

**Study on the economic, social and environmental impact of the modulation  
provided for in Article 10 of Council Regulation (EC) No 1782/2003**

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Executive Summary

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## Study on the Impact of Modulation

This is the Executive Summary of a study on the economic, social and environmental impact of the modulation provided for in Article 10 of Council Regulation (EC) No 1782/2003. The objectives of the study are:

... to provide a quantitative and qualitative assessment of the impacts of modulation on rural areas, social and economic performance, environment, competitiveness, community and national budgets. The study will take into account the re-distribution effects of modulation, within and between Member States, between economic sectors and types of holdings.<sup>1</sup>

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## **EXECUTIVE SUMMARY**

### **Introduction and Background**

‘Modulation’ is a policy mechanism for shifting funding from the part of the CAP budget dedicated to providing direct payments to farmers (Pillar 1) to the European Agriculture Fund for Rural Development (Pillar 2), which aims to provide targeted support to rural areas, to improve the competitiveness of the farming and forestry sectors, enhance the environment and improve quality of life.

In keeping with requirements under the World Trade Organisation (WTO), changes have been made to the way the EU Common Agricultural Policy (CAP) operates in recent years to ensure greater market orientation. Central to this were the 2003 reforms, which introduced the decoupling of direct payments from production as well as, amongst other changes, modulation on a compulsory basis for the EU-15 under Article 10 of Council Regulation (EC) No 1782/2003.

Greater market orientation within the agriculture sector means that the influence the CAP once had on patterns of production through production related payments and market interventions has significantly decreased, and will decrease further over the coming years. The market now plays an increasingly significant role in determining what gets produced, where and how, and is becoming increasingly global in nature as legal arrangements governing trade, through bilateral and multilateral agreements, become less constraining to the free movement of goods. At the same time, support within the CAP has started to place a greater emphasis on sustainability, the environment and rural development, encouraging the provision of public or non-market goods.

One means of assisting this transformation of agricultural production policy into a rural development policy – in which agriculture plays a key role – has been to adjust the balance of the budget allocated to the two Pillars of the CAP. Former guarantee and guidance measures are now transformed into a support fund for the farming sector (Pillar 1 of the CAP) and a rural development fund for both farmers and other rural actors as well (Pillar 2). The balance of funding between these two Pillars is progressively being shifted – or ‘modulated’ – from Pillar 1 to a series of programmes that provide incentives within Pillar 2: (a) to improve the competitiveness of the agricultural and forestry sectors, (b) to maintain and enhance the environment and countryside, and (c) to improve the quality of life in rural areas.

The aim of this study has been to explore what the economic, social and environmental effects of introducing compulsory modulation are, both under current rates and rules (the baseline scenario), and a potential future scenario (the Health Check scenario), based on the Commission’s proposals for increasing modulation as part of the CAP Health Check. The results should help to bring about a greater understanding on the degree to which these benefits are tangible, and how they might change under possible higher rates of modulation in the future.

To understand the impact of modulation it is necessary to understand the economic drivers influencing both the agricultural sector and the economies of rural areas more generally. This sector has been undergoing a profound transformation for decades,

and policy can only encourage inflections in trends that are otherwise driven by factors outside of the policy arena to a greater or lesser degree. The impacts of compulsory modulation, therefore, must be set against the broader changes taking place in relation to factors including macro-economic developments (often dominated by technological evolution), population growth (and migration), and market forces generated by commerce at the world level (in which consumer preference has a significant influence).

### **Methodological Approach**

The methodological approach that has been taken to understand the impact of modulation is based on several different types of analysis, which can be divided into two broad categories: a modelling approach and a non-modelling approach. The modelling approach allowed for results to be generated on impacts across the EU-27, and for simulations of the likely changes of these impacts under different rates of modulation, while the non-modelling approach allowed for more qualitative, context specific insights into the impacts of modulation to be made. The use of models also permitted an exploration of any differences that might emerge from changes to rules relating to franchise levels, co-financing requirements, or allocation of funds within Pillar 2 to specific measures, albeit based on a set of generalised assumptions.

The modelling approach consists firstly of a custom-built budget model, which allows the transfers of money involved from the national cuts in the first pillar through to the expenditure for each Rural Development measure within Member States' Rural Development Programmes to be tracked. Secondly there is a suite of economic models that place the Pillar 1 reductions and the additional budget available for Pillar 2 measures within the framework of the world economy, from both a general and partial, or sector-specific (agriculture), perspective. Finally a land-use model attributes changes in land-use that are calculated by the economic models to particular areas, on the basis of a 1 km grid covering the European Union. The use of economic models to understand the impact of Pillar 2 expenditures has been carried out for the first time, and has been informed by insights acquired from the non-modelling approach. The non-modelling approach included a literature review, case studies undertaken in eight Member States, questionnaires to Member State authorities for agriculture and rural development, and an assessment of standard indicators compiled within the Common Monitoring and Evaluation Framework for EU rural development policy.

A number of difficulties were encountered in identifying the precise impacts of compulsory modulation on the range of themes addressed by this study, some methodological, and some relating to data availability. These are to be expected in a relatively new policy area and included: the lack of empirical studies (*ex post*), especially on the effectiveness and efficiency of pillar two measures, lack of data, the use of analytical tools that are not in every case specifically designed to accomplish the task required, and the need for complementary research in a context where time and human resources are limited. The quantitative modeling approach is therefore limited to *ex ante* analyses and based on strong assumptions. One way to control the robustness of the results obtained from the model outputs with regard to crucial assumptions has been through conducting 'sensitivity analyses', in which counterfactual hypotheses were investigated using the same tools but with changes in

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variables (one at a time). The differences in magnitude of the outputs demonstrate, the sensitiveness of the results with regard to some key assumptions that are uncertain. The qualitative analysis has to a slight degree been limited by the fact of a policy review on modulation occurring at the same time as the study. As a result, eliciting reliable information about the likely response of authorities in the Member States to hypothetical increases in modulation was a challenge, given the political sensitivity of the topic and the inherent uncertainty of future policy choices.

### **The impacts of modulation**

The study of the impact of modulation has been undertaken through a double perspective of two different scenarios: a baseline scenario of compulsory modulation at 5%, and a Health Check scenario based on a 13% modulation rate, as elaborated in the Commission proposals in May 2008. As the effects of modulation *per se* are quite limited, in comparison with the macro-trends affecting agriculture since the 1950s, it is often the higher modulation rate that provides an indication of what the influence of modulation might in fact be.

The results of the combined analysis are consistent for the two primary observations coming from the study. Firstly, the reduction of first pillar payments made through the modulation process – at the level that occurs at present – has a negligible influence on agricultural commodity production and on the viability of farm businesses generally. However, the impact on farm income is naturally negative. Secondly, there are beneficial effects in evidence as a result of the availability of additional modulated funds within the second pillar – both for farmers and to other actors within the rural economy. This is in a large part due to the fact that these measures have clear objectives, are targeted at areas of identified need and the total amount of money available is higher due to co-financing requirements. As a result, the second pillar measures are able to provide the leverage that they are intended to, whether it be in increasing productivity and competitiveness through Axis 1, maintaining and improving the environment through Axis 2, enhancing the vitality of the rural economy through Axis 3, or encouraging local leadership and partnership through Axis 4 (the LEADER programme). However, the transaction costs of targeted payments and the monitoring costs are not quantitatively taken into account in this study.

Modulation can lead to a significant transfer of support between farms of differing type and size. Logical deduction from the existing pattern of payments suggests that, in general, modulation tends to lead to a redistribution of funds from:

- Larger to smaller farms, although the participation of rather small farms in many Pillar 2 measures is low in many Member States
- Larger arable farms to:
  - Livestock farms, including a significant proportion of more extensive farms, which are the main recipients of Axis 2 money, but also dairy farms, potentially accessing funding under all axes.
  - Other farm types which are able to access physical and human capital investments under Axis 1.
  - Forestry and farm/forestry enterprises (through the forestry measures).
  - Beyond the agricultural sector to the broader rural economy.

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It is important to remember, when considering the impacts of compulsory modulation, however, that its effects extend considerably beyond a simple readjustment to the funds available within the two pillars, as the additional funds that are made available for Pillar 2 are then augmented by national co-financing and, for certain measures, by private sector contributions. The funds provided by the Member States themselves, therefore, make a substantial contribution to the impact of second pillar resources. In contrast, the financial gain or loss from changing the level of the ‘franchise’ – the part of Pillar 1 payments that are not taken into consideration for the modulation amounts – is minor. As such, compulsory modulation acts as a conduit for leveraging an increase in funding available for rural areas, both to the agricultural sector and beyond.

In relation to the impact of compulsory modulation on the specific study themes, the key findings are summarised below. These are more fully elaborated in the conclusions of the study.

**Farm Structure:** Modulation on the scale examined here is not seen to have a significant net impact on changes in the number or size of farms within the EU-15 – although it may accelerate existing trends towards fewer, larger farms and certain categories of investment, particularly as a result of the availability of additional funds for the physical and human capital investments in Pillar 2. However, compulsory modulation may also serve to slow down structural change as a result of increased support for Pillar 2 measures, such as LFA and agri-environment, which can help maintain the economic viability of farm businesses, particularly in marginal areas, that would otherwise disappear.

**Production:** According to the models, the net overall agricultural production effect due to modulation under the Health Check scenario appears to be positive, albeit small, for primary agriculture in the EU-15 (0.48%) and the EU-27 (0.4%). Taken alone, the reduction of Pillar 1 direct payments has a minimal negative production effect (-0.06%), which is to be expected, given that payments are decoupled.

There are some differences between products. The net production effect is slightly positive for all broad groups of products (e.g. oilseeds, vegetables and permanent crops, meat), with the meat sectors being the most strongly influenced by modulation in terms of production. The exception to this is cereals, where the models indicate a slight net decrease in production of durum wheat, which at present still receives coupled payments in some areas, and, benefits from significant Article 69 support, particularly in Italy.

The main cause of this positive effect is the availability of additional money for Pillar 2 measures, particularly physical capital investment measures. While investments in human and physical capital measures through Axis 1 may increase production, however, investments in Axis 2 measures will equally require the maintenance or introduction of more extensive management practices, which may conversely constrain production.

**Competitiveness:** Increased rates of compulsory modulation appear to have a small net positive impact upon competitiveness within the agriculture sector, albeit measured in the narrow sense of gross value added within agriculture.

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Outputs from the economic models suggest that the increased rates of modulation under the Health Check scenario have a small net positive impact on GVA, compared with the baseline scenario. The impact on welfare is slightly positive. This is the case, without taking into account the anticipated impacts of the additional funds on the delivery of environmental non-market goods, which it is not possible to quantify as part of this analysis. On the other hand, transaction costs are not taken into account.

The positive impact is mainly caused by the impacts of Pillar 2 measures, particularly the dynamic impact of measures that increase the productivity of production factors such as human and physical capital mainly in Axis 1, for example those that enable investments in new technologies and physical infrastructure to be made, as well as those that focus on improving human capital, thereby helping to rationalise production processes, or to improve the quality of products. In relation to the service and processed food sectors, Axis 3 measures also have a role to play in contributing to increased competitiveness outside the agricultural sector, particularly those focused on incentivising diversification, improvements to rural infrastructure and stimulating tourism.

**Farm Income:** The impact of modulation on farm family income is unclear, with different economic models giving slightly differing results. These results, however, have to be treated with extreme caution as they are very dependent on the assumptions made about which Pillar 2 measures are considered to have an income effect. General conclusions mask more significant local and regional differences, particularly between farm types, whereby some type of farms/businesses are likely to benefit and some will lose out in terms of income.

Accepting that most measures within Pillar 2 will only have a small income effect, it seems that, looking at the overall impact of modulation, the main farm types to 'lose' from modulation would be arable/permanent crops, and beef producers. These types of farm tend to be recipient of higher levels of direct payments through Pillar 1; and although they may receive money back through Axis 1 and Axis 2 measures, it is conditional on meeting additional obligations in many cases and probably will not be sufficient to make up for the losses in their direct payments.

Those that are more likely to gain from modulation include dairy farms and fruit and vegetable producers, due to the lower level of direct payment receipts, and the possibility of them accessing funds through Axis 1 (and possibly Axis 2), as well as suckler cows and sheep and goats, due to the likelihood of their being able to access Pillar 2 funds, particularly agri-environment and LFA support, but also support through Axis 1.

In addition, there may be some counter-intuitive effects, whereby farms with attributes highly compatible with Pillar 2 objectives lose out under modulation because they experience Pillar 1 reductions but cannot access any further Pillar 2 measures, for example because they are participating in all the schemes for which they are already eligible. Such farms are most likely to be those enrolled in multi-annual schemes such as LFA and agri-environment schemes and will include some farms providing significant public goods.

**Employment:** While some changes in employment both within agriculture and the services, energy and industry sectors are likely to be experienced as a result of compulsory modulation, these changes are very minor. Overall, under the Health Check scenario, employment in the food processing and services sectors increases very slightly (0.02%) and decreases within the primary agriculture sector, albeit only by 0.12%. In relation to the agricultural sector, the main reason for this decrease stems from the reductions in Pillar 1 direct payments. This is then reinforced by the Pillar 2 investments in physical capital (mainly Axis 1), some of which may encourage further structural change. Modernization implies that some labour might be released in the short run but that the remaining farmers are more competitive in the long run. The ones who leave agriculture find a job in other sectors due to Axis 3 measures and a small GDP growth. Modulation therefore encourages and accommodates the process of structural change.

The models, CMEF indicators and case studies, all suggest that, under the Health Check Scenario, higher employment levels are likely to be experienced than would be the case with no modulation, as a result of the input of additional funds in Axis 2 and Axis 3 of the second pillar. However these do not outweigh the decreases seen as a result of reductions in Pillar 1 and the additional availability of funds for physical capital measures. The LFA and agri-environment measures help maintain and generate additional employment both directly within the agricultural sector as well as indirectly within other economic sectors. LFA payments, for example, contribute to farm income and the maintenance of employment in rural areas, and agri-environment schemes can have beneficial employment effects, for example by promoting organic farming, which is generally more labour intensive, and through generating the need for the use of contractors with specialist and traditional skills. In addition, the environmental benefits that accrue from these schemes can lead to indirect employment benefits resulting from increased tourism and recreation. Axis 3 measures relating to creating diversification opportunities, new business start-ups, improving service provision in rural areas and enhancing an area's tourism potential, as well as activities funded through the Leader approach, all have the potential to increase employment in rural areas, largely outside the agricultural sector. While the impact of these measures on employment creation will be small, given the limited resources allocated to these measures, the impact may be locally significant, contributing to a more diverse and secure job market in rural areas.

**Quality of Life:** Overall the quality of life in rural areas is expected to benefit from increased levels of modulation, although it has not been possible to quantify this impact. Taking GDP as a somewhat crude proxy to reflect the material wellbeing across the EU, any increase in GDP can provide some indication of the potential improvement in the quality of life insofar as this relates to the growth in the economy overall. The models indicate that increased rates of modulation under the Health Check scenario have a positive, albeit very small, impact on GDP growth (0.04% at rates of 13% modulation). This positive result is entirely due to the increased availability of funds, and their associated national co-financing, within Pillar 2. The effect is largely caused by those Axis 3 measures which are focused predominantly on investments outside of the agricultural sector, for example on the setting up of new businesses, improving rural services and promoting tourism.



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Looking beyond GDP, at low levels of modulation, reductions in Pillar 1 would not appear to have any real impact on the quality of life in rural areas, as no significant effects in terms of farm restructuring or land abandonment are experienced. However, drawing mainly on evidence from the case studies, increases in expenditure in Pillar 2 do have a positive effect on quality of life by increasing the funding available for measures that promote innovation, create employment opportunities, improve access to services for the rural population or provide funding for activities that can improve the economic attractiveness of, and thereby encourage investment in, rural areas. Beyond Axis 3 and the Leader approach, the LFA and the agri-environment measures stand out as having the potential to enhance the quality of life in rural areas in relation to their role in maintaining and enhancing the attractiveness of rural areas, and hence in attracting increased tourism. In addition, the case studies highlighted the value of these measures for keeping people in farming.

**Environment:** Overall, the impacts of modulation on the environment are positive for all environmental parameters including biodiversity, water quality, soil quality, landscape and climate change. These positive impacts are the result of the availability of additional funds within Pillar 2 and relate to a whole range of measures across all four Axes. The extent of these impacts, however, is hard to quantify beyond general terms.

The reductions in Pillar 1 direct payments do not appear to have had significant impacts on the environment. This is unsurprising, given that the impacts on agricultural producers (in terms of influencing factors of productivity, farm structure and income) of reducing Pillar 1 payments have been shown to be limited. The models show that there may be a small increase in land leaving agriculture as a result of reductions in Pillar 1 payments; however, these appear to have been more than compensated for by increases in the availability of funds within Pillar 2, particularly for the LFA and agri-environment measures. These impacts could, of course become more significant as the modulation rate increases and/or the franchise level changes.

The availability of additional funds within Pillar 2, however, is likely to have a significant impact upon the environment across the EU-15, but particularly in Finland and the UK (England) where the additional funds have been specifically focused on the agri-environment measure. In all Member States, modulation can be seen to have a positive impact on the trends identified for the CMEF impact indicators relating to the area of HNV farmland, the farmland bird index, nutrient surplus and production of renewable energy. In relation to the CMEF result indicators, modulation, under the baseline scenario, is estimated to enable over 5 million hectares of land to be managed in ways that benefit biodiversity, 3 million hectares to be managed to help improve water quality and soil quality and 1 million hectares to be managed in ways that will help with climate change mitigation and/or adaptation.

The results also suggest that the availability of additional funds for, in particular, the agri-environment and LFA measures is likely to retain slightly more land under agricultural management that would be the case without modulation. The models show that this land is more likely to be grassland than cropped land. The CMEF impact indicators also show that a significant area of land is anticipated to be prevented from being abandoned over the 2007-13 programming period. While the proportions of land indicated by the models are very small (under 1% of all

agricultural land), in reality, the effect could be much greater. It would certainly not be a uniform impact across the EU-15 and will depend crucially on local factors such as succession, land ownership, remoteness from markets etc.

### **Gaps / Research and analytical issues that need follow-up**

The study has sought to explore the impacts of modulation through the use of economic models and national case studies. This has revealed the considerable methodological and data challenges inherent in a complex policy evaluation exercise of this kind. This is particularly the case in seeking to specify and quantify the impacts of rural development policies in Pillar 2. Since these measures are a growing element of the CAP it is recommended that further investment both in analytical tools and data collection (at different geographical levels) is prioritised at both the Member State and EU level.

The availability of good quality, precise and comparable empirical evidence on the impacts of Pillar 2 measures at local, regional and Member State level is critical to inform future policy evaluations. While the CMEF indicators are a helpful step towards facilitating a more informative analysis of the impacts and estimates provided by Member States within their RDPs on the anticipated outputs, results and impacts of the various measures within Pillar 2, these need to be complemented by detailed monitoring programmes at the Member State level.

The newly established rural development and evaluation networks could offer a timely opportunity in this regard. These networks could be used to provide an assessment of current monitoring and evaluation programmes within individual Member States. They could work with the national networks to share good practice, and improve monitoring programmes to ensure that the benefits of Pillar 2 measures can be assessed more precisely and the information disseminated widely across all Member States.

If modelling is to be used to predict the impacts of different policy scenarios in relation to Pillar 2 measures with greater confidence, then again empirical evidence of the efficiency and effectiveness of these measures is crucial. For example, information about the rates of return to human and physical capital investments is needed, the level of deadweight or crowding out effects, transaction costs, and the impact of environmental measures on yields. Europe-wide economic models need to be developed further to enable them to reflect more locally differentiated impacts, including by farm type, based on the different ways in which measures are implemented in different locations. The work currently being undertaken in EURuralis 3.0 and the FP7 project 'CAPRI-RD' is a good start in this regard. Another large area of research is the conceptualization, modelling and monetization of public goods.

**Considerations for interpreting the results of the study:**

The results of modelling and other forms of analysis should not be taken to represent the impacts of shifting funding from Pillar 1 to Pillar 2 of the CAP *per se*, rather they represent the potential impact of a shift in funding between the two Pillars subject to a very specific set of assumptions and criteria, and the analysis is based on a number of necessarily simplified assumptions about how these criteria might change under different scenarios. If these criteria and scenarios have an important impact on the results and if they were to change, then the results of the study would also change. The specific criteria assumed for the operation of modulation are set out in Chapter 1 and the scenarios used in the study are set out in Chapter 2.

A further note of caution should be raised specifically in relation to the results of the economic models. The complexity of Pillar 2 measures and the range of ways in which they can be implemented across the EU-27 means that a series of assumptions have had to be made about the impacts of specific Pillar 2 measures on economic drivers in order to calibrate the models. These are based on the best available evidence derived from the literature, and follow the logic of intervention for each measure, however they are nonetheless generalisations. The outputs of the models, therefore, are clearly to a considerable degree a function of the assumptions that are fed into them and have not been able to take into account the differing impacts that measures might have in different Member States. The conclusions of the study should be read with this in mind.

Despite these caveats, however, the study team feels that the study offers several important and useful insights into the way the agricultural sector, and rural areas more generally are affected by the shift of funding from direct payments under Pillar 1 to a more targeted support mechanism under Pillar 2 through the mechanism of modulation, and provides a useful basis for future research.