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Evaluation of CAP measures concerning sectors subject to past or
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Evaluation of income effects of direct support

Executive Summary



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1. EVALUATION SCOPE

One of the five objectives assigned to the Common Agricultural Policy (CAP) by the EC Treaty is to guarantee the agricultural community a fair standard of living, in particular by increasing the individual earnings of people engaged in agriculture.

This evaluation examined the effects of the direct support schemes laid down in Council Regulation (EC) No 1782/03 (later Council Regulation (EC) No 73/09) on the income of farmers. The effects of direct payments related to other CAP objectives, such as enhancing the competitiveness of the agricultural sector or ensuring sufficient and secure food supply, were not taken into account in the evaluation.

The evaluation examined the effectiveness and efficiency of the implementation of direct support with respect to achieving the income objective. The evaluation also examined the coherence of direct payments with measures under the Single Market Organisation (Single CMO) and rural development measures with respect to this objective.

The geographical scope of the evaluation was EU 27. The coverage was regional and the examination period started on the 1st January 2005. However, in order to highlight the transitional effects of policy changes and to allow for a clear distinction of income changes due to market developments, data from 2001 onwards were analysed.

2. POLICY FRAMEWORK

The policy objectives specified in the Luxembourg Agreements in 2003 and inserted in the recitals of Council Regulation (EC) No 1782/2003, are as follows:

- ensuring a fair standard of living for the agricultural community
- making agriculture more market-oriented, avoiding distortions of competition and liberalising international agricultural trading;
- meeting the demand of consumers in terms of price, quality and hygiene;
- strengthening rural development;
- supporting sustainable agriculture and protecting the environment;
- making support policies more efficient and controlled, complying with financial rules.

The main change introduced by the 2003 reform consists in the implementation of a new set of instruments to achieve these objectives. According to the 2003 reform, it is the free market that determines production levels and quality of agricultural production. Specific measures are established for aspects that the market is unable to deal with in an optimal manner, taking into account non-market effects of agricultural activities in order to protect the environment, public health, etc.

In this context, Regulation (EC) No 1782/2003 introduced the Single Payment Scheme which represents a fundamental change in the income support instruments. The tools used until 2003 (price support, area payment, animal payment) have gradually been dropped in favour of a single payment. This aid is decoupled, since it is not bound to production levels (unlike price support), or to production (unlike the area payment), or to market conditions, and thus the production decisions of farmers (both in terms of output levels and quality) are responding to market demand.

New Member States have the possibility, during a transitional period, to apply a Single Area Payment Scheme (SAPS), i.e. a decoupled support system based on two fixed elements at the national level: a national financial envelope and a national agricultural area.

The decoupled payments are calculated by multiplying the number of eligible hectares and the single payment entitlement. The Member States could choose from three basic SPS models on how to

calculate the reference amount for an individual farm : decoupling based on historical farm data (historic model), decoupling based on regional historical data (regional model) and hybrid systems.

Regulation (EC) No 1782/2003 introduces also the possibility of partial decoupling that may or may not be used by Member States (articles 66 to 68*b*). Furthermore, Article 69 also allowed Member States to keep up to 10% of the funds available (under national ceilings) for each sector, and to assign it in the form of an additional coupled payment to farmers using special farming methods.

The Health Check (Council Regulation (EC) No 73/09) decided on the further integration of coupled measures into the decoupled direct support. Among others, the regulation provides assistance to sectors or regions with particular difficulties (the so-called 'Article 68' measures), abolishes arable set-aside, increases milk quotas gradually leading up to their abolition in 2015, and converts market intervention into a genuine safety net. It was also agreed to increase modulation, whereby direct payments to farmers are reduced and the money is transferred to the Rural Development Fund.

With regard to the new Member States, direct payments are phased in from 2004 to 2013 for the ten members entering in 2004 and from 2007 to 2016 for Bulgaria and Romania. By the date of accession, the new Member States had to make a decision whether they wanted to apply the SPS or the SAPS. Only Slovenia and Malta chose the SPS.

The new Member States may grant complementary national direct payments (CNDP) subject to the authorisation of the Commission and within specific limits. These CNDPs may be decoupled or coupled (to production, or to land use). Moreover, certain new Member States may decide to grant a separate sugar payment to historical producers of sugar beet as well as a separate fruit and vegetable payment and a transitional fruit and vegetable payment to SAPS eligible farmers.

3. THEORETICAL ANALYSIS OF THE ROLE OF DIRECT PAYMENTS IN SUSTAINING AND STABILISING THE INCOME OF FARMERS

3.1 The rationale for agricultural policy in support of income levels and stability

In the literature¹, the agricultural sector has been traditionally described as being affected by the so called “farm problem”, i.e. a situation of low and unstable incomes and low rates of return on farm resources. The farm problem consists of two aspects: a) a limited amount of resources and, in particular, limited endowment of capital; b) a low rate of return on farm assets, explained by the specific conditions of the markets for farm products and by the characteristics of factor markets.

Farm products markets are often characterised by very inelastic demand and supply. Therefore, any change in supply or demand generates large changes in product prices and, therefore, farm income instability.

Furthermore, these markets are characterised by slow demand increases coupled with fast supply increases. Supply increases are mainly driven by technical changes that have often been strongly orientated towards labour-saving technologies. These phenomena have caused a negative trend in real product price levels and, thus, a negative effect on farm income.

Persistently low farm incomes have traditionally been explained by a lack of mobility in the factor markets. This phenomenon has been related to the presence of adjustment costs in labour movements and of fixity and irreversibility of agricultural investment. However, while these factors can surely explain a short run disequilibrium in factor markets, it is still debated if these can also fully explain consistently lower incomes in the farm sector in comparison to other sectors.

The problem of low and variable farm incomes has been an important reason for providing public support to the farm sector. The support provided by the agricultural policy generally increases the

¹ John B. Penson Jr *et al.* (2010). Introduction to Agriculture Economics, 5th ed. Pearson Education, 198

amount of total farm revenues, for example, by enhancing the level of agricultural product prices or by granting direct payments to eligible farmers. However, it is important to underline that income levels differ among individual farms (according to the region where they are located, their production patterns, farm size, etc.). This suggests that the need for income support policies is rather differentiated within the whole farm sector.

3.2 Effects of direct payments on farm income, farm household income and resource allocation

The level of farm net value added is important because it represents the ability to remunerate all resources used in farm activities (a high level of value added allows for high remuneration of resources). However, not all the resources used on a farm are owned by the farm holder (i.e. external factors).

In this respect, the organisational structures of EU farms vary widely, not just in terms of the relative importance of own vs. external production factors, but also in terms of level of own production factors used on the farm such as, in particular, labour and capital. An important distinction is made between:

- non-family farms: where most of the work is provided by external paid labour. Own resources mainly refer to capital and the main focus of the farm management is on the returns on own capital including land;
- family farms: where a relatively large amount of work is supplied by the farm manager and the members of his/her family. The management is focused on the returns on both own labour and own capital. Family farms can be further subdivided into two main types:
 - In relatively large family farms, most of the family labour is used on-farm and, in this case, a large share of farm household income is generated by farm activities. This is the situation of full-time/professional family farms.
 - In relatively small family farms, only a small share of the labour provided by the farmer and his/her family is used on-farm. In this case, often referred to as part-time farming, the farm household income is generated by both farm and off-farm activities.

In **non-family farms**, direct payments increase the returns on own capital. If the flow of revenues generated by direct payments is more stable than the revenues from farm sales, direct payments stabilise farm income. In turn, both effects (i.e. increasing returns and more stable revenues) influence investment decisions, as they provide an incentive to increase on-farm investments, as opposed to a counterfactual situation of absence of direct payments. However, the nature of direct payments affects the way in which these investments are made as well as farm production decisions.

When direct payments are coupled, they provide an incentive to increase the level of production of those activities that receive such payments. In this case, direct payments distort production decisions that are influenced by the relative level of the unitary coupled direct payments granted to the different activities. When direct payments are decoupled, these should not have any impact on farmers' behaviour in terms of production choices and on-farm use of resources. However, decoupled payments may alter long-term decisions relative to the amount of resources (capital) to be used on- vs. off-farm.

With regard to **family farms**, the theoretical analysis developed through a simplified household model (distinguishing between two cases “No off-farm income – Full time/Professional farms” and “Off-farm income – Part-time farms”) clearly shows that the farm household income level depends to a large extent on the resource allocation between on- and off-farm employment. In turn, resource allocation is influenced by internal and external factors that also drive farm structural adjustment.

The household model can also be used to evaluate the impact of direct payments on farm income, household income, resource allocation and structural adjustment of the considered farm. By supplementing farm revenues, direct payments have the effect of increasing farm income and, thus, the income of those managing the farm. In the case of family farms, coupled direct payments could directly induce a greater use of the available family working time in farming activities.

Coupled direct payments increase farm income and, as a consequence, also household income. Therefore, direct payments can reduce the gap between the income of those engaged in farm activities and the income of the non-farm population, if the former is lower than the latter. The increase of farm income occurs because direct payments add to farm revenues. However, if direct payments are coupled to production, they alter the relative profitability of farm activities and distort the use of resources (e.g. labour and land) on the farm. This latter phenomenon results in an efficiency loss because a sub-optimal allocation of resources is reached. Under these circumstances, only part of the direct payments received by the farmer translates into additional income because part of the payment is needed to compensate for the efficiency loss (e.g. reduction of farm gross margin) caused by the change in resource allocation due to the distortive nature of the coupled payment.

Coupled payments can also have long run effects. Because these payments stimulate resource use on the farm, they may alter the farm structural adjustment process by slowing down the exit of resources from on-farm uses or by increasing their accumulation. This implies that this type of policy support could have consequences on the long-run viability of the farm sector.

Decoupled direct payments increase household income (in comparison with no policy at all) and they affect resource allocation less than coupled payments because they distort only the on/off-farm allocation of resources. They have a negligible impact on the on-farm allocation of resources.

3.3 Evaluating income effects of direct payments

In the literature², the analysis of effects of agricultural policies aimed at supporting farm incomes has been traditionally approached through the concepts of fairness, equity and efficiency.

Fairness and equity

In order to proceed on this topic, it is important to analyse the concept of fair standard of living and the problems arising when measuring it.

As stated in Article 39 of the Treaty on the functioning of the EU, one of the key objectives of the CAP is “*to ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture*”. However, the concepts of “fair standard of living” and “agricultural community” have not been more clearly defined in the legislation³.

The meaning of “agricultural community” could be understood in a strict way considering it as the farming community. The reference to farmers as the main intended beneficiaries of the policy seems evident from the second sentence of Art. 39 that says “*in particular by increasing the individual earnings of persons engaged in agriculture*” that is, first of all, the farmers. This seems coherent with the traditional nature of the CAP.

The literature indicates that the “fair standard of living” of the agricultural community is related to the well-being of agricultural households: this depends, first of all, on consumption capability, but also on individual-based factors (i.e. health) and the social and physical context. In any case, the economics and sociology literature analysing this issue commonly recognises that, in the presence of a

² OECD (1999). “Distributional effects of agricultural support in selected OECD Countries“. OECD, Paris. Nov, 1999. AGR/CA(99)8/FINAL.

Zahrnt V. (2008). “Reforming the EU’s Common Agricultural Policy: Health Check, Budget Review, Doha Round“. Policy Briefs, No 06/2008 European Centre for International Political Economy (ECIPE), Bruxelles.
Ziogas C. M. (1988). “Defining and determining a “fair” standard of living for the farm family”. European Review of Agricultural Economics, Vol. 15 (1988): 055-065.

³ Court of Auditors (2004). “Special Report No 14/2003 on the measurement of farm incomes by the Commission Article 33(1)(b) of the EC Treaty, together with the Commission's replies” (JOCE 2004/C 45/01).

homogeneous population, income level differences are sufficient to define differences in standards of living.

In the case of farm policies, two dimensions of inequality should be considered:

- Inter-sector inequality: differences between incomes in farm and in non-farm sectors;
- Intra-sector inequality: differences between incomes of different farms (e.g. small vs. large size farms; farms located in different regions – disadvantaged areas or not).

Therefore, agricultural direct payments may also be justified from a redistributive point of view if average farm household incomes are below the average income of non-agricultural households. However, when there are differences between individual farm household incomes, it is relevant to assess whether direct payments should be granted to all farmers irrespective of differences or to the farmers that are more in need. Note that this latter approach can increase the average farm household income and, at the same time, reduce the differences between individual farm household incomes (i.e. reduce income inequalities).

Measurement of farm household total income and availability of data on income

The farm household total income consists of income generated by agricultural activities (i.e. farm business income) and non-agricultural activities, profits and remuneration obtained from other non-core business activities, capital-derived income, welfare benefits and other revenues (i.e. off-farm income).

Although there is agreement on the fact that farm household total income consists of farm business income and off-farm income, opinions still diverge on how the farm household total income has to be defined and measured, and different approaches (microeconomic, macroeconomic and hybrid) have been adopted. The high heterogeneity of definitions and methods makes a combined reading of the existing information impossible. Furthermore, at the EU level and for individual Member States there is sparse and limited availability of data on farm household total income.

Income transfer efficiency

The ability of the policy to enhance the income level of agricultural households can be measured in terms of income transfer efficiency:

- Direct payments can be considered as an efficient income support instrument if they benefit farmers who actually need that income support and, furthermore, if they target the recipients in a way that reduces income disparities among farmers.
- Direct payments can cause distortions in terms of how farm resources are allocated. These distortions can be generated at the household level in terms of on-farm resource allocation (more resources used on those activities that receive coupled direct payments) and on/off-farm resource allocation (more resources used on-farm). In order to receive the payments, farmers forgo a more or less important part of their household income: farm income (net of payment) in the first case or off-farm income, in the second case. Therefore, not all the direct payments granted to farmers can be counted as their net income gain.

4. METHODOLOGY AND LIMITS OF THE EVALUATION

This evaluation examined the effects of direct payments on the income of farmers. The effects of direct payments related to other CAP objectives, such as enhancing the competitiveness of the agricultural sector or ensuring a sufficient and secure food supply, were not considered.

The evaluation methodology used for answering the evaluation questions and formulating conclusions and recommendations was based on a two-step approach:

- Formulation of hypotheses based on the theoretical analysis of the effects of direct payments on the level and stability of farmers' income and on their standard of living;
- The test of the hypotheses through quantitative analysis and an expert survey.

The analyses were carried out at two levels:

- at the macro-economic level, based on regional data (NUTS II);
- at the micro-economic level, based on individual farm data and distinguishing among different farm types according to the following classification criteria: seven types of farming, economic farm size, farm location and type of farm organisation⁴.

The following table provides a synthesis of the main issues covered by the evaluation and the tools used for addressing them.

Issues	Tools									
	Statistical analysis	Update of FADN data	Estimate of the effects of CMO measures	Regression models	Probit model	Gini coefficient	Quantile regressions	Review of the literature	Expert survey	
Role of direct support in enhancing the farm business income of farmers	✓	✓	✓	✓					✓	
Role of direct support in stabilising the income of farmers	✓				✓				✓	
Role of direct support in improving the standard of living	✓	✓								
Role of direct support on the farm household total income								✓	✓	
Contribution to the economic viability of farms	✓	✓							✓	
Targeting efficiency	✓	✓				✓	✓		✓	
Relative income transfer efficiency			✓	✓						
Coherence between direct support and other CAP measures	✓		✓	✓						
Coherence between direct support and LFA compensatory allowance	✓	✓								

Statistical analysis. Statistical methods were applied to analyse the evolution of the main variables with respect to the income of farmers and the economic viability of holdings.

The macro-economic statistical analysis has been used mainly for measuring the effects of direct payments in terms of level and stability of the agricultural income per labour unit. The analysis used data from the EU regional statistics provided by Eurostat. In some cases data at regional level (2004, 2006, 2007) are not available: Italy, Belgium, Poland, Romania, Slovenia, Spain, Portugal (only for 2007). Since the Eurostat data do not allow to distinguish the types of agricultural payments, we have integrated the more detailed payments data available from the CATS database (Clearance of Audit Trail System, provided by DG Agri). This operation resulted in the computation of a new factor income variable, termed Corrected Factor Income (CFI).

At micro-economic level, the analysis is mainly based on farm data from the FADN database (EU-FADN-DG AGRI L-3). The income of farmers was analysed through the Farm Net Value Added per Annual Work Unit (FNVA/AWU). The average values were calculated for the period 2004-2007 for EU25, 2007-2008 (2008 estimated) for Romania and Bulgaria. For the analysis of indicators prior to and after the reform (EU15) the periods considered were 2001-2004 and 2006-2007. The income indicator was analysed by converting the original values of the FADN database into Purchasing Power Standard (PPS) values, in order to take into account the differences in purchasing power across Member States.

It is important to bear in mind that across macro-regions the types of farming analysed can largely differ in terms of technological and economic parameters and support levels. The results of the analyses may thus be influenced by these differences.

⁴ Types of farming. Following the FADN classification (variable TF8: TF1, Field crops; TF2, Horticulture; TF4, Other permanent crops (except wine); TF5, Milk; TF6, Other grazing livestock(beef, sheep and goats); TF7, Granivores; TF8, Mixed, i.e. various crops and livestock combined).

Economic size. Three classes: Small, up to 16 ESU; Medium, from 16 to 100 ESU; Large, greater than 100 ESU. One ESU corresponds to a farm's Standard Gross Margin (SGM) of 1.200 Euro/year

Farm location. Following the FADN classification (variable A39: not located in LFA, located in LFA, of which located in LFA mountain areas)

Organisational form of the holding. Following the FADN classification (variable A18: Individual farms, Partnerships, Other types)

The following statistical analyses were carried out:

- The analysis of the role of direct payments in enhancing the income of farmers has been done by comparing the average value of farm income levels per labour unit in the real situation (with direct payments) and in the simulated situation (by deducting direct payments from the farm income) for the period 2004-2007 by: type of farming, region/groups of regions, typology (economic size class, farm location and organisational form of holding).
- The contribution of direct payments to farm income stability was measured by comparing the coefficients of variation of FNVA/AWU computed with direct payments and the coefficients of variation of FNVA/AWU computed by deducting direct payments (EU15, 2001-2007). Before proceeding to the calculation, the trend component was removed from the income series. The analysis has been done by type of farming, regions/groups of regions and typology (economic size class, farm location and organisational form of holding).
- As stated above, one of the key objectives of the CAP is “to ensure a fair standard of living for the agricultural community”. However, the European Community has never defined the concepts of ‘agricultural community’ and ‘fair standard of living’ as they appear in Article 39 of the TFEU Treaty. There are therefore still no clear concepts or criteria which can be applied to measure these variables. In this context, to assess the contribution of direct payments to the income objective, farmers’ income was compared to Gross Domestic Product (GDP) per employee at current market prices, provided by Eurostat in the Regional Economic Accounts. The GDP is the market value of all final goods and services produced in a year and it is often positively correlated with the standard of living. Accordingly, regional GDP is a measure of a region’s overall economic output and it represents an overall income benchmark (i.e. income generated by all sectors of a regional economy) to be compared with farm incomes expressed in terms of value added generated by all production factors. The ratio was computed in the real and simulated situation (without direct payments) for the period 2004-2007.
- A further analysis was conducted in order to assess whether and to what extent direct payments make it possible for the family units to attain an income (FFI/FWU) corresponding to at least the opportunity cost of paid employment (source: FADN, item Wages Paid calculated at regional level for all types of farming).
- The role of direct payments in supporting the economic viability of farms was assessed by analysing the return on investments (ROI) (and its components) and the return on assets (ROA) at regional level for three types of farms depending on the level of unpaid labour used on the farm. Both indicators were measured net of the value of family labour. The analysis of the financial viability of farms was made by comparing the ROA with the interest paid on loans. The analysis was carried out by comparing the average value of ROA (2004-2007) in the real and in the simulated situation (without direct payments).
- Targeting efficiency, i.e. whether and to what extent direct payments are efficient in targeting the appropriate recipients. The analysis compared at regional level the farmers’ income and the GDP per labour unit and was done considering three situations:
 - situation A: the income of farmers is higher than the benchmark even in the absence of direct payments. For farms in this situation, the benchmark income is achieved even without support;
 - situation B: the income of farmers is higher than the benchmark but only because of direct payments. For farms in this situation, only part (variable from to case to case) of direct payments contributes to the income objective;
 - situation C: even with direct payments, the income of farmers is lower than the benchmark.For each type of farming and region groups classified according to the SPS model (historic, hybrid, regional and SAPS), the percentage of farms falling into each of the three situations and the percentage amount exceeding the benchmark (in situation A and in situation B) in the total amount of direct payments were computed (2001, 2004, 2007).
- Coherence with other CAP measures in relation to the objective of enhancing farmers’ income: statistical analysis over time (EU15, 2001- 2007) of the farmers’ income level and of the support provided by direct payments and by other policies (rural development measures, excluding investments; measures under the single CMO).

- Coherence with other CAP measures in relation to the objective of stabilising farmers' income: comparison of the coefficients of variation of FNVA/AWU, FNVA/AWU net of direct payments, FNVA/AWU net of direct payments and CMO support and FNVA/AWU net of direct payments and rural development payments (EU15, 2001- 2007)
- Coherence among direct payments and LFA payments: comparison between the income of farmers in LFA areas receiving compensatory allowance (computed with and without compensatory allowance) and the income the farmers in LFA areas not receiving compensatory allowance and the income of farmers not located in LFA areas (2004 and 2007, weighted average of all types of farming, by type of farming and by SPS implementation model).

Update of FADN data. For Bulgaria and Romania, at the time the evaluation was carried out, FADN data were only available for 2007. In order to have at least two years of available data, for these two Member States the data were updated to 2008 through estimation. The 2007 income indicators, (FNVA and FFI) were re-calculated for 2008 on the basis of the updated values of total gross production, intermediate consumption and direct payments. The updating has two main limitations: other variables, such as subsidies, taxes and depreciation, are kept constant and the methodology assumes invariance of both the farm cost structure and production structure.

Estimate of the effects of CMO measures. Estimation has been used to calculate farmers' income net of the effects of market support. The aim was to distinguish the impact of market measures from the impact of other policies. The approach used is based on market price differentials computed annually by the OECD for a number of agricultural commodities produced in the EU. The support provided by CMO policies was calculated as the difference between current sales revenue values recorded in the FADN data base and reference sales revenue values computed on the basis of commodity-specific ratios.

The methodology applied to estimate the effects of CMO measures suffers from three main limitations: i) OECD provides market price differential estimates only for a set of 20 commodities. However, according to OECD estimations, they account for approximately 74% of the EU total agricultural output value; ii) the price differentials are calculated at the EU level, therefore they do not account for differences of CMO instruments across Member States. Nevertheless, the methodology has been applied to the current level of prices, thus maintaining the differences observed across Member States; iii) direct payments may have an effect on EU prices. The utilised approach does not account for this aspect that would, however, be non-negligible only for a limited set of products.

Econometric models at macro and microeconomic level. The econometric approach has been used to identify the statistical relationships between farmers' income level and a number of explanatory variables expected to influence farmers' income (e.g. direct payments, market interventions, economic or social factors, etc). Thus, regression models allowed to assess the effectiveness of direct payments (i.e. the net effect) in terms of enhancing the income of farmers. The regression parameters estimate the impact of an additional Euro of direct payments on farm income. If parameters are statistically different from zero and positive in sign, it can be assumed that direct payments contribute to enhancing farm incomes. The magnitude of the parameters provides an estimated measure of this contribution.

The regression models have been developed: at macro level for 2004, 2006 and 2007 (EU27); at micro level for 2004 and 2007 for seven types of farming. Furthermore, to assess if the parameters estimated for direct payments differ into sub-samples, two unrestricted models were developed at micro-economic level: a) to identify possible differences that may exist between farms located in mountain LFA and in other areas; b) between farms located in SPS and SAPS regions.

Probit model. A conditional probability model was applied at macro level to estimate the increase in the CFI stability due to a unitary increase of direct payments over the period. Probit regression expresses the effect of a unitary change of each dependent variable (coupled and decoupled payments) on the probability that income variability (the dependent variable) is lower in the period 2006-2008 compared to the period 2000-2004 (i.e. the dependent variable takes value equal to 1) or, *vice versa*, in the period 2000-2004 compared to 2006-2008 (the dependent variable takes the value of 0).

Gini coefficient of concentration has been used to assess the level of equity in the distribution of farmers' incomes. The Gini coefficient of concentration is used to measure the degree of statistical dispersion of variables that are transferrable between different units of the same population, such as income. The coefficient has been computed for each type of farming, distinguishing EU regions according to the model of SPS or SAPS implemented (2001, 2004, 2007). It is important to note that Gini coefficients calculated on actual and simulated income distributions (respectively, with and without direct payments) do not provide information on the way in which direct payments are distributed to lower or higher income farms.

Quantile regressions. The quantile regression is an extension of the above mentioned regression model. Quantile regression analysis, conducted at both the micro- and the macro-economic level, was used to analyse the effects of coupled and decoupled direct payments on farmers' incomes according to income classes, ordered from the lowest to the highest. The coefficients estimated for each income quantile provide a measure of the changes produced by one additional unit of coupled and decoupled direct payments on farm income per labour unit of that income quantile.

A **literature review** was aimed at analysing farm household total income information otherwise not available in the EU official statistics. The review includes studies and statistics available for single Member States and for groups of Member States. The literature review suffers from some limitations, related to: i) differences in the definition of households and farm households; ii) differences in the measurement of farm household income; iii) the lack of up-to-date studies and statistical data on farm household income.

Expert survey. The aim was to collect the informed opinions of a group of experts in order to better interpret the results of the quantitative analysis. Relevant questions were sent to the experts and the opinions obtained have been integrated in the analysis.

5. MAIN CONCLUSIONS OF THE EVALUATION

Before illustrating the main findings, it is important to recall that the evaluation examined the effects of direct payments on the income of farmers. The effects of direct payments related to other CAP objectives were not considered.

Moreover, the evaluation focused on **farm business income**, for which available statistics were able to satisfy the analytical requirements. The farm household total income was analysed in a qualitative way through a review of available studies and statistics.

It is important to note that the results of the analysis may be influenced by the changes in the structure and economic situation of farms. The main changes have been:

Structural characteristics
The average number of annual work units (AWU) per farm in the Eastern European Member States and in Germany East & North-East is noticeably higher than in EU 15. Furthermore, comparing pre- and post-reform averages, the following were noted: a general fall in average AWU/farm in the macro-regions of France, Belgium, Portugal, Austria, Greece and Ireland; an almost global increase in the macro-regions of Italy, Germany, Denmark, Luxembourg and Sweden; a more mixed situation (increase or fall depending on type of farming and/or macro-region) in other EU15 (e.g. United Kingdom, Spain, Netherlands, Finland).
The average number of AWU per hectare. The comparison of pre- and post-reform averages (EU15) highlights a general decrease of the number of labour units per hectare of agricultural area. The most important regular exceptions were found in the Italian macro-regions for permanent crops and in the macro-regions of southern Spain.
Economic situation
In most regions, the annual average growth rate of Intermediate consumption/AWU is higher than the annual average growth rate of Total output/AWU, and therefore the gap between costs and revenues becomes narrower.
In most regions, the annual average growth rate of Wages paid/ paid AWU is lower than the annual average growth rate of Total output/AWU, and therefore the growth of wages is lower than that of Output/AWU.

Such factors may well play a role in addition to direct payments' effects on FNVA/AWU:

- a) for equal levels of FNVA, income per labour unit (AWU) is structurally lower in the EU12 Member States compared to the EU15 (on average);
- b) in the EU15 the total number of AWU has decreased after the 2003 CAP reform. Therefore, for equal levels of FNVA, after the reform income per AWU becomes higher;
- c) changes of FNVA/AWU over time are influenced by changes in some of its components (total output/AWU; intermediate consumption/AWU; paid wages/paid AWU; number of AWU).

EQ 1a: To what extent have the direct payments contributed to achieving a fair standard of living for the agricultural community, by stabilising and enhancing the income of farmers?

The answer to this evaluation question provides the following conclusions regarding the effects of direct payments on the income of farmers.

In terms of enhancing farmers' income, direct payments:

- Have contributed to enhancing the income of farmers;
- Have played a particularly important role in generating farm income in grazing livestock farms (beef, sheep and goats), field crops, mixed farms and dairy farms;
- Have also played a role in strengthening the cohesion between regions, in particular in the sectors of field crops, milk, grazing livestock (other than dairy farms) and mixed farms;
- Have allowed a reduction of the existing gap between the average farm income per labour unit of small and large farms.

In terms of stabilizing farmers' income, direct payments:

- Have made a positive and robust contribution to the stability of the income of farmers. The largest effect on income stability is shown in the sectors which are the most supported by direct payments (field crop, grazing livestock and mixed farms);
- Have played a larger role in farmers' income stability in the smaller size farms (small compared to medium and large size farms and medium compared to large size farms), .

In terms of ensuring a fair standard of living of the agricultural community, direct payments:

- Have helped reduce the gap between average farmers' income and Gross Domestic Product (GDP) per employee.

The following tables provide a synthesis of the main results leading to the formulated conclusions.

In terms of enhancing farmers' income	
Analysis	Results
Statistical analysis of the relationships between EU agricultural payments under I and II pillar and agriculture income (EU27, in absolute value and per labour unit, 2004 and 2007)	There is a linear correlation between the level of the EU agricultural payments under I and II pillar and the level of corrected factor income. This indicates that agricultural payments lead to enhanced farmers' income.
Econometric analysis at macro-economic level: regression models	In all analysed years (2007, 2006 and 2004), the parameter estimates for the direct payment variables are statistically significant and positive in sign, which means that one additional Euro of direct payments translates into increase of farm income.

In terms of enhancing farmers' income	
Analysis	Results
Statistical analysis of the overall farm income levels per labour unit (FNVA/AWU, weighted average for period 2 004-2007, expressed in PPS) for the whole EU	The results of the calculations made by deducting direct payments from the weighted average of farm income (FNVA/AWU) for the period 2004-2007 indicate that the removal of direct payments would have led to a 27% fall in farm income value.
Econometric analysis at micro-economic level: regression models	The parameter estimates for the direct payments variables are statistically significant and positive in sign in all considered cases: seven types of farming and whole sample; both 2004 and 2007. This shows that direct payments play a role in enhancing farmers' income both in each of the seven types of farming analysed and at the level of the whole sample.
Statistical analysis of the share of direct payments in farm value added (% of DP/FNVA per AWU, average for 2004-2007)	Direct payments represent about 50% of the income of grazing livestock farms (beef, sheep and goats), more than 40% of the income of field crop farms and of mixed farms (various crops and livestock combined) and more than 30% of the income of dairy farms (EU27).
Statistical analysis of the overall average values of farm income levels per labour unit per type of farming (FNVA/AWU, weighted average for period 2004-2007, expressed in PPS) for the group of old Member States (EU15) and for the group of new Member States (EU12)	In the two sectors for which the share of direct payments is the lowest, i.e. horticulture and permanent crops (except wine), the average farm income per work unit is lower than the average community income: <ul style="list-style-type: none"> - with respect to the EU15 average farm income (27.884 PPS), the lowest level is reached in permanent crops (-22.5%), grazing livestock (-21.6%) and horticulture (-10.8%) - similarly, with respect to the EU12 average farm income (13.422 PPS): the lowest level is reached in permanent crops (-34.8%), grazing livestock (-15%) and horticulture (-10.9%).
	Even though calculations were done in PPS, there is a big difference between the average farm income per labour unit in EU15 and in EU12. The average FNVA/AWU value of the EU15 Member States is double the average FNVA/AWU value of the EU12: the ratio between the two averages is 2.08:1 in the actual situation and would have risen to 2.21:1 in the simulated situation (without direct payments).
Statistical analysis of the coefficients of variation (CV) of the FNVA/AWU values around the EU average calculated for the macro-regions per sector	There are strong differences between regional average farm incomes in all analysed sectors: the coefficients of variation are higher than 40% for all the sectors. Once direct payments are deducted from average farm income, the coefficients of variation would increase in a particularly important way in those sectors where the share of direct payments in farm income is the highest: <ul style="list-style-type: none"> - Milk, the CV would rise from 46.5% to 60.1% - Mixed farming, the CV would rise from 46.1% to 62.6% - Grazing livestock (beef, sheep and goats), from 40.3% to 84.6% - Field crops, the CV would rise from 40.2% to 52.2%
Statistical analysis of the	There is a close and direct relationship between the level of farm

In terms of enhancing farmers' income	
Analysis	Results
FNVA/AWU levels (average for period 2004-2007) in macro-regions by type of farming and by ESU class	income per labour unit and the economic size of farms: in general, the farms of the small economic size class (which are mostly family farms) have the lowest average farm income per labour unit. Thus, the ratio between the average level of income of large farms and small farms is 3.92 for field crops, 2.76 horticulture, 3.12 permanent crops, 4.7 for milk farms, 4.1 for grazing livestock (beef, sheep and goats), 3.36 granivores and 4.58 for mixed farms.
	In the simulated situation (by deducting direct payments from average farm income for the period 2004-2007), the gap between large and small farms would increase, in particular in farms specialised in field crops and in mixed farms. Indeed, the ratio between the average level of income of large farms and small farms would have become 4.4 in the case of field crops and 5.23 in the case of mixed farms.

In terms of stabilizing farmers' income	
Analysis	Results
Econometric analysis at macro-economic level: probit regression	<p>The results show that decoupled payments have a positive and significant effect on farmers' income stability (i.e. the estimate of the corresponding coefficient takes a positive sign and is statistically significant).</p> <p>Moreover, the analysis of marginal effects of the same model shows that a 1% increase of decoupled payments would increase by 1.8% the probability of the dependent variable (i.e. income variability) taking the value of 1, which corresponds to lower income variability in 2006-2008 compared to 2000-2004.</p> <p>The results on the contribution of the coupled payments variable are not as clear, because the statistical significance of the estimate of the corresponding coefficient is low. Therefore, it is not possible to draw clear conclusions .</p>
Statistical analysis of the coefficients of variation (CV) of farmers' income with and without direct payments across macro-regions by type of farming (EU15, 2001-2007)	<p>Direct payments contribute to more stable farmers' incomes across most EU15 regions in the sectors traditionally supported through direct payments:</p> <ul style="list-style-type: none"> - In nearly half of the considered regions, direct payments contribute to lowering variability in field crop farms by at least 15% and as much as 65% ; - In farms specialised in grazing livestock (beef, sheep and goats), direct payments contribute to diminishing farmers' income volatility by 18-51% in one third of the regions; - Similarly, in mixed farms, direct payments contribute to diminishing farmers' income volatility by 10-40% in half of the regions.
Statistical analysis of the coefficients of variation (CV) of farmers' income with and without direct payments across small,	The comparison of the coefficients of variation computed in the real and in the simulated situation (without direct payments) indicates that the removal of direct payments would have made farmers' income volatility even higher in the smaller class farms

In terms of stabilizing farmers' income	
Analysis	Results
medium and large farms by type of farming (EU15, 2001-2007)	<p>(small compared to medium and large size farms and medium compared to large size farms).</p> <p>Indeed, in the absence of direct payments, the coefficients of variations would increase in a particularly important way for most regions in smaller size farm classes in the following types of farming:</p> <ul style="list-style-type: none"> - Grazing livestock farms (other than dairy), the CV of small size farms would rise by 6% to 33.1%; the CV of medium size farms would rise by 7% to 46.3%. - Granivores, the CV of medium size farms would rise by 1.4% to 22.3%. - Mixed farms, the CV of small size farms would rise by 2% to 15%; the CV of medium size farms would rise by 11.1% to 50.1%.

In terms of ensuring a fair standard of living to the agricultural community	
Analysis	Results
Statistical analysis of the ratio between FNVA/AWU and the average GDP/employee for 2004 - 2007 at regional level for each type of farming and for the different economic sizes	<p>In 60.5% of regions, average farm income per labour unit for the analysed period is lower than half of the regional GDP per employee. In the simulated situation, without direct payments, 84% of regions would not reach the threshold of half of the GDP/employee.</p> <p>In all four most supported sectors (field crops, dairy farms, grazing livestock farms and mixed farms), the absence of direct payments would cause a further widening of the gap between farmers' income and GDP per employee, in a large number of regions for the period 2004-2007.</p> <p>The simulations carried out without direct payments based on 2004-2007 data indicate that in the livestock sector farm income would not have reached half of the regional GDP/employee in 100% of regions. In the real situation the income did not reach half of the regional GDP/employee in 67% of the regions. The simulations also indicated that in the field crop sector, the number of regions not reaching half of the GDP/employee would have doubled (from 43% to 86% after deducting direct payments).</p> <p>The comparison between farm income and GDP/employee in the three classes of economic size highlights that in 98,1% of regions average farm income for small farms is lower than half the GDP/employee. Concerning medium farms, 73% of cases do not reach the threshold of half the benchmark; in the group of large farms, only in 24,8% of cases average farmer income in the EU regions is lower than half the benchmark.</p> <p>In the simulated situation, without direct payments, small farms' income would not have reached half of the regional GDP/employee in 99,4%% of the regions. and medium farms' income in 90,8% of regions.</p>

In terms of ensuring a fair standard of living to the agricultural community	
Analysis	Results
Statistical analysis of the ratio between FFI/FWU and the average wage of farm employees calculated at regional level for each type of farming (average 2004 – 2007)	<p>The analysis aimed to assess whether in the analysed period the family units attained a farm income (FFI/FWU) corresponding to at least the average wage of farm employees calculated at regional level for all sectors. The FFI/FWU value does not correspond exactly to work remuneration, as it also includes remuneration of capital and profit. Therefore, a value of the ratio amounting to 1 (or lower) indicates a fragile situation in which either family labour or capital is under-remunerated⁵.</p> <p>In all four most supported sectors, in a large number of regions, the simulations without direct payments indicate that the farm income per family unit would fall below the remuneration level of paid employment in the reference region. In the livestock sector the farm income per family unit would not reach the remuneration of paid employment in 78% of regions.</p>

EQ 1b: Analysis of the differentiated role of direct payments on farmers' income according to farm location and type of organisational form of holding

The answer to this evaluation question provides the following conclusions regarding the effects of direct payments:

- Direct payments have reduced the existing differences between farmers' income in non LFA areas and in LFA areas and the subgroup of mountain LFA areas.
- Direct payments have had larger effects on farmers' income stability in LFA areas in comparison to non-LFA areas.
- Direct payments have contributed to reducing the gap between average farmers' income in farms located in LFA area and in the subgroup of mountain LFA areas and the regional GDP per employee).
- Direct payments appear to have had a larger income stabilizing effect in individual farms and farms organised as partnerships compared to farms having other types of organisational form
- In the EU15 regions (on average), in the simulated situation, without direct payments, the loss of farm income per labour unit is greater in individual farms and lower in farms having other types of organisational form (farms organised as partnerships lie somewhere in-between)
- In EU12 regions (on average), the situation appears to be the exact opposite: the loss of farm income per unit of labour following the simulated removal of direct payments would have been greater in farms having other types of organisational form compared to individual farms and partnerships.

The following table provides a synthesis of the main results leading to the formulated conclusions.

Analysis	Results
The analysis focuses on the comparison of the average 2004-2007 farmers' income of LFA areas and of LFA mountain areas with	The income of farmers located in LFA areas and in the subgroup of mountain LFA areas, apart from some exceptions, is more dependent on direct payments than the income of farmers located in non LFA areas.

⁵ Should this level not be reached, it would cease to be convenient to carry on the activity, as it would be more convenient to be employed elsewhere.

Analysis	Results
<p>the average 2004-2007 farmers' income of non-LFA areas.</p> <p>In order to isolate the effects of direct payments on LFA farm income, the FNVA/AWU has been calculated by removing the LFA compensatory allowance.</p>	<ul style="list-style-type: none"> - Concerning the gap between LFA farmers' income and non LFA farmers' income: the ratio between the two averages would become 0.78:1 in the simulated situation (without direct payments) against 0.88:1 in the real situation. - Concerning the gap between the income of farmers in the subgroup of mountain LFA and non LFA farmers' income: in the simulated situation (without direct payments), the gap would remain almost the same (0.81:1 in the actual situation against 0.80:1 in the simulated situation). However, this result, obtained at EU27 level, can be influenced by the fact that the subgroup mountain LFA is more represented in EU15 Member States (higher average farm income) than in EU12 Member States (where LFA are mostly non mountain). - Both in the group of LFA areas and in the subgroup of mountain LFA area, the largest gap with farm income levels of non LFA areas is observed in grazing livestock (beef, sheep and goats) farms.
<p>Statistical analysis of the coefficients of variation (CV) of farmers' income with and without direct payments across farms located in LFAs, mountain-LFAs and non-LFAs (EU15, 2001-2007)</p>	<p>Direct payments' contribution to income stability is larger in LFAs than in non-LFAs across the examined sectors.</p> <p>Overall, the contribution of direct payments to income stability is not different in mountain-LFAs compared to non-LFAs, with the exception of field crops farms, where direct payments' income stabilising effect is larger in mountain-LFAs.</p>
<p>Statistical analysis of the ratio between FNVA/AWU and the average GDP/employee for 2004 - 2007 at regional level for each location</p>	<p>In all regions and across all types of farming the farm income in non LFA areas, in LFA areas and in mountain LFA areas is lower than the GDP per employee. Indeed:</p> <ul style="list-style-type: none"> - the average regional farm income per labour unit does not reach half of the regional GDP/employee in 55% of the non LFA regions, in 72% of the LFA regions and in 81.3% of the regions of the subgroup mountain LFA; - only in around 2% of the non LFA regions and of the LFA regions and in 1% of the mountain LFA areas the average regional income of farmers exceeds the benchmark. <p>In the simulated situation (without direct payments), the average regional farmers' income would not reach half of the regional GDP/employee in 81% of the non LFA regions, in 89% of the LFA regions and in 91% of the mountain LFA regions.</p>
<p>Statistical analysis of the ratio between FFI/FWU and the average wage of farm employees calculated at regional level for all sectors (average 2004 - 2007, at regional level for each type of farming)</p>	<p>Direct payments largely contribute to allow family farms in the group of LFA areas and in the subgroup of mountain LFA areas to reach a farm income per labour unit (FFI/FWU) at least equal to labour opportunity cost, but to a larger extent in LFA and in the subgroup mountain LFA areas compared to non LFA areas. Indeed:</p> <ul style="list-style-type: none"> - In the set of EU15 LFA regions, all sectors considered, the average regional family farm income per labour unit (2004-2007) is higher than the average wage of farm employees in 70% of the cases, in 66% of the cases in mountain LFA areas and in 85% of the cases in non LFA areas. In the simulated situation (without direct payments) and for the same period only 29% (-41 percentage points compared to

Analysis	Results
	<p>the real situation) of the group of LFA regions, 51% of the subgroup of mountain LFA (-15 percentage points compared to the real situation) and 48% of the non LFA regions (-37 percentage points compared to the real situation) would reach the benchmark.</p> <ul style="list-style-type: none"> - In the set of EU12 LFA regions, all sectors considered, the average regional family farm income per labour unit (2004-2007) is higher than the average wage of farm employees in 70% of the cases, in 38% of the cases in mountain LFA areas and in 79% of the cases in non LFA areas. In the simulated situation (without direct payments) and for the same period only 35% (-35 percentage points compared to the real situation) of the group of LFA regions, 5% of the subgroup of mountain LFA (-33 percentage points compared to the real situation) and 60% of the non LFA regions (-19 percentage points compared to the real situation) would reach the benchmark.
<p>Statistical analysis of the average values of farm income levels (FNVA/AWU average for period 2004-07) in macro-regions by organisational form of holdings and by type of farming</p>	<p>For the EU15 in all sectors the average income per labour unit on individual farms is lower than the average level of farms organised as partnerships, and the average level of income of farms organised as partnerships is lower than farms having other types of organisational form.</p> <p>The loss of farm income per labour unit following the simulated removal of direct payments is always greater in individual farms and always lower in farms having other types of organisational form (farms organised as partnerships lie somewhere in-between). Indeed:</p> <ul style="list-style-type: none"> - the ratio between the average income of farms having other types of organisational forms and individual farms is 1.50 for fields crops; 1.58 for horticulture; 1.47 for permanent crops (excluding wine); 1.60 for milk farms; 2.02 for grazing livestock (beef, sheep and goats); 1.79 for granivores; 1.64 for mixed farms; - in the simulated situation, the ratios for horticulture, permanent crops and granivores sectors would remain almost the same. In the other types of farming, the ratios between the average income of farms having other types of organisational form and individual farms become 1.67 for fields crops; 1.84 for milk farms; 2.28 for mixed farms; 3.85 for grazing livestock <p>For the EU12 average, the situation is completely different: in the other types category the FNVA/AWU value is a little below or above the average level attained by Individual farms:</p> <ul style="list-style-type: none"> - The ratio between the farm income levels of other forms and Individual farms is 0.54 in the case of granivores; 0.80 for horticulture; 0.84 for permanent crops; 0.86 for milk; 1.06 for field crops; 1.26 for mixed farms. - These results lead to state that, in the case of horticulture, permanent crops, milk and above all granivores, in the (large) Other type farms there is evidence of surplus labour, leading to a lower average value of farm income per unit of labour

Analysis	Results
	In the simulated situation (by deducting direct payments from the average FNWA/AWU for period 2004-2007) the ratio of farm income levels between farms having other types of organisational forms and individual farms would be worse for granivores (0.39) and for milk specialised farms (0.74), but remain similar for all other sectors considered.
Statistical analysis of the contribution of direct payments to farm income stability: comparison of the coefficients of variation (CV) of FNVA/AWU gross and net of direct payments across farms with different organisational forms (EU15, 2001-2007)	<p>Farm income variability increases more in individual farms and partnerships than in the other types of farms when income is considered net of direct payments (simulated situation) in most analysed regions and in four sectors:</p> <ul style="list-style-type: none"> - field crops, the CV of Individual farms would rise by 5.1% to 58.4%; the CV of Partnerships would rise by 3.4% to 46%; - milk, the CV of Individual farms would rise by 0.9% to 15.5%; - grazing livestock (beef, sheep and goats), the CV of Individual farms would rise by 6.3% to 33.6%; - mixed farming. The CV of Individual farms would rise by 4.1% to 63.7%; the CV of Partnerships would rise by 1.9% to 24.5%.

EQ 2: To what extent have the direct payments contributed to supporting the economic viability of farms?

A farm can be considered viable when it is able to guarantee a “sufficient remuneration” of family labour and farm capital. Two aspects have been taken into account:

- economic viability: the ability to guarantee remuneration of family labour at least equal to its opportunity cost, and a positive remuneration of farm capital;
- economic and financial viability (considered together): the ability to guarantee, besides the remuneration of family labour, the remuneration of farm capital at least equal to the average interest rate applied to medium-term loans.

The answer to this evaluation question provides the following conclusions regarding the effects of direct payments:

- Direct payments have been crucial in ensuring the economic viability of farms, in particular those specialised in field crops, grazing livestock (beef, sheep and goats), mixed farming and, partly, in the milk sector.
- In the analysed period, farms in which the paid labour component is high (FWU/AWU <30%) are the most efficient in the EU15 and the least efficient in the EU12. This suggests that the strategic goals in this class of farms might be completely different: more targeted to economic results in the EU15 and more focused on social aspects in the EU12. In other words, maximisation of profit in the first case, and maximisation of employment in the second case.
- In the EU15 the hybrid SPS model has probably contributed to a stronger growth of the return on investments (ROI) and of the return on assets (ROA) .

The following table provides a synthesis of the main results leading to the formulated conclusions.

Analysis	Results
<p>Economic viability: statistical analysis of ROI and ROA, at global average level (EU27) and for the set of macroregions belonging to EU15 and EU12 (2004-2007 for each of the seven types of farming, with and without direct payments).</p>	<p>The overall results of the analyses indicate that in particular for four types of farming: field crops, other grazing livestock, mixed farming and partly in milk farms, the removal of direct payments would generate economic results that are not sufficient to adequately remunerate capital nor family labour. Indeed:</p> <ul style="list-style-type: none"> - At the EU27 level, ROI and ROA values in the actual situation are generally low, but always positive (ROI: max 5.5% in horticulture, min 1.7% in grazing livestock; ROA: max 4.3% in permanent crops, min 1.3% in mixed farming). - In the simulated situation ROI values would be negative in grazing livestock (-2.5%), in mixed farming (-2.4%) and field crops (-1.5%); ROA values are negative in grazing (-2.8%), mixed farming (-3.3%), field crops (-2.1%) and milk (-0.8%). - Similar results are found in EU15 and EU12.
<p>Economic viability: statistical analysis of ROI and ROA at regional level for three types of farms depending on the level of unpaid labour used on the farm:</p> <ul style="list-style-type: none"> - FWU/AWU<30% - FWU/AWU 30-70% - FWU/AWU>70%. 	<p>The analysis showed that at the EU15 level, the remuneration of farm capital is generally lower for farms where the family component of labour is higher (FWU/AWU >70%), and higher in farms where the family labour component is modest. At the EU12 level this rule does not appear to be so evident: the lowest remuneration of farm capital is observed in farms with low family labour use.</p> <p>This leads to surmise that in farms where use of family labour is modest the strategic goals being pursued might be completely different: aimed more at profit maximisation in the EU15, and employment maximisation in the EU12.</p> <p>The class of farms in which the family component of labour is high (FWU/AWU >70%) has the highest concentration of farms that in the real situation are unable to remunerate capital and labour at the opportunity cost level (thus they are not economically viable):</p> <ul style="list-style-type: none"> - in all types of farming, average ROI and ROA values of farms with FWU/AWU >70% are negative even in the real situation (with direct payments) in a relatively large number of regions. This is particularly evident in horticulture, grazing livestock (beef, sheep and goats) and mixed farms. <p>On average and with some differences among types of farming, in about 76% of regions direct payments enable farms to adequately remunerate family labour (calculated at opportunity cost) and to remunerate to some extent the capital invested in farms. <i>Vice versa</i>, in about a quarter of Community regions farms are not economically viable, even with direct aid.</p>
<p>Economic viability: statistical analysis of ROI through its components: the Return on Total Output (ROTO) and the ratio Total</p>	<p>This analysis showed that in general both the Return on Total Output and the ratio TO/TA are lower for farms in which the family component of labour is high (FWU/AWU >70%). Lower ROI in farms with FWU/AWU >70% is the effect of a</p>

Analysis	Results
Output/Total Assets	situation of disadvantage affecting both components: a less efficient production process (lower ROTO) and lower efficiency of total assets (low TO/TA).
Economic and financial viability: statistical analysis of ROA compared to the Interest Rate for Medium-Term Loans (IRL)	<p>In most class/type of farming combinations the majority of regions are concentrated in the ROA/IRL band between 0 and 1. Accordingly, on average, in the majority of regions direct payments allow the attainment of economic viability, but not of financial viability.</p> <p>Furthermore, despite the presence of direct payments, farms having an organisational model relying on the use of family labour to a large extent find it more difficult to attain a state of viability compared with farms applying other organisational models.</p>
Effects of the 2003 reform on economic viability of farms in the EU15: statistical analysis of ROI and ROA development in the period 2001-2004 and in the period 2006-2007, in regions grouped by SPS model	<p>In EU15, ROI and ROA values rose for a larger number of regions having adopted the hybrid SPS model compared with the number of regions having adopted historic SPS model (in all FWU/AWU classes, and in all types of farming except for granivores).</p> <p>Consistently similar results across the considered region groups lead to conclude that the phenomenon observed could not be random. In other words, and without prejudice to all other causes, the system implementing hybrid SPS would appear to have favoured to some extent the growth of ROI and ROA.</p>

EQ 3: To what extent have the direct payments been efficient with respect to achieving their objectives?

The answer to this evaluation question provides the following conclusions regarding the effects of direct payments.

- In the years analysed (2004, 2006 and 2007), at global level the efficiency of direct payments in terms of directing income support to farmers whose income is lower than the benchmark is quite high. However the results show remarkable differences across the regions.
- Direct payments have contributed to reducing disparities among farmers' incomes in the EU regions, but uneven income distribution persists in most types of farming and in most geographical areas.
- Direct payments have borne a larger positive effect on farmers' income equity in the regions applying the hybrid and the regional SPS models than in the regions applying the historic SPS model.
- Coupled payments have not been efficient with respect to the objective of reducing farmer's income disparities between income classes.
- Regarding decoupled payments, the results of the modelling at macro-economic and at micro-economic level are not completely similar. While the results of the regressions at macro-economic level allow us to conclude that this type of payments contribute to decreasing farmers' income disparities, the results of the regressions at micro-economic level are less clear-cut.

The table hereunder provides a synthesis of the main results leading to the formulated conclusions.

Analysis	Results
<p>Statistical analysis: the analysis compared at regional level the farmers' income and the GDP per employee and was done considering three situations:</p> <ul style="list-style-type: none"> - situation A: the income of farmers is higher than the benchmark even in the absence of direct payments. - situation B: the income of farmers is higher than the benchmark but only because of direct payments; - situation C: even with direct payments, the income of farmers is lower than the benchmark. <p>For each type of farming and region groups classified according to the SPS model (historic, hybrid, regional and SAPS), the percentage of farms falling into each of the three situations and the percentage amount exceeding the benchmark (in situation A and in situation B) in the total amount of direct payments were computed (2001, 2004, 2007).</p>	<p>In 12% of the farms the income per work unit would reach the regional GDP per employee even without direct payments (2007)</p> <p>82% of the expenditure went to farms whose income per work unit does not reach the regional GDP per employee even with direct payments (2007).</p> <p>However, 11% of the expenditure went to farms that even without direct payments achieve a farm income per work unit equal or above the regional GDP per employee (2007; situation A). The remaining 7% of the expenditure represents the amount exceeding the benchmark for farms that receive more direct payments than they need to reach the regional GDP/employee level (2007; situation B).</p> <p>In 16.4% of the EU27 macro-regions, over 30% of the expenditure is going to farms that without direct payments (situation A) or with direct payments (situation B) achieve a farm per work unit income equal or above the regional GDP per employee. However, in further 36.4 % of regions, the percentage is 10%.</p> <p>In sectors where the share of direct payments in farm income is the highest (field crops, milk, grazing livestock, mixed farming) the differences among types of farming are important, with field crops and grazing livestock at the two extremes:</p> <ul style="list-style-type: none"> - concerning field crops, the % of direct payments that goes to farms with incomes above the benchmark ranges from 13.2% in the group of regions applying the Regional SPS to 31.4% in the SAPS group (2007) - concerning grazing livestock, the % of direct payments that goes to farms with incomes above the benchmark ranges from 3.5% in the group of regions applying the Hybrid SPS to 9.9% in the SAPS group (2007)
<p>The comparison of Gini coefficients calculated for the FNVA/AWU distributions gross and net of direct payments in 2001, 2004 and 2007.</p>	<p>Farmers' income distributions are characterised by high inequity (i.e. real situation with farm income gross of direct payments):</p> <ul style="list-style-type: none"> - No Gini coefficient is lower than 0.30 (2001, 2004 and 2007); - Farm income inequity is higher in the EU12 compared to the EU15 in most sectors (2007): from a minimum of 6.3% difference in milk farms to a maximum of 35.5% difference in permanent crop farms. Only in farms specialised in granivores inequity is slightly higher in the EU15 (+2.2%) compared to EU12; - the highest farm income inequity is found in granivores farms (68.6% in EU15 and 66.4% in EU12) and in farms specialised in permanent crops of the EU12 (82.8%). <p>Direct payments contribute to reducing farmers' income inequity in all considered types of farming, groups of regions and years. They have a stronger effect in reducing income disparities (2007):</p>

Analysis	Results
	<ul style="list-style-type: none"> - in the sectors traditionally benefitting from substantial direct support, in EU15 compared to EU12. Indeed, in mixed farms inequity would rise by 19% in EU15 and by 11.6% in EU12 in the absence of direct payments; in farms specialised in field crops by 13.2% in EU15 and by 11.9% in EU12; in grazing livestock farms by 31.7% in the EU15 and by 17.1% in the EU12; - in the EU12 compared to the EU15, across farms specialised in permanent crops (inequity would rise by 9.5% in EU12 and by 5.2% in EU15 in the absence of direct payments) and granivores (by 14.7% in EU12 and by 8.6% in EU15); - Hybrid and Regional SPS regions compared to SPS Historic regions: in mixed farms direct payments reduce inequity by 15% in Historic SPS regions and by 20% to 30% in Hybrid and Regional SPS regions; in grazing livestock farms by 29% in Historic and by 45-46% in Hybrid SPS regions; in field crop farms by 12% in Historic and by 22% in Hybrid SPS regions with strong regional component; in milk farms by 7% in Historic and by 11% to 19% in Regional and Hybrid SPS regions with strong regional component; in farms specialised in granivores by 5% in Historic and by 18% to 31% in Regional and Hybrid SPS regions with strong regional component (2007).
<p>The econometric analysis: quantile regressions at macro-and micro-economic level</p>	<ul style="list-style-type: none"> ▪ Macro-economic level: decoupled payments have a larger income effect on the lower farmers' income classes and a smaller impact on the higher income classes (the value of the coefficients of decoupled aids decreases as the corrected factor income per agricultural employee increases). On the contrary, coupled payments contribute more to farmers' income in the higher income classes than they do in the lower income classes. ▪ Micro-economic level: coupled payments are generally more effective in supporting the farms with high farmers' income levels than those with low farmers' income levels. The results concerning decoupling payments are less clear-cut, showing a different level of efficiency with respect to the targeting objective depending on type of farming.

EQ 4: To what extent have the direct payments been coherent with other CAP measures: measures under the Single CMO and rural development measures?

The answer to this evaluation question provides the following conclusions regarding the effects of direct payments.

- Direct payments have been coherent with the other measures in relation to the objective of enhancing farmers' income: the three types of support measures complement each other as they substitute each other over time in order to maintain the overall level of support approximately constant.
- Direct payments have been coherent with the measures under the Single CMO as farm income support tools. Concerning the rural development measures, the results of the regression estimates are less clear-cut;
- The three types of policy instruments have been coherent with respect to contributing to more stable incomes of farmers. Coherence between direct payments and CMO support appears to be

higher than between direct payments and rural development measures in most types of farming.

- Direct payments (at EU level considering all regions and all types of farming, for the period 2004-2007) have been coherent with the compensatory allowance given to specific farms in a certain LFA area, because the income of these farmers is lower or equal to the income of farmers not located in LFA areas and to the income of farmers located in LFA areas but not receiving the compensatory allowance. However, the analysis by type of farming and by groups of regions according to the SPS model indicates that there are also cases where farmers receiving both the compensatory allowance and direct payments have an income higher than other farmers (i.e. farmers not located in LFA areas and farmers located in LFA areas but not receiving the compensatory allowance).
- After the reform, in the groups of regions implementing the SPS hybrid model (with a prevalent regional component) and of regions implementing the regional model, the degree of coherence between direct payments and compensatory allowance have increased.

The following table provides a synthesis of the main results leading to the formulated conclusions.

Analysis	Results
Statistical analysis over time (EU15, 2001- 2007) of the farm income levels per labour unit and of the support levels provided by direct payments and the other two policies, per labour unit and by type of farming	<p>In the four types of farming most supported with direct payments (field crops, grazing livestock other than dairy, mixed farming and in part milk farms), until the implementation of the reform (2001-2004), the difference between the level of farmers' income and the total level of support is extremely limited: farm income per labour unit is almost equal to total support per labour unit. In this period, the increase of total support by work unit is related to the increase of all three support components: direct payments, CMO measures and rural development payments (without investments).</p> <p>After the reform, the overall support per work unit slightly decreases (the large decrease of support given through CMO measures is not totally compensated by the increase of direct payments and of rural development support). The average income of farmers (upward trend) appears to be more linked to market results. Thus, the policy development seems to have favoured the market reorientation of farms.</p> <p>In the other three types of farming (horticulture, permanent crops and granivores) the total support is marginal in relation to farm income per work unit and remains almost unchanged over time, in all its components.</p>
The econometric analysis at micro-economic level: the estimated parameters of CMO and of the other non direct payment policies (mainly rural development policy) show/do not show the same sign as the sign of direct payments' parameters	<p>In all considered models the parameters referring to direct payments and to the support provided by CMOs are positive. This indicates that both direct payments and CMO measures play a positive role in enhancing farmers' income, i.e. they are coherent.</p> <p>In the case of the other non direct payment policies in four of the seven types of farming the estimated coefficients are positive, in the other 3 the coefficients are not significant. In the model for the whole 2007 farm sample, the estimated coefficients turn negative. The regression analysis cannot explain the reasons behind the results. However, with due prudence, the hypothesis can be advanced that such result is linked to the very nature of the rural development payments considered: the analysis has considered the annual payments that are often granted to farmers as an incentive to provide public goods, while payments for</p>

Analysis	Results
	investments have not been accounted for.
<p>Statistical analysis of coefficients of variation: share of regions where direct support and CMO support both have positive effect in terms of stabilising farmers' income (comparison of the CV, EU15, 2001- 2007)</p>	<p>Previous analysis has shown that direct payments contribute to increasing farmers' income stability. In four out of six types of farming (excluding horticulture, for which direct payments and the other analysed policies do not have any effects on farmers' income stability) the share of regions where CMO measures and direct payments act in synergy (the difference between the CV is positive) ranges between 82-91%.</p> <p>Only in two types of farming (grazing livestock and permanent crops) the share of regions where the two policy instruments act in synergy is lower (respectively 46.7% and 65.2%).</p> <p>This could lead to conclude that overall, CMO support measures provide an additional positive effect towards reducing farmers' income volatility.</p>
<p>Statistical analysis of coefficients of variation: share of regions where direct support and rural development payments both have positive effect in terms of stabilising farmers' income (comparison of the CV, EU15, 2001- 2007)</p>	<p>In all analysed types of farming, rural development payments provide an additional positive effect on farmers' income stability: the share of regions where the two policy instruments act in agreement ranges between 75-82.8%.</p> <p>In field crops, granivores and mixed farming, rural development payments do not provide additional positive effect on farmers' income stability in approximately 20% of the regions. However, rural development payments would not be expected to greatly contribute to farmers' income stability, as previously discussed.</p>
<p>Statistical analysis of the ratios:</p> <ul style="list-style-type: none"> - FNVA/AWU of farms located in LFAs receiving LFA payments / FNVA/AWU of farms located in LFAs not receiving LFA payments - FNVA/AWU of farms located in LFAs receiving LFA payments / FNVA/AWU of farms not located in LFAs <p>in the actual and in the simulated situation (with and without LFA payments), for the years 2004 and 2007</p>	<p>There is coherence when the income of LFA farmers receiving LFA payments is lower than or at most equal to the income of other farmers (i.e. the income of farmers not located in LFA and farmers located in LFA but not receiving the LFA payments).</p> <p>The values of the two ratios should be < 1, meaning that both LFA payments and direct payments contribute to reduce farmers' income disparities between the farmers analysed. Conversely, if the value of the ratios is > 1, then the two instruments overlap each other.</p> <p>Both in 2004 and in 2007, at EU level (considering all regions and types of farming together) the two ratios are always < 1, both in the actual and in the simulated situation.</p> <p>However, the analysis by type of farming and by groups of regions according to the SPS implementation model indicates that there are also cases where farmers receiving both the compensatory allowance and direct payments have an income higher than other farmers (i.e. farmers not located in LFA areas and farmers located in LFA areas but not receiving the compensatory allowance).</p>

6. RECOMMENDATIONS

On the basis of the evaluation results and the conclusions, the evaluator suggests the following recommendations:

1. The comparative analysis across the seven analysed types of farming shows that some of the lowest farm income levels per labour unit are found in the two sectors benefitting to a very limited extent or not at all from direct support, namely horticulture and permanent crops (except wine). In the EU15 Member States, the average farm income per labour unit of these sectors (post-reform period) is about 22% lower than the EU15 average income in the farm sector overall. Furthermore, these two sectors show the highest risk in terms of farm viability (in 37% and 21% of the regions, respectively for the horticultural and the other permanent crops sectors, average returns on assets are negative).

In the light of these results, and given the positive effect of direct payments on farm income and viability confirmed by the evaluation, the evaluators recommend to extend direct payments to include farms operating in these sectors. It is noted that this possibility was already introduced by Regulation (EC) No 1182/2007 of 26 September 2007 laying down specific rules as regards the fruit and vegetable sector.

2. The analysis has revealed that in many regions the farm income of most farmers does not reach the reference benchmark (regional GDP per employee). This means that direct payments are basically granted to farmers who need them, and, therefore, the efficiency of direct payments in terms of directing income support to group of farmers that need it can be considered as good. However, the analysis has also revealed that there are cases where direct payments are granted to farmers whose farm income is above the benchmark, especially in certain sectors (i.e. in the field crops sector) and in certain regions.

Therefore, it seems reasonable to recommend the identification of adequate assignment criteria and appropriate instruments able to redistribute at least part of the amounts that go to farmers whose income is above the benchmark to farmers who are most in need (i.e. for whom the current level of direct payments does not allow reaching the benchmark), regardless of the sector.

3. It was not possible to evaluate the role played by direct payments in farm household total income, in spite of noticeable interest in this matter. The analysis of the existing literature (studies and statistics) reveals the existence of heterogeneous definitions of agricultural households and, thus, of a variety of measurement criteria and data collection instruments (where they exist). In essence, therefore, the high heterogeneity of definitions and methods makes a combined reading of the existing information impossible. Consequently, it is recommended that a common definition of *farm household* and *farm household total income* be developed and that harmonised statistics be developed with respect to both the official national and EU statistics and the FADN, provided that the policy makers are sufficiently interested in this matter.