

BOX 4.2

Rural Development Measures: the new objectives of the CAP

The Rural Development Regulation focuses on three major objectives, which are reflected in thematic “Axes”:

Axis 1. Increasing the competitiveness of the agriculture and forestry sector. This includes measures for human resources (early retirement; young farmers; training and information and farm advisory services); physical capital (investments; processing and marketing; infrastructure improvements); quality of agricultural production and products (support for farmers participating in food quality schemes); and transitional measures (support for semi-subsistence farmers in the new member states; setting up of producer groups).

Axis 2. Improving the environment and countryside through support for land management. This Axis includes measures for sustainable use of agricultural land (mountainous and less-favoured areas; other areas with natural handicaps; support for non-productive investments; agri-environmental measures; animal welfare payments; and support for Natura 2000 – measures to preserve biodiversity); and for sustainable forestry (afforestation; agro-forestry; Natura 2000 forest areas; restoring forestry production potential; and support for non-productive investments).

Axis 3. Enhancing the quality of life in rural areas and promoting diversification of economic activities. This covers three groups of measures: quality of life (basic services for rural areas and population; renovation and development of villages; protection and conservation of the rural heritage); economic diversification (diversification to non-agricultural activities; support for micro-enterprises; agri-tourism); and training skills acquisition (training and information).

These thematic Axes – and particularly the third one – are complemented by support for Local Action Groups (public and private partnerships) under the Leader programme. The Leader approach, which supports both agricultural and non-agricultural activities, is integrated into the mainstream of rural development programmes and each programme will contain a Leader axis.

Member countries are required to spend a minimum of 10% of their EARDF funds on Axis 1, 25% on Axis 2, and 10% on Axis 3: 5% (2.5% in the new member states) of the EARDF funds must be devoted to Leader initiatives and all projects are to be co-financed. The co-financing comes from several sources – EU, national, local and municipal government, as well as private funds. Depending on the Axis, the EU budget provides between 20–55% (75% in “convergence regions”) financing of eligible costs.

Sources: EC Commission and OECD.

its implementation, with the general aim of reinforcing the coherence between agricultural policy and rural development.

The 2003 reform and the 2008 Health Check also provided extra funding for second pillar measures. The “modulation” of payments, which consists of siphoning off some of the SFP for the largest recipients, channels some money towards second pillar measures. A mechanism for financial discipline introduces a cap for payments at the national level so as to ensure that the farm budget fixed until 2013 is not exceeded.

In addition, the 2003 reform and the 2008 Health Check strengthen the linkage between first pillar payments and the respect of the environment, by linking the conditionality of the payments to a set of good practices, including environmental (see Box 4.1, under Conditionality). This is designed to increase the environmental impact of the new measures without increasing the corresponding budget. Another feature of the 1999, 2003 and 2008 reforms is that, concomitantly with the shift towards a rural policy (which is not subject to the provisions of the Rome Treaty designed to avoid distortions of competition by ensuring a single level of payments across the EU), a degree of decentralisation was introduced in the CAP. The executive responsibility over programming and implementation is devolved to member states. In the rural development area, national authorities can choose options in a menu of policies and may apply those more appropriate to local conditions. In the area of direct payments, modulation is partly optional and can be used for locally defined measures, while member states can choose the modalities for allocating SFPs as well leaving some payments coupled to production or not. EU support to agri-environmental measures contributes to covering a maximum of 85% of the cost in areas covered by “Objective 1” and 60% in other areas. Note that the 2003 reform modified the co-financing of EU rural development measures and introduced a financial discipline mechanism ensuring that farm budget was not exceeded.

The role of external pressures

Many of the pressures for reforming the CAP came from the budget. The increasing expenditures devoted to storage and export refunds in the 1980s played a major role in the 1992 CAP reform, whose main purpose was to reduce market imbalance. The need for changes in the CAP also stems from new demands from the civil society, i.e. for the environment. However, foreign pressure has been at least as important a catalyst. This is particularly the case of the pressure that was expressed through multilateral channels, as explained below.

The 1992 reform of the CAP took place during the Uruguay Round of multilateral trade negotiations. Although the Commission denied any formal link with the trade negotiation, the reform clearly helped the negotiations by meeting some of the fiercest criticism to the CAP. Without the external pressure of the WTO

negotiations, it is likely that the reforms would have been more oriented towards supply control.

The Uruguay round capped some direct payments. The pressure on the CAP was limited, thanks to the fact that a large share of the payments was eligible for “blue box” status (and therefore exempted from compulsory reduction) before being decoupled and hence (likely) eligible for “green box” status. The tariff cuts only put limited pressures on the CAP. They followed a phase of tariffication which had led to set tariffs at a level that was sometimes higher than the previous level of protection (the “dirty tariffication” issue, see Ingco and Hathaway, 1995). The WTO limit on export subsidies proved to be a major constraint on the CAP, since public intervention would now mean acquiring stocks that would become impossible to sell on the world market. This constraint clearly played a role in the decrease in intervention prices that took place under the 1999 reform.

More generally, the 1994 Agreement on Agriculture bound the definition of agricultural policies. A shift towards higher intervention prices, as requested by some farmers’ organisations, seemed out of the question. The possible conclusion of a WTO agreement under the Doha round was also anticipated during the 2003 reform. The decoupling of direct payments was motivated by EU internal reasons, namely the need to move away from “compensation” logic. However, the decoupling of the direct payments also aimed at lowering the actual Aggregate Measure of Support (AMS) and to anticipate the fact that the “blue box” category of payments is likely to disappear or be dramatically reduced under a potential WTO agreement. Thanks to the 2003 reform, a large cut (roughly 75%) in the EU AMS ceiling could be achieved without significant further reforms of the CAP (Butault and Bureau, 2006). The likely ban of export subsidies (whose principle was agreed in the 2004 Framework agreement, reiterated in the 2005 Hong Kong declaration, even though the EU indicated that it was subject to a full Doha agreement) is also binding for the design of the future CAP.

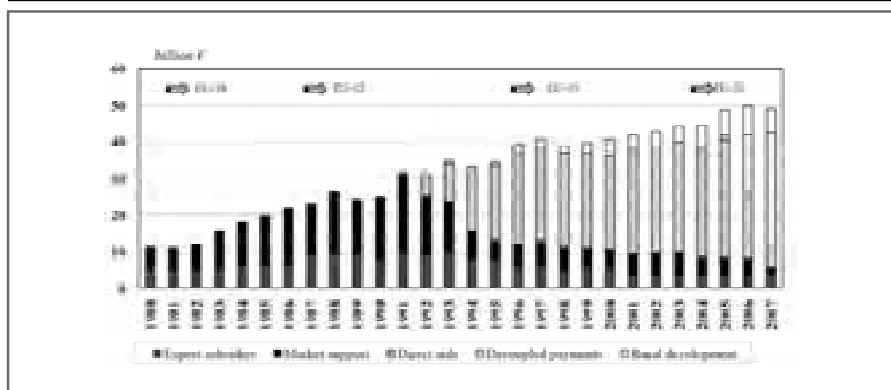
The market access provisions of a potential Doha agreement also constrain the design of the future CAP. The draft modalities that have been tabled at the end of 2008 would involve considerable cuts in tariffs. As a result, it is likely that, except for a limited number of tariff lines considered as “sensitive”, most EU products will no longer be significantly protected. With the size of cuts that are being discussed, a market management scheme such as intervention would no longer be sustainable since public purchases would be flooded by imports. In the case of sugar, but also bananas, the pressure for reform also came from WTO panels. Even without an agreement, the recent WTO jurisprudence (Canada Dairy and EU Sugar panels) suggests that many aspects of the CAP could be challenged, not only under the Uruguay Round Agreement on Agriculture, but also under the (potentially broader scoped) Subsidies and Countervailing Measures Agreement.

The provisions of the Uruguay Round Agreement and a potential Doha agricultural agreement are not the only multilateral pressures that have pressed for changes in the CAP. In the case of the sugar sector, the 2006 reform was driven by internal pressures but also by the new conditions created by the “Everything but Arms” initiative, i.e. a EU decision to open borders without restrictions to exports originating in the least developed countries (LDCs). This is also the case of the reform of the rice sector. Because of the export potential of LDCs in these sectors, the respective CMOs had to be dramatically modified. In the future, the pressures on the CAP coming from bilateral or regional agreement are likely to be significant.

The rationale of these policy changes in light of stated objectives

With the series of reforms that have taken place since 1992, the CAP has followed a consistent path. This path is in accordance with standard economic theory that recommends ensuring supply and demand through prices rather than supply control that generates rents, which capitalize in asset values and make changes difficult because of inheritance effects. Channelling taxpayers’ money towards direct payments to producers rather than using it for policies such as storage costs or export refunds that have only an indirect effect on producers’ income and are characterised by a low transfer-efficiency ratio, is also consistent with the targeting principle which remains a useful guideline for policy-making (Bhagwati, 1971). Direct payments are now the main component of the EU agricultural support provided to farmers, even though this total support is notoriously difficult to measure. Within 15 years, the considerable changes that took place in the CAP have led to a major shift of the farm support burden from consumers towards taxpayers. It has also led to changes in the composition of the EU budget (Figure 4.1), with the decoupled payments now representing the bulk of the EU farm budget.

FIGURE 4.1
Composition of the EU agricultural budget over time



Source: EC Commission figures

4.2 Effectiveness of farm policies in meeting their stated objectives

In spite of reforms, questions remain regarding the effectiveness of the “new CAP” for meeting stated objectives such as making the agricultural sector more productive, supporting farmer’s incomes and enhancing the multifunctional role of agriculture.

Efficiency in meeting productivity objectives

The initial CAP had strong ambitions regarding the increase in productivity. The “guidance” section of the early CAP budget was designed to improve structures, while the guaranteed prices intended, among other objectives, to provide a stable and predictable environment that would foster innovation. Productivity gains were considerable between the 1960s and the 1990s. This contrasts with the findings of studies over the recent period, which suggest that gains in total factor productivity of EU agriculture has slowed down (see Butault, 2008, for France; Newman and Matthews, 2007, for Ireland). It is unclear to what extent the EU productivity slowdown has been caused by the recent CAP reforms. Productivity figures might reflect the slower adjustment in inputs to the policies that have provided disincentives to increase output, such as the recent decoupling of direct payments, but the observed trends may also reflect a decreasing rate of technical change. One should not overestimate the contribution of the “old CAP” to productivity growth. However, the reforms of the CAP have focused on balancing supply and demand, on income support and on promoting non-conventional outputs (multifunctionality). As a result it is hard to find instruments in the “new CAP” intended specifically to increase productivity, even though this remains a stated objective of the CAP.

Farmers complain that regulations, such as restrictions to the use of genetically modified (GM) seeds and animal welfare regulations, the conditionality of payments and all of the administrative requirements for receiving payments reduce their competitiveness. One can argue that direct payments largely cover the costs induced by the conditions on environment, food safety and animal welfare that are requested. However, not all sectors affected by these restrictions/regulations perceive these direct payments (for the case of pig and poultry negatively affected by GMO regulations, see EC, 2008). Moreover the payments themselves have an ambiguous effect on productivity. In some sectors, direct payments now represent a considerable share of farm income (above 100% in some countries in the beef and sheep sectors, for example). That is, the CAP acts as a way to support incomes, rather than helping consolidation and building a more competitive sector. By providing financial security, the payments alleviate some of the credit constraints that reduce the adoption of innovation. On the other hand, they may also delay the exit of ageing farmers (Baum et al., 2006). It has even been suggested that they might have a negative impact on the restructuring of production structures in the new member states (Ciaian and Swinnen, 2006).

Efficiency in transferring income

Regarding the objective of increasing individual earnings, the “old CAP” showed poor transfer efficiency. By shifting to a system of decoupled payments, some of the deadweight losses associated to drawing resources artificially into the production of a supported commodity and deterring consumption of such a commodity because of higher prices have been reduced. Compared to the structure of the spending that was in place in the 1980s, where storage costs and export refunds represented the bulk of the expenditures, more of the taxpayers’ money now reaches producers. However, the move towards targeted payments to an individual farmer, overall, might have increased some of the management costs, which are not only borne by the EU budget but also by member states and by farmers themselves. These costs are often neglected by economists recommending a shift from market intervention to “lump sum” payments. The opportunity costs of public funds also need to be taken into account. This issue is particularly worrying in the case of direct payments under second-pillar programmes, where management costs are a significant share of the payments received by farmers. Even though the overall efficiency of these schemes should be measured with supplementary criteria (since their environmental impact is positive, rather than negative as is often the case with intensive agriculture), one should keep in mind that they perform poorly in terms of transaction costs and informational rents (Falconer and Whitby, 2000; Bonnieux, 2007; Bonnieux et al., 2008; Mettepenningen et al., 2008).

Leakages to unintended beneficiaries

The high level of direct payments also raises the issue of their macroeconomic effect and the fact that, through price adjustment, they may not fully benefit the intended beneficiary. Arguably, active farmers are the population group targeted by farm support. When an input is inelastic, payments to producers are often passed to the input supplier through an increase in price. The capitalisation of the payments (or other type of farm support) in assets such as “land” or “entitlements” is such that a large share of the support is passed to the asset owner, i.e. an unintended beneficiary (at least not in the stated objectives like the ones mentioned in the Rome Treaty). With asset values inflated by payments, young farmers must finance a higher initial investment and face the risk that future policy changes may affect the return on that investment. Even in countries where farmers own most of the land they cultivate (e.g. Poland, Italy, Greece), the leakage has a negative impact on structural change, since the most dynamic farmers are generally younger while land ownership is typically concentrated in older rural households. A share of the benefits of the CAP is transferred out of the sector each time a farmer has to make payments to siblings entitled to inheritance, or purchase of quotas or land from farmers leaving the sector. Retiring farmers are often the main beneficiary (in some EU countries, the EU milk quota, an asset with an implicit value that always finds a way to meet the market in spite of national regulators who sometimes set up

rules for limiting transferability, has almost become a substitute for low pensions for retiring farmers).

The extent to which such leakages take place varies across member states. Consider the case of direct payment land prices. The degree to which support is capitalised into land rents is a function of three main factors: (1) how the policy is implemented, specifically its initial incidence (targeted to land, inputs or labour); (2) the ease with which land can be shifted to alternative uses (the elasticity of supply); and (3) the ease with which land can be substituted with other factors of production (OECD, 2008b). In particular, there are countries where a market for premium entitlements is quite separate from the market for land and where support improbably leads to higher land prices. Matthews (2008) even points out that, given that the number of SFP entitlements is less than the number of eligible hectares in most member states, the value of the SFP should not be reflected in the price of land, and given that the direct payments which the SFP replaced were coupled payments, the 2003 decoupling should lead to a fall in the price of land. More generally, there is evidence that, even before the 2003 reform, not all payments were capitalised into land prices (Gohin 2006). Land prices are affected by a range of factors other than policy support, including planning regulations and expectations of capital gains. Changes in land rents since 2006 would be a better indicator of capitalisation, but data are scarce. Land rents seem to have increased significantly in new member states over the past 3 years, while they have tended to decrease in countries such as the UK and Ireland (Matthews, 2008). In the case of France, for example, specific legislation on land tenure has introduced a considerable viscosity in the pass-through of prices and payments to land rents and hence land values.

In the reformed CAP, most payments are still tied to land, i.e. the least mobile asset. In practice, the value of the SFP capitalised into land rents seems to depend on the ratio of the number of entitlements to the number of hectares of agricultural land as well as on the payment model (historic, regional or hybrid) in place (Isermeyer, 2003; Kilian and Salhofer, 2007). The pass-through of farm support to asset owners seems to be an issue in new member states, in particular in countries like Slovakia and Hungary, where farmland is rented to a large degree.

Efficiency of the “new CAP” in meeting new challenges

Since the 1990s and the debates on multifunctionality, the CAP has clearly been reformed so as to tackle new challenges such as providing amenities and reducing negative externalities. It is unclear, however, how well the CAP has performed in this area. The responsibility of the CAP in the poor environmental record of the EU agricultural sector is subject to controversies, and whether or not the recent reforms have made things better is unclear. There is little doubt that public policies have encouraged negative externalities.

In the past, high prices provided incentives to use larger amounts of fertilisers and pesticides. Ill-defined direct payments have encouraged the reduction of permanent grassland and the irrigation of some arable crops. Subsidies to land consolidation, drainage or irrigation have made things worse, contributing to the destruction of habitats such as wetlands (ECA, 2000). The reformed CAP has not fully managed to reverse these incentives in spite of repeatedly stated objectives. The 1992/1999 reforms have not led to visible diminution of the negative externalities over the 1990s. The 2003 reform, by introducing decoupling and eco-conditionality as part of cross-compliance, has reduced the incentives to increase yields by using larger amounts of chemical inputs. However, a link between payments and land has been maintained. By making risk-averse farmers wealthier, direct payments still provide an incentive to produce more with more variable inputs (Hennessy, 1998). In addition, the overall effects of decoupling are sometimes unclear. They seem to have ambiguous effects in areas such as Scotland, where the livestock sector has contracted in some extensive areas, but tended to concentrate in others. It seems that farmers have also anticipated future regulations by accelerating some degradation of habitats (the ploughing of permanent pastures, draining of wetlands in France) before the 2003 reform.

Agri-environmental schemes have been presented as a powerful way to curb the negative environmental impacts of the CAP since 1992. After more than 10 years of implementation, the various assessments suggest that they have benefited mainly producers who had low opportunity costs for implementing the environmental efforts. In most cases, these are also the farms where the environmental benefits are limited. The schemes that attracted contractors were often those with relatively lenient terms of references. That is, the pro-environment instruments of the CAP seem to offset only partially the environmentally negative consequences of the broader policy.

Meeting other rural development objectives

The Rural Development Regulation and the EFARD have brought some consistency among the various measures included under the term “rural development”. However, it remains difficult to assess the efficiency of a policy that is so broadly defined. Overall, for the period 2000–2006, the second pillar supported a menu of 22 measures, from which member countries are free to choose. The total second pillar budget for 2000–2006 was €60 billion for the EU (25 members) – just over 10% of the total CAP budget. For the 2007–2013 period, the second pillar budget is expected to account for around 20% of total EU spending on agriculture.

Evaluations of rural development schemes suggest a mixed balance in areas other than strict environmental issues (AgraCEAS, 2003; ECA, 2005; EC, 2004). One of the major conclusions drawn from the mid-term evaluations of the 2000–2006 RD programmes was that many programmes lack focus, a clear strategy and coherence

between them. The EC (2004) report questioned the co-ordination between rural development programmes and other European or national support schemes, and pointed out that a large number of available measures seemed to include contradictory objectives. On the practical side, funding provisions and delivery mechanisms were shown to be complex, and the management of the programmes leads to administrative burden.

Efficiency in providing stable prices and incomes

The stabilisation of agricultural markets is one original objective of the CAP. Following the succession of reforms, European markets are now less regulated, and with the dismantling of intervention in some sectors and the cuts in intervention prices in others, producer prices fluctuate now more than in the past. On the other hand, the introduction of direct payments provides a stable source of revenues for farmers. This evolution suggests a gradual shift in the objectives from stabilisation of prices to stabilisation of farm incomes.

CAP reform seems to have resulted in an increase in the variability of the prices faced by individual producers (Thompson et al., 2004). Indeed, statistical evidence on the coefficient of variation of domestic agricultural prices has doubled during the 10 years following the 1992 reform compared to the previous ones, while it has remained roughly the same on the world market over the same period. However, extra volatility in the price faced by producers has been offset by a larger share of income coming from the stable direct payments. As a result, income variability has not increased over the same period (Table 4.1). In the case of French arable crops farms, farm income variability was also greatly reduced by the changes in the composition of support over 1992–2001 period compared to a benchmark situation with no CAP (Jacquet et al., 2004). One important point is that without the CAP, the income of the stylised farm studied by these authors would have been negative in 6 years over the 10 years considered in the analysis (note that the endogeneity of the production costs was not accounted for, however). Simulations by Van Asseldonk et al. (2008) show that the variability of farm incomes is greater if the CAP is removed: twice for a representative Hungarian farm and up to 6 times higher for a representative Spanish farm. The impact of the CAP on stabilising income far exceeds the situation brought about by yield, revenue and index insurances schemes (at least under their assumptions, where strike levels at 80% of the mean yields). That is, in spite of greater price variability, the new CAP performs better than the old one at “cushioning” farm incomes.

If the reformed CAP seems to be effective in stabilising European farmers’ incomes, it is mainly because of a reliance of farm revenues on direct payments, whose proportion in farmer’s incomes is now very large, often exceeding 100% in particular sectors.

TABLE 4.1
Impact of the CAP on price and income variations

	Period 1986-1992	Period 1993-2000
With the CAP		
Price		
Average	180.3	131.4
Standard deviation	10.3	16.3
Coefficient of variation	0.06	0.12
Income		
Average	881.3	1056.5
Standard deviation	49	56.5
Coefficient of variation	0.06	0.05
Without the CAP		
Price		
Average	101.3	114.1
Standard deviation	20.0	22.2
Coefficient of variation	0.20	0.19
Income		
Average	318.6	418.2
Standard deviation	135.5	132.7
Coefficient of variation	0.43	0.32

Source: Thompson et al. (2004).

Distributional effects

In addition to correcting market failures, public intervention can be justified by redistribution purposes. It is nevertheless quite difficult to assess the effectiveness of the CAP in meeting such objectives. The first reason is that there is no clear objective stated in this area. Typically, the vision of what should be a “fair” distribution of incomes among farmers is something on which no consensus has ever been met in the EU. It is true that if governments want to achieve social objectives, there are better instruments for redistributions than a sectoral policy in developed countries. However, one can safely consider that public policies should, at least, not increase “natural” disparities.

Save for, perhaps, the exception of payments for less-favoured areas, the CAP has never had as an objective to reduce existing “natural” disparities. Market price support under the “old” CAP tended to exacerbate initial differences, in the sense that it benefited larger and more profitable farms (Tarditi and Zaniias, 2001). However, the distribution effects are quite complex, involving differences between types of farms (Allanson, 2007; Latruffe et al., 2008). In addition, because the CAP delays exit of ageing farmers, it is unclear what the overall impact of the payments

is, once the dynamic effects are taken into account (Elsholz and Haarsche, 2008). Finally, the distributive impact of the second pillar payments are significantly different from those of the first pillar (Langstaff et al., 2008)

Well-publicised cases of wealthy aristocrats or large corporations receiving direct payments have contributed to turning the public opinion against the CAP. Beyond anecdotal evidence, however, the concentration of the CAP benefits is genuine. Because they result from the compensation of past cuts in gross incomes (in most countries the payments have been based at least partly on individual historical references), the largest amounts of money transferred through SFPs go to large farms in relatively well-endowed areas. Figures on the direct payments only (to say nothing of the market price support) show that the 880 largest beneficiaries, i.e. 0.02% of the EU farms, received more than €500K, or 2.5% of the payments. At the other end of the distribution, more than 50% of the beneficiaries, or 2.5 million farms, received less than €1250, and 77% of beneficiaries (3.74 million farms) received less than €5000. Among farmers themselves, some new fractures have developed. While the 1993 “compensatory” payments could be seen as a compensation for the rupture of an implicit contract between farmers and society, decoupling now raises the longer term issue of the legitimacy of these payments.

4.3 The CAP and distortionary effects on production and trade

Most of the CAP budgetary expenditures now take the form of direct payments, but border protection and some remaining price support persist, as well as supply control in dairy and sugar. If there is a relatively wide consensus on the modelling of traditional farm policy instruments (tariffs/export subsidies, production quotas) modelling the features of the reformed CAP, i.e. a mix of decoupled and semi-decoupled payments, is still subject to controversies. One puzzling problem is to assess how much the current direct payments have on production and input use. We first review the different approaches to model direct payments before moving to review the evidence on the effect they have on production and trade.

4.3.1 Review of analytical approaches for modelling CAP direct payments

In terms of modelling, one can distinguish simulation models from what can be called “econometric” models. In simulation models, e.g. calibrated general equilibrium models, the working of direct payments is assumed and parameters are calibrated so as to replicate reality. In “econometric” approaches, e.g. supply response models, one attempts to find the best specification of how direct payments work, based on the past impacts of these instruments. In the latter group, some studies on arable crop direct payments resulting from the 1992 and 1999 CAP reforms are available,

but little can be said on the functioning and the impact of decoupled payments, which are too recent to carry out econometric analysis. Another useful distinction is between studies that rely on a static/certain framework and those (there are actually few of them) that introduce risk and/or dynamic considerations. Clearly, the second group accounts for more complex effects, including the role of direct payments in the formation of producer's expectations. However, even in the simplest case without risk and dynamics, the effects of direct payments on production are not obvious, as we illustrate in the next sections.

A general theoretical framework

Consider a conceptual framework that makes it possible to represent stylised effects of CAP direct payments on input demand and production. A standard approach for modelling direct payments is to assume a particular technology and derive the demand for land.

The technical specification varies according to economic (econometric or simulation) models, but land demands can be viewed as a special case of the following general structure:

$$l_i = l_i(p_i, r_i, z_i) = l_i(p_i, w_i - cf_i \cdot a_i, z_i)$$

where i is the index of the arable crop, p_i the output price, r_i the rental price of land net of the direct payment, z_i a vector of other variables (for instance prices of fertiliser, pesticides, seeds, etc.), w_i the rental price of land, a_i the per hectare direct payment and cf_i a coupling factor. Land demand can be derived from the profit maximisation programme of farmers. Consequently land demand depends positively of the output price and negatively of the net land rental price under standard assumptions on the technology. That is, crop-specific land demand increases with direct payments.

The introduction of a coupling factor allows representing the various assumptions made in the literature, which largely determine the magnitude of the impact of direct payments on input use and production. This coupling factor is generally assumed to be constant across arable crops in simulation models and varies between 0 and 1. It is also generally assumed to be constant across farmers, although they may exhibit different risk aversion. In such cases, the value is assumed to encompass the various effects of direct payments identified in the literature (i.e. risk related effects, dynamic and financial effects, etc.) in a synthetic representation. Indeed, the degree of complexity of simulation models, in particular in a general equilibrium framework, does not make it possible to detail all of the economic mechanisms at stake, and the coupling factor is used as a parameter to calibrate the overall impact of direct payments.

A value of 0 implies that direct payments have no effects on area allocations and, more generally, no production effects at all, given that yields are generally assumed to be independent of direct payments. This zero-value was considered as an extreme option for the post-1992 CAP payments, which were classified in the "blue box" category because their overall production impact was difficult to assess (given the strings attached to these payments and the obligation of supply control such as fallow land). At the other hand of the spectrum, a value of 1 for this coupling factor implies that producers must engage in production in order to receive payments, and that these payments influence the factor allocation across activities and consequently have production effects.

Typically, the various simulation models rely on a rather fragile calibration of this parameter. As examples, the FAPRI model (developed by a consortium of US universities including Iowa State University) relies on a specification that corresponds to specifying a value of 0 for this parameter cf_i , the AGLINK model (developed by the OECD) a value of 0.14, the GOLD model (developed by the University of Missouri) a value of 0.5 and finally the CAPRI model (from the university of Bonn) a value of 1.

The measurement of decoupling also depends on other important modelling assumptions about the land market. In most economic models, the mobility of land across arable crop sectors is assumed to be nearly perfect, while the mobility of land is assumed to be more limited between these sectors and other farm sectors (pasture). In order to limit the number of parameters and notations in this description, let us assume, without a great loss of generality, a perfect mobility of land across arable sectors. We have:

$$w_i = w \quad \forall i \in ac$$

$$\sum_{i \in a} l_i = L(w)$$

where ac is the set of arable crop sectors and $L(w)$ is the supply function of land to these sectors, which positively depends of the land rental price. In this framework, the impacts of direct payments are obtained from the following comparative statistics:

$$dl_i = cf \cdot \frac{\partial l_i}{\partial r_i} \cdot \left(-\frac{\sum_{i \in ac} \frac{\partial l_i}{\partial r_i} \cdot da_i}{\frac{\partial L}{\partial w} - \sum_{i \in ac} \frac{\partial l_i}{\partial r_i}} - da_i \right) \quad dw = cf \cdot \left(-\frac{\sum_{i \in ac} \frac{\partial l_i}{\partial r_i} \cdot da_i}{\frac{\partial L}{\partial w} - \sum_{i \in ac} \frac{\partial l_i}{\partial r_i}} \right)$$

From these equations, it appears that a high coupling factor is not sufficient to ensure large acreage (and production) effects of direct payments. For instance, if these direct payments are reduced by the same amount ($da_i = da$) and the mobility of land between the arable crop sectors and other farm sectors is zero

($\frac{\partial L}{\partial w} = 0$), then there is no impact on acreage and one simply obtains a

decrease of the land rental price. On the other hand, if this mobility parameter is strictly positive and the reduction of direct payments is not uniform across activities, this will result in both an effect on land allocations and on the land rental price. In other words, the amount of new land which can be allocated to arable crop farming is also an important driver. Unfortunately this information is not always available (nor are the exact specification and underlying assumptions always made clear in simulation models). An extra complexity for modellers is that the CAP restrains the amount of total land through the definition of base areas. This, again, is poorly taken into account in most models.

The impact of direct payments on production occurs not only through the allocation of land, but also through their impact on yields. Here, too, are some methodological challenges. With the exception of a few general equilibrium models, a standard specification is to assume that the output is the product of a yield function and an area function (a typical approach in partial equilibrium models). Yields per hectare are often specified as functions of own producer price and a trend capturing the impact of technical change. Using a stylized example, we show that even under a simple framework (a mono-product firm using three inputs), the assumption that direct payments do not affect yields requires strong assumptions on the technology, assumptions that seem to be contradicted by empirical evidence. Indeed, unless there is no substitution between land and other inputs and the marginal productivity of land is constant, yields will be affected by direct payments and the overall impact of these payments on production results from both drawing more land into production and an indirect effect on yields. The magnitude of the respective effects is uncertain. An extreme case is if direct payments do not affect yields and where total land devoted to, say, arable crops, is fixed. In such a case, the impact of direct payment on production level would be zero. If we introduce an extra complexity, i.e. the fact that direct payments are *de facto* conditioned to a set-aside requirement, direct payments could end up having

a negative effect on output. That is, there is at least a theoretical possibility for the distortion resulting from direct payments to have the opposite effect from what is commonly believed.

The interaction of direct payments with set-aside requirements

The 1992 CAP reform had conditioned direct payments (corresponding to arable crops) to the obligation of setting aside a certain percentage of land that was devoted to grains, oilseeds and protein crops. For the bulk of the payments that are now decoupled, the 2003 reform has ended the distinction between direct payments corresponding to various productions, but there was still a *de facto* obligation of setting land aside to get the SFP until the November 2008 adoption of the Heath Check. That is, from 1993 to 2009, direct payments interacted with supply control.

Gohin and Guyomard (2000) developed a static micro-economic model where crop acreage allocations, production supplies and yields are endogenous, taking into account the interaction between the set-aside requirements and the direct payments. Producers choose area allocation, output supply and yields per hectare by maximising their profit subject to market and technical constraints (the main instruments of the CMO for arable crops, i.e. intervention prices, direct aids to cultivated land, direct aids to land left fallow, set-aside commitments, base areas, etc., can be taken into account within a programming model). Simulations of the level of production with and without the CAP payments in France suggested that the 1992 and 1999 type of payments (i.e. a package combining direct payments subject to setting aside land devoted to arable crops) actually reduced both the acreage and the production of arable crops (cereals, oilseeds and protein crops) in the EU. This means that the blue-box type of payments provided as a compensation for a price decrease in the 1990s reduced the distortion effects on production and trade compared to the previous CAP, as expected. However, less intuitively, simulations suggest that, because of the joint effect of the semi-decoupling (remember that the 1992 and 1999 payments were provided on a per hectare basis, not a per tonne of output basis), of the capping of the overall surface eligible and the compulsory set-aside to receive payments, the overall impact of getting rid of the 1992 payments would have been a larger EU production. Clearly, this result is caused by the set-aside provision. And it will no longer hold after 2008. However, it suggests that the overall distortions of the 1990s CAP on world markets was perhaps overestimated by analysts, who often focused on the production-incentive effect of these payments, which was actually offset by the mandatory set-aside provisions of the whole package.

The decoupling when land markets are heavily regulated

Most analyses of the production effects of direct payments implicitly assume

that land markets are not regulated. Accordingly, direct payments can be freely capitalised in land values. However, as underlined by Gohin (2006), this assumption is at odds with reality. European data on land markets show that the land rental prices are still much lower than the per hectare direct payments. For instance, in the case of France, Germany and the United Kingdom, it appears that land rental prices represent between one-third to two-thirds of the per hectare direct payments. According to these figures, the full capitalisation assumption is inapplicable for recent years for those member states. Of course not all land is rented, but figures from farm accounting data (in particular the Farm Accounting Data Network) also suggest that, on farmer-owned land use farms, Agenda 2000 arable crop direct payments are not fully capitalised in land either. In addition to the observed statistic, econometric analysis on the degree of capitalisation of direct payments in land values also challenge this view of perfect land markets. To our knowledge, there are only two studies applied to EU agriculture. One is an unpublished French study (Meze, 2003) which did not find that 1992 CAP arable crop direct payments capitalised in land rental prices. The other is a Belgian application of the land value model (Duvivier et al., 2005) where the authors find that, during the period 1993 to 2001, the elasticity of arable farmland price to compensatory payments ranges from 0.12 to 0.47. This elasticity is not directly comparable to the coupling factor referred above, but that it is lower than 1 implies that the assumption of full capitalisation of direct payments into land rental prices is not supported by econometric studies. Without providing formal evidence for the EU case, these studies tend to challenge the full capitalisation usually assumed in simulation models.

If one is willing to accept the idea that CAP arable direct payments are not fully capitalised in the land rental prices, then one needs to explain why and where the “non-capitalised” part goes. There are two possible explanations: 1/ there exist some rigidities/imperfections in agricultural factor markets, and 2/ capitalisation takes time (Gohin, 2006). More specifically, CAP arable crop direct payments were initially introduced as compensatory payments for price decreases in order to support farm revenues. It might be the case that farmers perceive these direct payments as a reward for their labour and thus resist the full transmission of these payments to landowners. This assumption makes sense given the strong opposition of farmers in some EU member states to the CAP reform and the SFP, because this instrument further breaks the link between support and production. In addition, land leasing arrangements depend heavily on member states, but it is not uncommon to see very long contracts, with only slight possibilities of renegotiation. This may explain a slow capitalisation of direct payments in the land rental prices. Finally, there exist some national regulation laws on farm land uses which also prevent full arbitrage and thus full capitalisation.

Gohin (2006) introduced a new way to model CAP direct payments that were implemented after the Agenda 2000 for arable crops. Part of the direct payment is perceived as a labour/capital subsidy. In addition to the arguments provided above,

this allocation of the non-capitalised part can also be justified by the residual nature of farm labour and capital incomes. When this new specification is introduced in a general equilibrium model that details the EU agricultural sector, the “decoupling” impacts are quantitatively very sensitive to this modelling assumption. More precisely, if one adopts the standard assumption of full capitalisation of direct payments in land values, then the 2003 CAP reform leads to a small reduction of EU soft wheat production (by 1.6%). By contrast, assuming an incomplete capitalisation, the same reform leads to a significant reduction of EU soft wheat production (by as much as 7.3%).

Impacts of direct payments on yields: econometric evidence

Since the 1992 CAP reform, total land allocated to arable crop production – and thus eligible to direct payments – faces ceilings. Hence, at the aggregate level, it is useful to analyse the impacts of the new policy instruments on yields. Several econometric analyses have been performed regarding the recent evolution of arable crop sectors, with the objective of identifying the impacts of price and direct payments on yields and production. This includes Moro and Sckokai (1999) who estimate the land/yield/production decisions of arable crop producers located in the north of Italy. This estimation is performed on individual data with a standard specification (no risk/no dynamic) including the effects of intervention prices, direct payments and set-aside requirements. Gohin (2001) retains the same framework using the generalised maximum entropy approach to impose regularity conditions on aggregate data. Arnade et al. (2002) ignore the direct payment and set-aside requirements in their estimation of national supplies and areas, but examine the evolution of price impacts. Benjamin and Houée (2005) also consider aggregated data, but use reduced form equations when specifying yield equations. Sckokai (2005) allows risk and dynamic effects occurring through farm investments. Serra et al. (2005) examine in particular the impacts of the 1992 CAP reform on pesticide use by French farmers. Compared to the standard (static/certain) framework, their contribution is to allocate pesticides among crops and to measure the elasticity of production and pesticide uses with respect to CAP instruments. Sckokai and Anton (2005) estimate reduced-form equations of yields and areas with respect to CAP instruments for individual farms of 5 EU member states (France, Germany, Italy, Spain and UK). Sckokai and Moro (2006) develop a structural estimation framework with risk aversion, which is applied to Italian arable crop farms.

As usual, the results of these econometric studies are rather fragile, as a result, for instance, of the multi-co-linearity between explanatory variables or the endogeneity of set-aside land. Despite these usual caveats, it is interesting to learn from the results of these estimations. Tables 4.2 and 4.3 below report the average and standard deviation of yield elasticities inferred from these studies. It appears that on average, producer prices positively influence yields for all crops. Own price elasticities of yields are, however, relatively low (from 0.09 to 0.19 on average). The

impacts of direct payments appear to be limited: the estimates are slightly positive in the case of wheat and slightly negative for coarse grains and oilseeds.

These results suggest that the CAP reform adopted since 1992 effectively reduces the production incentives of the CAP by reducing yields. But they also suggest that this effect has been small on overall arable crop production (we do not report cross-price elasticity below, which tends to be negative).

TABLE 4.2
Elasticities of yields with respect to price, from available econometric studies

	Wheat (17 points)	Coarse grains (26 points)	Oilseeds (15 points)
Average	0.188	0.167	0.088
Standard error	0.340	0.209	0.070

Source: authors, average of several econometric studies on EU countries available in the literature.

TABLE 4.3
Elasticities of yields with respect to direct payments, from available econometric studies

	Wheat (14 points)	Coarse grains (18 points)	Oilseeds (13 points)
Average	0.023	-0.016	-0.019
Standard error	0.082	0.054	0.051

Source: authors, average of several econometric studies on EU countries available in the literature.

Wealth effects of direct payments and production impacts

In addition to the relative price effects of direct payments discussed above, there are several micro-economic mechanisms establishing a link between these direct payments and the farm production. Payments affect:

- agricultural labour supply by modifying the labour/leisure arbitrage of farm households;
- the capital invested in agriculture by relaxing the potential constraints on credit markets (Verammen, 2007);
- the number of farms by covering their fixed costs (Chau and de Gorter, 2005);
- the wealth of farmers and thus the incentive to produce for risk-averse farmers (Hennessy, 1998);
- the real wages and the employment level in different sectors through a

general equilibrium effect linked to the public funding of these payments (Chambers, 1995).

Moreover, direct payments can theoretically modify farm production through their technical efficiency, provided that this efficiency depends on the input levels and also that one of the above mechanisms applies. For instance, Serra et al. (2007) consider the case where direct payments have a wealth effect on risk-averse producers leading them to increase their input use, which in turn has an impact on their technical efficiency.

However, from an empirical point of view, the literature suggests that above effects of direct payments on quantities actually produced are small (Bhaskar and Beghin, 2007). The survey conducted by these authors concern mainly cases in the US, and there are few studies devoted to those in the EU. Sckokai and his co-authors, who are the only ones to account for the risk aversion effect, find that small- and medium size farmers are risk averse but not the large ones, and that direct payments do not have a significant impact of production through wealth and risk aversion. Gohin and Bureau (2006), in the case of the sugar sector, show that the argument that direct payments could “cover fixed costs” was unconvincing given the possibility for adjusting fixed factors through, for example, service labour and equipment. All these studies suggest that EU direct payments therefore have a limited impact on supply.

The “wealth effect” might nevertheless be underestimated in the literature. Féménia et al. (2008) argue that the observed wealth of an agricultural household depends, among other things, on the benefits that are expected from farming, and therefore on future payments. The wealth of an agricultural household, observed at a given time, depends on the expectations concerning the durability of direct payments. This implies that the initial wealth should not be considered as fixed as this is currently done in econometric analysis or in simulation models. In other words, their suggestion is that one must also modify the initial wealth of a risk-averse agricultural household when identifying the decoupling of farm programmes in general and of direct payments in particular. This “actualised wealth” effect obviously depends on the structure of farm household wealth. In particular, this effect is zero if the farm household does not own farmland at all, which is the usual factor capturing the direct payments in the long run. In such case, benefits of farm programmes are completely passed to the landowners. On the contrary, if the farm household partly owns farmland, then it will capture part of the benefits of farm programmes. In that case, this farm household will be better off, might become less risk-averse (if risk aversion decreases with wealth) and will produce more. That is, the actualisation of the initial wealth modifies the measurement of the coupling effect of direct supports and more marginally than traditional instruments. Through the wealth effect there might be a significant impact of payments on production, which remains to be fully measured.