deduced from the work already undertaken and the results obtained are judged sufficiently interesting to warrant reporting in a single study. Several studies that have been undertaken are somewhat technical in nature, using a variety of modelling and regression techniques, and several include the analysis of farm level data. The results are presented first, followed by a non-technical summary of the main conclusions and policy implications that can be drawn.

Each empirical study tackles some of the issues defined in the broad conceptual framework on decoupling. Table 1 shows the issues covered in each study. The coverage differs because of the type of support measures analysed, and the type of effects or questions that are raised. Apart from the conceptual framework (OECD, 2001b), three other studies involve some investigation of all the main PSE categories of measures: a general study on the production and trade impacts of policies using the PEM model with relative price effects only (OECD, 2001a) and with relative price and risk-related effects (OECD, 2002d), and the micro simulation model of risk reducing strategies (OECD, 2004c). Other studies cover only some of these categories. Four studies focus on the EU area payments introduced in 1992, but other support mechanisms in force in the Common Market Organisation for arable crops (corresponding to the market price support category in the PSE classification) are also considered: OECD (2002c) on quantitative constraints; OECD (2002a) on risk effects; OECD (2004b) on yield response and OECD (2005a) on investment response.

Three studies analyse the main support measures for crops in specific countries: the United States (OECD, 2004a), in the province of Manitoba, Canada (OECD, 2005c), and in Spain, particularly insurance subsidies (OECD, 2002b). The illustrative study (OECD, 2005b) focuses on area based payments even if the issues raised are of a broader nature: the impact on production based on the current conditions attached to payments, policy expectations and different levels of support.

Static effects

Relative price effects of crop support measures were studied systematically using the PEM model. The main findings in this area obtained using the PSE database and the PEM crop model were reported in OECD (2001a). This study compares the impact on production and trade of different, stylized categories of support from the PSE classification. A set of simulations involving small, equal changes in support in the different policy categories allowed the production and trade impacts to be compared. All the other studies on decoupling include the relevant relative price effects of policies, but they try to include other effects also for the purpose of comparison. *Quantitative constraints* have been dealt with in the context of an application of the PEM crop model to analyse the impact of base area and set aside provisions on the degree of decoupling of EU 1992 area payments (OECD, 2002c).

The impact of the existence of *imperfect input markets* (e.g. for labour or credit) has not been explicitly tackled in any of the studies. However, the three studies on investment [OECD (2005a), (2005c) and (2005d)] refer implicitly or explicitly to the idea of some imperfections in capital markets. The literature review on recent US payments (OECD, 2004a) refers to decisions in markets other than land and output, and covers both static and other types of effects.

The work on decoupling has had a special focus on area based payments. Most of the programmes that are designed to be “more decoupled” have chosen to link payments to land (payments per hectare), with some strict or loose restrictions attached to the use of that land. In general, area payments are assumed to generate a smaller production response than other types of support measures that are linked to output or to more elastic inputs. This is basically due to the assumptions about yield response. Even if the land response to area payments should normally be larger than for price support, the yield response to area payments is expected to be much smaller or even negative (land substitutes some other non supported inputs). Meanwhile, the yield response to price support is also positive. Due to the lower elasticity of land supply as compared to other inputs, the net effect of the area and yield responses leads to a lower production impact of area payments as compared to price support. This is the “relative price” effects explanation for area payments being “more decoupled” than price support and it is the main driving force of the results in OECD (2001a) which use the PEM model.

The validity of this argument needs to be explored along at least three lines of research. First, it should be tested that observed yield response is consistent with this argumentation. This is done in OECD (2004b) where

yield response to the introduction of the 1992 area payments in the European Union is tested. Additionally, some results on yields are obtained in OECD (2002b) and in OECD (2005a). The second line of research refers to the conditions that are attached to the area receiving the payment, since the basis of the previous argumentation is that the same conditions are applied to area payments and price support. The conditions attached to area payments often affect the alternative uses of land that are permitted or excluded. Broader alternative uses of land (for instance, no requirement to produce) may generate additional cross commodity effects that, in general, reduce the total production response to payments. The potential impacts of these conditions are explored in section A of OECD (2005b) and the dimension of the cross effects is part of the analysis in several studies, such as OECD (2001a), (2002a), (2002d) and (2005d). Finally, the argumentation is based only on relative price incentives, while other effects associated with risk or dynamic are not considered.

Risk-related effects

Several studies explicitly include risk averse behaviour and estimate the magnitude of insurance and wealth effects. The study on risk and PSEs (OECD, 2002d) extends the analysis carried out in OECD (2001a) by considering not only the standard relative price effects of PSE measures but also their risk-related effects. This study relies on the hypothesis that farmers are risk averse under two different representations of risk preferences (CARA and DARA). The PSE measures are stylised; thus, the mechanisms by which the different measures modify the risk faced by farmers are not explicit. The other studies dealing with risk provide at least two important contributions: they provide some empirical evidence supporting the assumption that farmers are risk averse and they are more specific in the way they incorporate the effects of policy measures on the risk faced by farmers. The studies on EU area payments (OECD, 2002a and 2005a) model the risk-reducing effects of the EU cereal intervention price explicitly and obtain an econometric estimate of the risk behaviour of farmers. The study on insurance programmes and Spanish cereal farms (OECD, 2002b) focuses specifically on a risk-reducing tool: crop insurance. The two empirical studies on investment (OECD 2005a and 2005c) include in their analysis risk-related effects.

An important aspect of the risk-reducing policies is the interaction they may have with other policies and with risk reducing market strategies. A support programme oriented to reducing risk may not achieve this objective if it crowds out other policies or strategies and even impede market strategies to exist. OECD (2004c) tackles this interaction among different risk reducing policies and strategies.

Dynamic effects

Expectations of prices, which are sometimes affected by policy decisions, are explicitly included in three of the studies. The studies of EU area payments (OECD, 2002a and 2005a) and on insurance programmes in Spain (OECD, 2002b) use adaptive expectations to predict the mean of the price distribution and the Chavas and Holt (1990) price truncation method to calculate the variance/covariance matrix of prices in the European Union crops markets when there are intervention prices. The study on PSEs and risk (OECD, 2002d) deals with the *expectations of future payments*, assuming a kind of adaptive expectations approach for the distribution of farming receipts. The mean of each category of payments and the reduction in receipt variability from policy actions is extrapolated from the past to the future. The issue of expectations about future policy changes and, particularly, future updates of the base parameters defining the amount of future payments is illustrated with some examples in section B of OECD (2005b).

The dynamic dimension of production decisions creates a potential impact of policies through *investment* decisions. That is, support programmes may facilitate or create incentives to invest and, through this investment, induce additional production. Two empirical econometric studies have tackled this issue: an analysis of micro data in Italy (OECD, 2005a) and an aggregate analysis for the Canadian province of Manitoba (OECD, 2005c). OECD (2005d) by the Secretariat summarises the principal findings in the two technical studies.

The degree of decoupling of policy measures, according to the restrictive definition of decoupling (*full decoupling*), has been investigated in OECD (2002c) and (2002d) using the PEM crop model. The restrictive definition of decoupling refers to the impact of support measures on the degree of adjustment of production and trade when an external shock occurs. This restrictive definition directly refers to the contribution of policy measures in smoothing adjustments on domestic markets by “exporting” the need for adjustment to other countries, through trade quantity changes. Hence, to be relevant, analysing the extent to which a measure is fully decoupled requires using a world market equilibrium model such as the PEM crop model. It is particularly relevant to examine the impact of policy measures on the degree of adjustment of production and trade to an external shock in the context of the study dealing with quantitative constraints (OECD, 2002c). In the study on risk and PSEs (OECD, 2002d), attention is paid to the risk reducing effects of policy measures that result in the variability of receipts associated with shocks in the world markets not being transmitted to domestic producers. In this context, the extent to which policy

measures may contribute to the increase in world price variability is examined.

Levels of support

All the issues on decoupling that have been analysed so far have a direct incidence on the degree of decoupling of different support measures. This degree of decoupling is typically defined in terms of marginal impact on production. Whenever some marginal impact is estimated, it seems pertinent to question the production and trade impacts of the whole programme in absolute terms. The question concerning total impact when the level of support is potentially large is discussed in Section C of OECD (2005b).

Annex 2. Summary of the Methods and Main Results

OECD (2001a)

The Market Effects of Crop Support Measures by Jesús Antón and Joe Dewbre (OECD Secretariat)

<i>Method</i>	<i>Main Results</i>
<ul style="list-style-type: none"> • Development of a partial equilibrium model for crops with a representation of demand and supply in the output and inputs markets. • The model is static and deterministic, and the elasticities are calibrated from a review of the literature with a medium term horizon of response. • Stylised PSE measures are modelled as price gaps in the input or output markets. • Data: country aggregate annual data for main crops from PEM / PSE database 1986/98. 	<ul style="list-style-type: none"> • The following hierarchy from most to less production impacts is found: Variable input payments, Market price Support and Output payments, Area Payments and Payments based on Historical Entitlements. • Different measures differ also in their efficiency in transferring income to farmers. The hierarchy of measures according to their transfer efficiency is opposite to that for production impacts: from Payments based on Historical Entitlements to Payments based on variable input use.

OECD (2001b)

Decoupling: A Conceptual Overview by Jesús Antón (OECD Secretariat)

<i>Method</i>	<i>Main Results</i>
<ul style="list-style-type: none"> • Review of the literature on decoupling agricultural support. • Application of microeconomic analysis to the decoupling problem. • Identification of potential economic incentives and the underlying mechanisms 	<ul style="list-style-type: none"> • Definition of decoupling and development of the indicator “degree of decoupling • Definition of different types of effects to be empirically investigated. They are grouped into three areas: Static Effects, Risk Effects and Dynamic Effects

OECD (2002a) [AGR/CA/APM(2002)14/FINAL]

**Risk Related Non-Price Effects of the CAP Arable Crop Regime:
Results from a FADN Sample
by Paolo Sckokai (Universita' Cattolica di Piacenza, Italy)**

<i>Method</i>	<i>Main Results</i>
<ul style="list-style-type: none"> Theoretical model: Risk averse farmer facing risk on output prices, system of output supply, derived input demand and land allocation equations. Data: a sample of over 4 000 farms from 1993/99 FADN database (crop farms in Italy). Econometric estimation using sample and three sub-samples by farm size are considered. Scenario simulation: 5% reduction in cereals intervention prices with 50% area payments compensation. Controlled simulations to split the total effects in insurance, wealth and price effects. 	<ul style="list-style-type: none"> Farmers are risk averse with CRRRA in the range (0.06, 3.3) Large insurance effects of intervention prices: comparable in magnitude to standard price effects. The area payments bring land into production and have significant effects on production and yields. Cross effects can be very large, including cross insurance effects. Wealth effects tend to be rather small.

OECD (2002b) [AGR/CA/APM(2002)16/FINAL]

**The Impacts of Crop Insurance Subsidies on Production in Spain
by Alberto Garrido and Maria Bielza (Universidad Politécnica de Madrid, Spain)**

<i>Method</i>	<i>Main Results</i>
<ul style="list-style-type: none"> Empirical model to estimate the determinants of individual decisions about insurance demand, yields, land allocation and production. Comparison between premium paid and willingness to pay for insurance to estimate risk aversion. Econometric estimation Data: a sample of 19 377 cereal farms from ENESA database of cereal producers in Spain, 1990/2000 	<ul style="list-style-type: none"> Farmers are risk averse. CRRRA below 1. Insurance demand: ambiguous impact of yields and output prices. Insurance subsidies increase the demand for all types of insurance. Yields: increase with insurance subsidies and area payments. Production is increased by insurance subsidies, but lower impact of high coverage (yield)

OECD (2002c) [AGR/CA/APM(2002)12/FINAL]

**The Effects of Quantitative Constraints on the
Degree of Decoupling of PSE Measures**
by Chantal Le Mouël and Jesús Antón (OECD Secretariat)

<i>Method</i>	<i>Main Results</i>
<ul style="list-style-type: none"> • Application to base area and set-aside provisions of the EU area payments scheme. • Analysis of the nature of the economic incentives created by base area and set-aside provisions. • Re-specification of the EU land supply module of the PEM crop model. • Simulation of relevant policy scenarios with the modified version of the PEM crop model. • Data: country aggregate annual data for main crops from PEM / PSE database 1986/98 	<ul style="list-style-type: none"> • Base area: Slight constraint at the EU level. • Set-aside: Binding constraint at the EU, member States and individual producer level. • Base area: No or little impacts on the degree of decoupling of EU area payments. • Set-aside: Increases the degree of decoupling of EU area payments. • Base area and set-aside do not have marked effects on world price variability

OECD (2002d) [AGR/CA/APM(2002)13/FINAL]

Risk Effects of PSE Crop Measures
by Jesús Antón and Chantal Le Mouël (OECD Secretariat)

<i>Method</i>	<i>Main Results</i>
<ul style="list-style-type: none"> • Statistical analysis of revenue variability based on the PSE time series 1986-2000. • Development of a price premium to include risk effects in the PEM crop model. • PEM simulations to estimate production impacts and assess risk related effects of PSE measures. • Simulation of stochastic shocks in world markets under policy regimes that reduce revenue variability. • Sensitivity analysis of production ratios • Data: country aggregate annual data for main crops from PEM / PSE database 1986/98. 	<ul style="list-style-type: none"> • Most PSE categories in most countries reduce farmers' revenue variability. • The main risk reducing category is MPS: often reducing variability by half. • The magnitude of the insurance effects is large but differs across PSE categories and countries (up to 79%) • The wealth effects are small and strongly related to transfer efficiency. • Risk related effects may narrow differences in the production impact among PSE categories. • Reducing domestic risk increases world price variability.

OECD (2004a) [AGR/CA/APM(2004)21/FINAL]

**A Review of the Empirical Studies of the Acreage and Production Response
to US PFC Payments Under the FAIR Act and Related Payments
Under Supplementary Legislation
by David Abler and David Blandford (Pennsylvania State University)**

<i>Method</i>	<i>Main Results</i>
<ul style="list-style-type: none"> • Review of empirical literature by academic experts • Data: different in each article reviewed 	<ul style="list-style-type: none"> • There are very few econometric studies estimating the impacts of US payments. • The empirical literature supports the view that PFC and MLA payments had some impact on production. • Both planted area and the use of inputs, particularly farm household labour, were influenced by payments. • In general, the impacts are less than 15% of planted area • The results on the relative magnitude of PFC and MLA compared to price support are inconclusive

OECD (2004b) [AGR/CA/APM(2004)17/FINAL]

**The Impact on Yields of Arable Crops of Moving from
Price Support to Area Payments: A Study on the CAP Reform
by Catherine Benjamin and Magalie Houée (INRA Rennes)**

<i>Method</i>	<i>Main Results</i>
<ul style="list-style-type: none"> • Econometric estimate of yield equations of five crops in five EU countries • Time series analysis of average yields in each country • Data: Aggregate EU countries data 1990/2000. 	<ul style="list-style-type: none"> • The 1992 CAP area payments seem to have had an impact on reducing yields of the main crops in the main countries • However the impacts of prices and payments on yields are found to be weak and often statistically non-significant. • Further research may be needed to have more definitive conclusions about the yield response to prices and payments, using smaller geographical units or even micro data

OECD (2004c) [AGR/CA/APM(2004)16/FINAL]

**The Impact on Production Incentives of Different Risk Reducing Policies
by Jesús Antón and Céline Giner (OECD Secretariat)**

<i>Method</i>	<i>Main Results</i>
<ul style="list-style-type: none"> Analytical model of Bayesian decision making (expected utility) for an individual farmer under price and yield viability Numerical calibration of the model using individual micro data Monte Carlo simulations of response to different risk reducing support programmes Types of programmes analysed: price hedging, crop insurance, deficiency payments, and area-based countercyclical payments. Data: Average farm data from Kansas 1973/2003. 	<ul style="list-style-type: none"> If farmers are risk averse, no policy expenditure oriented to reduce the risk of farming can be production neutral. The better the policy is targeted to the main source of risk, the more effective it is in reducing farming risk Risk strategies interact with each other. When giving support through a risk reducing payment, some use of market strategies such as crop insurance or hedging, are normally crowded out. Often large impacts on reducing risk are also associated with large impacts on production.

OECD (2005a) [AGR/CA/APM(2005)13/FINAL]

**Modelling the Impact of Agricultural Policies on Farm Investment Under Uncertainty:
The Case of the CAP Arable Crop Regime
by Paolo Skokai (Universita' Cattolica di Piacenza, Italy)**

<i>Method</i>	<i>Main Results</i>
<ul style="list-style-type: none"> The theoretical model in [AGR/CA/APM(2002)14] is extended to include investment dynamic relations. Econometric estimation using a sample of farm level data from the FADN database (crop farms in Italy), period 1993-99. Three sub-samples by farm size are considered. Scenario simulation: 5% reduction in cereals intervention prices with 50% area payments compensation. Controlled simulations to split the total effects in insurance, wealth and price effects. Data: a sample of over 4 000 farms from 1993/99 FADN database (crop farms in Italy). 	<ul style="list-style-type: none"> Farmers are risk averse The results are influenced by the over-capitalisation of Italian farms in the sample (annual reductions of capital to long run equilibrium.) Partly due to this, weak linkages are estimated between investment and production. Scenario simulation: investment falls by 14%. Increase in price variability is the main driving force of this reduction. The production effects associated with investment are very small

OECD (2005b) [AGR/CA/APM(2005)11/FINAL]

Decoupling: Illustrating Some Open Questions on the Production Impact of Different Policy Instruments*by Jesús Antón, Franziska Junker and Céline Giner (OECD Secretariat)*

<i>Method</i>	<i>Main Results</i>
<ul style="list-style-type: none"> • Economic analysis of three issues on decoupling: <ul style="list-style-type: none"> A. Why Area based Payments may influence decisions on land use? B. The Impact on Production of Policy Expectations C. Impacts on Production of Different Levels of Support • Development of economically consistent illustrative examples • Data: Average data of Brandenbug region 2001 (A) and PEM/PSE crop data 2000 (B and C) 	<ul style="list-style-type: none"> • “More decoupled” payments are often area-based: current conditions attached create production response, even if production is not required • Expectations of policy changes or base updates can generate measurable production responses, but there is little knowledge of how expectations are formed in this area. • Highly decoupled programmes may have large total impact on production if the total level of support is high.

OECD (2005c) [AGR/CA/APM(2005)14/FINAL]

Dynamic Econometric Models of Crop Investment in Manitoba Under Risk Aversion and Uncertainty*by Barry Coyle (University of Manitoba)*

<i>Method</i>	<i>Main Results</i>
<ul style="list-style-type: none"> • Theoretical model: ADL model are argued to be more appropriate than Euler equation • Econometric estimation of ADL model. • Investigation of risk and returns incidence of different Canadian crop programmes. • Simulation of the programmes using the estimated equations and the measured programme incidence. • Data: aggregate investment data for crops in the province of Manitoba. Period 1960-2002 	<ul style="list-style-type: none"> • There is significant investment response to prices, variances and wealth, with the expected signs: positive, negative and positive, respectively. • NISA has a smaller impact on investment than GRIP. • WGTA are estimated to have price effects on investment much larger than wealth effects due to transition payments

OECD (2005d) [AGR/CA/APM(2005)12/FINAL]

**The Impact on Investment and Production of Different
Agricultural Policy Instruments – Principal Findings
by Jesús Antón (OECD Secretariat)**

<i>Method</i>	<i>Main Results</i>
<ul style="list-style-type: none">• Synthesis of empirical results obtained in two econometric studies on investment response on Italy [AGR/CA/APM(2005)13/FINAL] and on Manitoba [AGR/CA/APM(2005)14/FINAL].• Data: see study on Italy and Manitoba	<ul style="list-style-type: none">• There are significant investment response to agricultural support, but no clear relationship between the size of the response and the implementation criteria has been found• The production effects associated with this investment response are relatively small in the only study that tackles this issue

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